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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A STUDY AND COMPARISON OF FOUR PROMINENT CLARINET REED MAKING METHODS

A DOCUMENT

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF MUSICAL ARTS

By

RANDALL STEWART PAUL

Norman, Oklahoma

2001

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A DOCUMENT

APPROVED FOR THE SCHOOL OF MUSIC

BY



Dr. David Etheridge
Major Professor



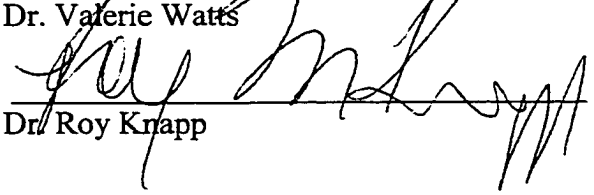
Dr. Eugene Enrico



Dr. Michael Rogers



Dr. Valerie Watts



Dr. Roy Knapp

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I would also like to thank my wife Nora Louis Paul and all my friends for the help and support they have shown during this project. If it were not for their understanding and cooperation during this process, a successful result would have been impossible.

Special credit is due my father, Brayton B. Paul, who created all the illustrations used in this manuscript. He is a forty-year career draftsman and mechanical engineer in the aerospace industry. His experience includes working for the Bendix Corporation, the Martin Company, the McDonnell Aircraft Company, Seamans Electric Company, Central Scientific, and the Lockheed Georgia Company. His career includes work on precision approach radar systems, as well as the XB-51, B-57, F-18, and the C-5A Galaxy aircraft. His mechanical drawings and expertise added much needed clarity and credibility to this document.

Finally, this manuscript is dedicated to my mother, Gertrude Elizabeth Paul, whose wish to have me achieve my educational ambition has finally been realized.

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ABSTRACT

A STUDY AND COMPARISON OF FOUR PROMINENT

CLARINET REED MAKING METHODS

BY: RANDALL STEWART PAUL

MAJOR PROFESSOR: DAVID ETHERIDGE, D.M.A.

The purpose of this study is to document and compare the clarinet reed making methods of four prominent professional clarinetists. This study is intended to give critical insight and needed specificity to a process that often seems mysterious and confusing. The clarinetists that were chosen for this study represent four diverse methods of reed making; therefore, a comparison of these methods will give greater insight into the process.

The individuals chosen, and the reed making method that they represent are: Stanley Hasty, former Principal Clarinet of the Rochester Philharmonic and Professor Emeritus of the Eastman School of Music, uses a hand made method that he developed and taught at Eastman; Christopher Sereque, Principal Clarinet of the Seattle Symphony, uses the reed making machine the REEDUAL; Daniel Gilbert, Second Clarinet of the Cleveland Symphony and Professor of Clarinet at Oberlin Conservatory, uses the reed making machine the BKM 4; and Robert DiLutis, Second Clarinet of the Rochester Philharmonic, uses a reed making machine that he invented called "The Reed Machine."

The first chapter details the need for the study and the interview method used. The second chapter reviews important background research in the form of published books and articles. The next four chapters detail the reed making methods of the interviewees. The seventh chapter summarizes these four methods and the last chapter details the reed making method of the author. There is a bibliography, and an appendix that lists retailers for equipment and supplies.

A STUDY AND COMPARISON OF FOUR PROMINENT CLARINET REED MAKING METHODS

CHAPTER I

INTRODUCTION

Background

Of the physical features that are specific to the clarinet, the reed is by far the most variable.[1] Each reed has a set of characteristics that are unique and may or may not suit the performer's needs. In addition, each individual reed undergoes changes depending on a variety of factors including humidity, age, and even altitude.[2] Given the nature of these reeds and their innate inconsistencies, the clarinetist that desires more predictable performance results inevitably turns to a serious study of the clarinet reed. As one would expect, a plethora of books and articles are devoted to reed making and adjustment.

As one surveys the literature on reed making and adjustment, the rationale for this interest falls into several important categories. These reasons essentially answer the question: Why do clarinetists want to make and adjust their reeds? The first reason is that of consistency. As a performer, one is obviously interested in doing the best job possible each time they are in front of listeners. Having a reed, which is the main factor in the tone generating mechanism of a clarinet, that is constantly changing with regard to tone quality, resistance, and response would be very

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[1] Donald Jay Casadonte, *The Clarinet Reed: an introduction to its biology, chemistry, and physics* (D.M.A. diss., The Ohio State University, 1995. Ann Arbor, Michigan, University Microfilms, 1995), 5.

[2] Charles Stier, *Clarinet Reeds: Definitive instruction in an elusive art* (Silver Spring, MD, by the author, 1991), 16.

unnerving. This would be analogous to a flute player or brass player whose instrument mouthpiece was constantly changing in performance. It is no surprise then; this reason is one of the first ones mentioned in most of the books and articles written on this subject.

Another important factor is the notion of customization. Since no two players are alike, and musical tastes change with regard to tone quality, music performed, acoustic performance environments, and instruments and mouthpieces used; there is a genuine need for an element of personal customization. This aspect usually translates into a greater feeling of comfort and security for the performer.

Finally, there is the factor of greater selectivity with regard to the basic cane product. The books and articles on reed making are especially concerned about this feature. It is logical to assume that greater control of the source of material will lead to a higher level of performance in the final product.

Although numerous attempts have been made to manufacture a clarinet reed of more stable man-made materials, most performers have opted to continue using natural cane and exploring ways to control it. One way of controlling the variability of natural cane is for the performer to learn to make their own reeds. Professional double reed players have never adopted the commercially available reeds made for their instruments. They choose instead to make the reeds themselves aided by a variety of machines and tools that allow them more individuality of design, as well as control over the final product. The majority of single reed players, on the other hand,

have relied primarily on commercially available reeds since the early part of the twentieth century.[3]

Since about 1950, however, there seems to be increasing interest among clarinetists to make their own reeds. Early publications by Kalman Opperman and Jack Spratt in the 1950s were followed by the teachings of Stanley Hasty and others. Shelley Hanson (1978), Glenn Bowen (1980), David Pino (1980), Phillip Rehfeldt (1983), and Ronald Vazquez (1993) are just a few of the authors who have made major contributions to the reed making literature.[4] This trend has continued to pick up momentum until the present day. Now, one can identify many prominent professional clarinetists who like to perform on reeds they have made themselves. In addition, almost every clarinet conference or symposium features a lecture or demonstration on clarinet reed making.

To accommodate this renewed interest in reed making, the field of clarinet performance has seen the addition of several new machines and other related equipment appear on the commercial market. These machines, although quite varied in design, are similar in that they aid the reed maker in obtaining consistent results and attempt to speed up the process. Some examples are as follows:

(1) The REEDUAL now available again since its original appearance in the 1970s;

(2) The Laker/RDG machine produced in the mid 1980s and is still available;

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[3] Ronald V. Vazquez, *A Book for the Clarinet Reed-Maker* (Annapolis, MD: R.V. Publishing, 1993), preface.

[4] Shelley J. Hanson, *A Systematic Approach to the Making and Adjusting of Single Reeds* (Ph.D. diss., Michigan State University, 1978. Ann Arbor: University Microfilms, 1978); Glenn H. Bowen, *Making and Adjusting Clarinet Reeds* (Handcock: Sounds of Woodwinds, 1980); David Pino, *The Clarinet and Clarinet Playing* (New York: Charles Scribner's Sons, 1983; reprint, Mineola: Dover Publications, Inc., 1998); Phillip Rehfeldt, *Making and Adjusting Single Reeds* (Redlands: by the author, 1983).

(3) The new DiLutis "The Reed Machine" available since the early 1990s; and (4) A German manufactured machine similar in design to the REEDUAL, made by Wilfried Schmidt, called the Blattkopierschlefmaschine BKM 4, (Reed-copying machine BKM 4).

Purpose of the Study

The purpose of this study is to document and compare the methods of four prominent clarinet reed makers; Stanley Hasty,[5] Christopher Sereque,[6] Daniel Gilbert,[7] and Robert DiLutis.[8] These individuals were chosen based on their reputations as fine performers, as well as being influential persons in the field of reed making. These individuals represent a great deal of diversity in their methods and techniques. Stanley Hasty represents the method of making reeds with simple tools like a reed knife and sandpaper. So he could be called a hand made reed maker. Christopher Sereque represents a school of reed making that involves the REEDUAL machine and he has invented a method called a "multiple model method." Daniel Gilbert also uses a machine that is similar to the REEDUAL called the BKM 4. This machine is made in Germany and is very sophisticated. Although the BKM 4 is more common in Europe than the U.S., it is gaining popularity. Robert DiLutis has

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[5] Stanley Hasty, *A Personal Interview on Clarinet Reed Making*, interview by author, tape recording, Rochester, NY, 9 July 1997.

[6] Christopher Sereque, *A Personal Interview on Clarinet Reed Making*, interview by author, tape recording, Seattle, WA, 22 April 2000.

[7] Daniel Gilbert, *A Personal Interview on Clarinet Reed Making*, interview by author, tape recording, Cleveland, OH, 1 August 2000.

[8] Robert DiLutis, *A Personal Interview on Clarinet Reed Making*, interview by author, tape recording, Rochester, NY, 30 August 2000.

invented his own machine and a line of reed making accessories called "The Reed Machine." Since each of these experts approach the problem of reed making from a different perspective, this document shows great diversity, and the ideas that are shared among the interviewees have greater significance. This document should be helpful to clarinetists interested in making reeds, since this information is largely unpublished and will now be located in a single source.

Limitations

This section describes the scope, terminology, and measuring system used in this study.

This study is limited to the methods of these four individuals. Since there are over a hundred published articles on clarinet reed adjustment alone, no attempt to survey materials for other instruments was made, unless there was a need to include this information. This study integrates some published material by prominent authors like those mentioned in the bibliography. However, it is not to be a comparison of this information because its purpose is to document and illuminate diverse and unpublished methods.

This study presumes that the reader is reasonably familiar with concepts and vocabulary used by musicians and clarinetists. There is no attempt to define terms that are commonly used at professional conferences or that can be found in other sources like those listed in the bibliography.

For the purpose of this document, however, there needs to be an explanation of the term "hand made." The literature available on clarinet reed making sometimes

uses this term to designate reeds made by the performer, as opposed to a commercially available product. In this paper, the term "hand made" is used to designate a reed made from simple tools like a knife and sandpaper. In contrast, the term "machine made" refers to a process involving a machine like the REEDUAL. In order to designate a reed made by the performer, this paper uses the term "self-made" or "home made."

Measurements

Another important concept that needs clarification is that of reed measurements. As of yet, there is no agreement on the appropriate method for measuring a reed. As one surveys the literature it becomes evident that this can be a major source of confusion among clarinetists. It seems that some reed measurements are usually given in the metric system and other measurements are usually given in standard (inches) measurement. For the purpose of this study, measurements are given in metric units first, with the standard measurement given in parentheses. This lack of standardization will not be a problem until one discusses the topic of reed vamp measurement.

The most commonly used dial indicator sold for the specific use of reed vamp measurement is the "PerfectaReed" gauge manufactured and sold by Ben Armato. This measurement device, either in its original form or the currently produced "Phase II" version, is widely used by clarinetists and is easily obtainable. Although this is a fine quality instrument, the measurement system it uses can lead to confusion.

This gauge uses a metric dial indicator that divides a millimeter into fifty segments. For instance, if a reed measurement shows 0.27 on the dial indicator, this number has to be multiplied by 2 in order to be related to millimeters. If one needs to relate this information to inches, or standard measurement, this number has to be again multiplied by the metric conversion factor of 0.03937.

The following is an example:

0.27 (PerfectaReed) X 2 = 0.54 (mm)

0.54 (mm) X .03937 (metric conversion factor) = 0.021 (in.)

To translate inches to millimeters, simply divide the measurement by .03937.

0.12 (in.) ÷ 0.039 (metric conversion factor) = 3.07 (mm.)

Understanding the measurements used by reed makers is crucial when reading articles or attempting to copy reed dimensions from another person. However, being able to convert these readings is not important when the reed maker is just using the measurements for themselves.

For the purpose of this paper, all vamp profile measurements are given in the "PerfectaReed" system. In order to avoid confusion, the letters (PR) will follow the numeric dimensions to indicate this measuring system.

Need for the Study

Although several books and articles have been published on reed making and adjustment, the specific information needed for someone embarking on this process is lacking and confusing. As one surveys the repertoire, he quickly realizes that many sources contradict each other or are vague in certain areas. This leaves the reed

maker confused about key issues. The following excerpt from Vazquez[9] will illustrate this point:

> "Curing the cane is one of the most important steps in the whole reed-making process. Properly curing blanks increases the stability of the resulting reeds and reduces their tendency to warp. Here is how to cure your blanks. Soak as many pieces as you have ready. This will expand the fibers of each piece and start the curing process. After soaking the cane let it dry for a few hours, and then soak again. Soak your cane a total of three times a day for as long as seven days, or once a day for ten days."

If one soaks the cane three times a day for seven days, the result will be 21 soak/dry cycles. If one soaks the cane once a day for ten days, the result will be 10 cycles. This passage seems to indicate that any amount of soaking from 10 to 21 cycles will be acceptable. However, other authors like Pino[10] indicate anything less than 20 cycles will be ineffective in cane preparation.

> "Believe it or not, you should alternate these periodic wettings and dryings for a total of about twenty times! You can wet the blanks four times a day for five days, or five times a day for four days, or perhaps three times a day for a week. In any case it is important to wet the blanks about twenty times; anything less than that does not seem to do the job. What job? Well, the more the chemicals in your saliva are given a chance to act upon the fibers of the blank *before* it is made into a reed, the less those chemicals will break down the fibers *after* you have completed the reed. Furthermore, the less the fiber breakdown while one is playing on the reed, the less the reed's behavior will change over a period of time. This means that your future reed will be more reliable, day after day-one of the chief advantages of making your own reeds."

These passages bring some other questions to mind:

1) Would it be better or worse to allow more time between the wet/dry cycles?

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[9] Ronald Vazquez, *A Book for the Clarinet Reed-Maker*, 20.

[10] David Pino, *The Clarinet and Clarinet Playing*, 169.

2) Would there be any benefit to soaking the blank more than twenty times?

Another possible source of confusion is the term "soak". The Vazquez excerpt above does not specify what substance is used to moisten the cane. Other sources like Opperman[11] and Pino[12] specifically instruct the reader to use saliva for this process. Could there be a reason for this discrepancy, or does it really matter? These are examples of questions that this study hopes to clarify.

Design and Procedures

This document will consist of eight chapters; an introduction, a summary and review of related literature, a chapter for each person interviewed a summary chapter, and an epilogue. The epilogue is a chapter that outlines the reed making method of the author and can be used as a guide for the novice reed maker. There will also be a bibliography and an appendix. After the introduction and summary of related literature, the body of the document will follow. Each person interviewed will be audio/video taped to be sure that an accurate record is kept and that the author will remain unbiased in the documentation. Since the interviewees have not had their method documented and published in print before this study, it is important that the information be as accurate as possible. Each interviewee will also be given a draft copy of his chapter and will have the opportunity to add or change information to insure that his section is accurate. The author will hold the original taped interviews in a secure location. In order to protect the interviewees, the author has agreed not to

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[11] Kalmen Opperman, *Handbook for Making and Adjusting Single Reeds* (New York, N.Y.: Chappell Music Company, 1956), 15.

[12] Pino, *The Clarinet*, 168.

sell or market the videotapes. They are to be used as documentation only and are to be destroyed at the conclusion of this project.

The body of the document will focus on the reed making procedure for each person interviewed. The author will sort through the interview material, as one would with printed sources, and extract the information that is most important for the study. The information may also be re-ordered so that the reader can easily grasp the material. This process will aid the reader by providing a continuity of information without destroying the integrity of each interviewee's individual reed making style. The intent of this study is to document, illuminate, clarify, and disseminate this information. It is not to make value judgments about equipment, individuals, or methods. Likewise, this document is not intended to be an endorsement of individuals, equipment, or procedures.

The questions asked in the interviews will focus on obtaining the most critical parts of information related to reed making. These topics are the same ones used by many of the sources outlined in the bibliography. These key areas of investigation form an outline to the reed making process and proceed in the order used by most reed makers. This organizational method will give this study a logical order to each method discussed and will also aid the reader in comparing one method to another. These topics are as follows:

1) Biography and General Impressions

2) Tube Cane Selection

3) Cane Aging and Storage

4) Cane Splitting

5) Rough Blank to Finished Blank

6) Making the Blank Flat

7) Rough Cutting the Vamp

8) Finishing the Vamp

9) Final Finishing

10) Special Tricks

The summary chapter is a synthesis of the information gleaned from the four interviewed individuals and will follow the same format. This chapter shows what aspects of reed making the four individuals have in common and in what aspects they disagree.

The final chapter is a detailed description of the reed making method of the author. This chapter will also serve as a guide to the novice reed maker and includes several ideas that seem to help students obtain results quickly and stay motivated about the process. These ideas have enabled students at Wright State University to successfully make their own high quality reeds. The hope is that this chapter contains a concise description of the clarinet reed making process. It will be general enough to act as a guide, but specific enough that the novice will be able to make playable reeds quickly and easily without extensively surveying the repertoire.

CHAPTER II

SUMMARY AND REVIEW OF RELATED LITERATURE

Although there are over sixty-five books and over one hundred articles written on the subject of single reeds, most deal with the problems and procedures of adjusting commercially available reeds. These sources will be included in the bibliography, but only those books and articles related specifically to this study will be included and summarized here. The rationale for this is that the two procedures, although related, are actually quite different. The commercially available reed product presents the performer with a set of given and relatively unalterable conditions. The commercially available clarinet reed is, for the most part, a finished product. The manufacturer's intent is to produce a product of high quality at the lowest cost, to serve the needs of as many people as possible, and to make a profit. The manufacturer has already made cane selection, decided on a set profile and dimensions and even graded the reeds for strength. Therefore, any discussion of reed adjustment is already limited to these factors. The literature on this topic discusses such things as subtle balancing, reed flattening, choosing reeds, changing a reed's strength, preserving a reed, and breaking-in the reed.

In contrast, the publications that deal with reed making begin with the cane in the "tube" state. Almost all of these sources discuss cane maturation, selection, seasoning, dimensions of the reed in every possible parameter, cane preparation, and reed preservation. Although there will be some overlap of topics like reed balancing and the break-in procedure, these procedures are approached differently, because the

cane may have been prepared first by soaking and drying, or matured or seasoned while in the tube or blank state.

This review of the literature will proceed in the following manner. The first items to be discussed will be the books written on reed making, followed by articles written on reed making. These will be discussed in order of publication to give the reader a sense of the progression of literature on the subject. It should be noted that many of the books written on this subject are little more than pamphlets or self published works. These works are intended to be used by a small percentage of individuals interested only in learning about a process that until recently has been regarded as obscure. Several of these publications are not scholarly as such, although they include valuable bibliographies and important information. There is almost no motivation for these individuals to publish this material because the market for this topic has been so small. Most publish for the sole purpose of adding to the available information on the subject. Thus the reader must resist the temptation to criticize the author's writing style or sometimes haphazard approach to the topic.

Many other books and articles mentioned in the bibliography will not be discussed here. They are books and articles related to, but not specific to, the topic of reed making. These items are regarded as crucial to the subject and part of the standard repertoire of knowledge, but do not necessarily deal with the reed making process. These publications may be quite valid because they deal with measurements, tools, acoustics, historical considerations and the like, and should be considered worthy of investigation. But they serve more as a foundation of peripheral knowledge reinforcing techniques or procedures already documented elsewhere.

Books and Articles on Reed Making

In 1956, two important publications were distributed; *How to Make Your Own Clarinet Reeds* by Jack Spratt, [13] published by Jack Spratt Woodwind Shop, and *Making and Adjusting Single Reeds for all Clarinets and Saxophones* by Kalmen Opperman, [14] published by Chappell Music Company. Although the Jack Spratt publication is only twenty-four pages long, it contains some useful information. The author gives a simple overview of the reed making process and articulates the philosophy of clarinet reed making and adjusting from the early part of the century. The first two chapters deal with this philosophy and some generalities regarding cane-growing regions around the world. Chapters 3 and 4 deal with reed adjustment and reed finishing. Chapter 5 details how to make a reed by hand from tube cane and illustrates this procedure with numerous drawings and reproduced photographs of machines in use at the time of publication. The last chapter discusses the history and validity of using plastic or synthetic reeds. This is an interesting chapter especially today, since the arrival of the Legère synthetic reed. This new synthetic reed first became available to clarinetists in 1998, at the Ohio Clarfest, and it remains to be seen how successful it will become.

The Opperman publication is much more specific with regard to the reed making process. This publication, almost twice as lengthy, discusses the process; tools used give measurements, and have numerous detailed illustrations to clarify the points made in the text. In his appendix, Opperman gives his readers some sources to

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[13] Jack Spratt, *How to Make Your Own Clarinet Reeds* (Old Greenwich: Jack Spratt Woodwind Shop, 1956).

[14] Opperman, *Handbook.*

purchase tools and supplies, but the reader should notice the bibliography in the Spratt publication. He quotes authors as far back as 1925.

Certainly, one of the most often quoted and helpful discussions of reed making come from the 1965 publication *The Art of Clarinetistry* by William H. Stubbins. [15] In Chapter 6, entitled "The Craft of Reed-making," Dr. Stubbins articulates a straightforward method of making reeds by hand. This chapter is 37 pages long and contains numerous helpful photographs, illustrations, measurements and instruction. This publication is so well known that numerous reed makers today describe their particular style as "traditional" or "non-traditional" as it relates to this method. In keeping with this general trend, this paper will also use this terminology. It seems that of all the sources available to clarinetists, the scope of this chapter combined with its early publication date make this resource an invaluable part of any serious reed maker's library.

A Positive Approach to Clarinet Reeds is a Master of Music Essay written at the Eastman School of Music by Michael Webster[16] in 1967. This non-published handbook contains a very good chapter on making reeds by hand. This chapter is essentially a synthesis of the techniques of Michael Webster and Stanley Hasty. Of greatest interest to clarinet reed makers are the excellent diagrams and explanations on checking reed contour using a back lighting procedure.

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[15] William H. Stebbins, *The Art of Clarinetistry* (Evanston: Summy-Birchard Co., 1965), 99-138.

[16] Michael Webster, *A Positive Approach to Clarinet Reeds* (Rochester: by the author, 1967).

A Systematic Approach to the Making and Adjusting of Single Reeds is a Doctoral Dissertation completed in 1978 by Shelley Hanson[17] from Michigan State University. This substantial work of over 100 pages and 71 illustrations details a basic clarinet reed making philosophy. This work has three large chapters which deal with curing, profiling, and correcting a reed blank (Chapter1); the principles of reed adjustment (Chapter 2); and specific refinements to a reed to alter sound production and the break-in process (Chapter 3). There are five appendices; these include knife technique, sizing and shaping a reed blank, adjusting commercial reeds, sources of reed making supplies, and sample reed measurements.

Glenn Bowen's handbook entitled *Making and Adjusting Clarinet Reeds* was published by Sounds of Woodwinds, Inc., in 1980.[18] Dr. Bowen taught clarinet at the University of Wisconsin-Madison and is a student of Stanley Hasty. This 37-page manual, intended to help clarinetists learn the clarinet reed making technique, is divided into three chapters. The first chapter discusses equipment; the second chapter details the procedure; and the third chapter is concerned with testing and adjustment. In the appendix, Dr. Bowen gives a list of retailers who sell the materials used in this process.

David Pino included a chapter on reed making in his book, *The Clarinet and Clarinet Playing*[19], also published in 1980 by Schribner's Sons. Chapter 11, entitled "Reeds," can be subdivided into three larger sections dealing first with philosophy,

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[17] Hanson, *A Systematic Approach.*

[18] Glenn Bowen, *Making and Adjusting Clarinet Reeds* (Madison: by the author, 1980).

[19] Pino, *The Clarinet*, 153-178.

then procedure and preservation. Although this chapter is relatively short, Dr. Pino's clear writing style and specific instructions are a great introduction to this process.

Otto Kronthaler's *Das Klarinetten Blatt, Eine Bauanleitung*[20], published in 1988, can most easily be described as an updated and German version of the Opperman handbook. Because this publication is in German, and somewhat difficult to obtain, it will be described in greater detail than the other publications. In the first sections, Kronthaler discusses the reed in general. He describes the relationship between the reed and high quality clarinet tone, discusses where the cane comes from, names the parts of a clarinet reed, describes the cane structure and proper cane maturation and its relationship to cane density. In the next section, he discusses some common tools used like a reed knife, scraper, reed tip clipper, planer, and a special type of reed plaque. This reed plaque tool is somewhat different than the ones commonly used by American clarinetists and in English publications. Instead of a simple piece of glass cut slightly longer and wider than a clarinet reed, this tool is made of wood. It is also much longer and has a raised front edge that allows one to scrape the reed toward the body safely. Several European sources show this method of scraping the vamp of the reed toward rather than away from the body. Having this tool allows the user to rest the apparatus against the body for stability and scrape toward oneself without fear of being cut with the sharp reed knife.

In the next sections, Kronthaler describes the reed making process and illustrates his ideas with simple drawings and photographs. This publication shows

[20] Otto Kronthaler, *The Clarinet Reed: An Introduction to its Making* (Celle: Moeck, 1988).

nothing new. Much of the same information can be found in the Opperman handbook. However, Kronthaler's description of cutting, finishing, balancing and testing the reed are well described. The second half of this publication is more interesting, for Kronthaler describes some reed making equipment currently used and available. He describes the REEDUAL and the BKM 1 (BKM 4 in the 1993 edition) machine which both use an electric motor with sandpaper as an abrasive. He also describes a few other machines that are manually operated and use fixed blades, as well as some other interesting equipment that could make the reed making process easier or faster. Kronthaler includes a bibliography with sources that date back to 1903, as well as several important English sources. However, it is interesting to note that he does not include the Opperman handbook, which is so often quoted by others.

In 1993, Phillip Rehfeldt published *Making and Adjusting Single Reeds.*[21] This source, published by the author and the University of Redlands, breaks this topic into eight sections. Chapter 3 ("Breaking-in"), Chapter 4 ("Ideas and Suggestions"), and Chapter 5 ("Cutting Reeds from Tubes") are the most useful. Dr. Rehfeldt also includes sources for cane supplies and equipment, as well as a bibliography. The author does not believe that reed making can be broken down into a set of instructions, so most of the publication is ninety-four "ideas and suggestions" which are intended to help the reader make and adjust single reeds.

The most recent publication and the most useful for this dissertation, is *A Book for the Clarinet Reed-Maker: An Illustrated Single Reed-Making Method* by

[21] Rehfeldt, *Making and Adjusting Single Reeds.*

Ronald Vazquez[22] published in 1993 by the author. This work is significant for several reasons. Not only does this author articulate a specific set of instructions and procedures, but he is also the first to describe in detail the reed making process using the aid of a machine (REEDUAL). There are thirteen chapters in this 100-page manual with ample photographs, bibliography, and information of supplies and specific reed dimensions. The author even includes a large chart for reed adjustment and discusses German and Viennese style reeds.

Articles on Reed Making

The first article that speaks to the topic of reed making appears in 1948 by W. R. Tenny. [23] In his article "On Making Clarinet Reeds," Tenny gives a simple description of the hand made reed process as it existed in the beginning of the century. It is interesting to note that many of these early articles talk about the influence of World War II on the cane producing regions of France and the negative impact it had on cane production.

In 1952 and 1953, Jack Spratt released four publications in *Crescendo Magazine*.[24] This series of articles was later published in 1956 as his famous book, *How to Make Your Own Reeds*. There is no different information contained in the book. However, it may be easier for the reader to find this publication in article form, rather than the book form, or vice-versa.

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[22] Vazquez, *Clarinet Reed Maker*.

[23] W. R. Tenny, "On Making Clarinet Reeds," *Symphony* (November 1948): 7.

[24] Jack Spratt, "How to Make Your Own Clarinet Reeds," *Crescendo Magazine*, 2 (Sept-Oct 1952): 15; (Nov-Dec 1952): 8-9; (Jan-Mar 1953): 12-13; (Apr-Jun 1953): 16-17.

Kalman Opperman's 1956 publication "Why I Make My Own Reeds"[25] is a very eloquent and succinct rationale for custom reed making. In just a few paragraphs, Mr. Opperman presents an intriguing and motivating argument for the serious single reed player to make his/her own reeds by hand.

Almost twenty years later, in 1974, Raymond Willard wrote the article "Hand Made Reeds-Why Not?"[26] This short article is essentially an argument for making reeds by hand. The two main points that he makes are that it is not as time consuming or as expensive as one would think.

In 1976, Roger Salander published a series of three articles in *The Clarinet* that outline some basic reed making and adjusting principles.[27] These articles are very easy to read and contain much useful information. Mr. Salander makes his reeds without the aid of any machinery. He is an example of a professional performer who not only makes his reeds by hand but also tries to do so without a lot of measuring or elaborate processes. These articles are excellent for someone who is a novice reed maker, for they serve to inform as well as motivate the reader.

The 1983 articles by Fritz Waldstadter[28] are published in German and are a two-part series. The first article deals with the historical origins of the reed, while the second article contains a guide for reed making. This second article is very similar in

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[25] Kalman Opperman, "Why I Make My Own Reeds," *The Clarinet* 23 (summer 1956): 28-30.

[26] R. D. Willard, "Hand Made Reeds-Why Not?" *Woodwind World* 13, no. 2 (1974): 28-29.

[27] Roger Salander, "The Agony and the Ecstasy; The Later Stages in Reed Making," *The Clarinet* 3, no. 2 (1976): 8-10.

[28] Fritz Waldstadter, "The Clarinet Reed. The Historical Origins and Function of the Clarinet Reed, Together with a Guide to Reed making," *Oesterreichische Blasmusik* 31, January-March 1983): 1-3; 3-5.

approach and scope to the articles discussed earlier by Spratt and Opperman. Although the information in these articles is useful, they give an overview to the reed making process and a rationale for doing so.

The James Heffernan article "The Successful Use of the REEDUAL"[29] published in 1984, is the first to articulate the reed making process from the standpoint of using a machine as an aid. This article, which is broken down into six smaller sections, contains many useful photographs and an easy-to-follow progression of steps. It covers such topics as machine calibration, attaching the abrasive, cane preparation, choice of model reeds, typical pitfalls, break-in process, and reed adjustment.

The most recent series of articles on clarinet reed making are by Lee Livengood, which were published in 1992.[30] This is a series of three articles entitled "A Study of Clarinet Reed Making." In Part I of this series entitled "A Case for Clarinet Reed Making," Livengood takes a serious look at why clarinetists choose to make their own reeds. In this article, the author answers two important questions: what is the difference between commercial and home made reeds; and what are the advantages? In Part I, he discusses cane selection, the curing process, the ability to maximize the potential of each piece of cane, the time involved in learning and completing the process, and how much money it will cost. In Part II, "A Method for Making Reed Blanks from Tube Cane," Livengood explains an easier way to

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[29] James Heffernan, "The Successful Use of the REEDUAL," *The Clarinet* 2, no. 4 (1984): 40-43.

[30] Lee Livengood, "A Case for Clarinet Reed Making (Part I)," *The Clarinet* 19, no. 3 (1992): 40-41; "A Study of Clarinet Reed Making (Part II)," *The Clarinet* 19, no. 4 (1992): 46-49; "A Study of Clarinet Reed making (Part III)," *The Clarinet* 20, no. 1 (1992): 26-29.

accomplish this typically difficult task. He points out that since the early publications of Opperman and others, some new devices have appeared on the market which greatly reduce the time, energy, and toil of this important process. The reader should note that although these devices are still available on the market today, several new tools have appeared since 1992. Part III, "Selected Bibliography," is an annotated and selective bibliography. The author states, "Its purpose is to give an overview of the most significant sources on reeds and to guide clarinetists to the best sources for the study of reed making." Although this bibliography is limited in scope by design, it represents a significant source of information to the clarinetist and these articles are a "must have" for any clarinetist interested in this process.

CHAPTER III

THE REED MAKING METHOD OF STANLEY HASTY

Biography and General Impressions

Stanley Hasty's musical background includes study with several prominent clarinet teachers and positions in a number of the leading symphony orchestras of the United States. He cites Rufus Arey, a former teacher of clarinet at the Eastman School of Music of the University of Rochester, and Ralph McLane, a former clarinetist with the Philadelphia Orchestra, as the two teachers who have most influenced his playing. During his career as a professional clarinetist, Hasty has been Principal Clarinetist and soloist with the Rochester Philharmonic Orchestra, the Pittsburgh Symphony Orchestra, the Baltimore Symphony Orchestra, the Cleveland Orchestra, the Indianapolis Symphony Orchestra, and the National Symphony Orchestra[31]. Mr. Hasty has given numerous master classes and has appeared as a recitalist, lecturer, clinician, and adjudicator throughout the United States and Canada. He holds degrees from the Eastman School of Music and the Juilliard Graduate School. Mr. Hasty has been a professor at the Eastman School of Music, the Cleveland Institute of Music, the Juilliard School, the Peabody Conservatory, and Indiana University.[32]

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[31] David Etheridge, *Mozart's Clarinet Concerto, The Clarinetist's View* (Gretna: Pelican Publishing Co., 1983), 29.

[32] Etheridge, ed., *ClarinetFest 2000 Program* (Norman: The University of Oklahoma, 2000), 75.

In terms of reed making, Hasty began altering commercially available reeds early in his career. This reed altering and adjustment process developed from simple adjustments, like reed balancing and warp removal, into a more elaborate process that involved using the commercial reed as a blank and then completely reshaping the vamp to a different profile altogether. He found that these altered reeds were such a significant improvement over the commercial product that he eventually turned to making his reeds completely by hand from tube cane. He found that by making his reeds from tubes he could "cure" the cane before the reed was made and this resulted in a finished reed that would not only be of a higher quality but also last much longer. Stanley Hasty is an example of a reed maker who learned his craft by hand using simple tools like a reed knife and sandpaper, similar to the way many double reed players make their reeds. This is his favorite way of making reeds and he continues to use this method primarily today. Mr. Hasty is familiar with many of the reed machines now available and even owns a REEDUAL. However, he feels most comfortable with his hand made process. Throughout his teaching career, especially while he was at the Eastman School, he trained many students in this craft and many of them have gone on to become enthusiastic supporters of hand made reeds.

Some general impressions of Hasty's method can best be described as one relying on the senses of touch and sight. Mr. Hasty does not rely on complicated measurements of reed profile or strive for precise measurements in terms of reed thickness. He, like other reed makers and some scientific literature suggests,[33] believes that the individual pieces of cane vary so much in their flexing qualities, that

[33] William Cannell Willett, *An Investigation of Clarinet Reed Contour and its Relation to Tone Quality*, Rochester, NY: Microprint Service, Eastman School of Music, 1976.

measurements can only be used as a basic guide. He does achieve consistency in reed length and taper by using a reed shaper, and this shape resembles an Oliveri reed shape. It is important to understand that his method is based on many years of experience making reeds by hand and much trial and error. Over the years he developed a keen sense of touch as he strives to bring out the individual potential of each piece of cane. Measurements and machines are less important to him since he has refined his skill to the point that he can look at, touch, and flex the reed to discover where improvements can be made or where problems exist.

The Hasty Process

Tube Cane Selection

Mr. Hasty looks for tubes that are straight, have a golden brown color, straight grain, and have thick walls. Because he likes to make his blanks thicker than commercial reeds, he prefers the thick walls. He also wants to be sure that the finished reed has a great deal of consistency in terms of flex and balance. He believes, as others do[34], that the thick walled tubes allow him to make a reed from cane material that is of a more consistent hardness.[35] The following diagram will illuminate this point. Notice how the thinner walled tube puts the edges of the finished reed very close to the bark of the tube. The reed material that is close to the bark of the tube has a consistency that is considerably more dense than material that is closer to the center of the tube. Ideally, one wants to make a reed from the material

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[34] Fred Ormand, *The Single Reed Manual, a Practical Guide for Reed Adjustment* (Ann Arbor: The University of Michigan, 1977), 24.

[35] Opperman, *Handbook*, 6.

that is neither too close to the bark, nor too close to the center of the tube. This middle region of cane material is more consistent in density and will give the reed maker a better final product.

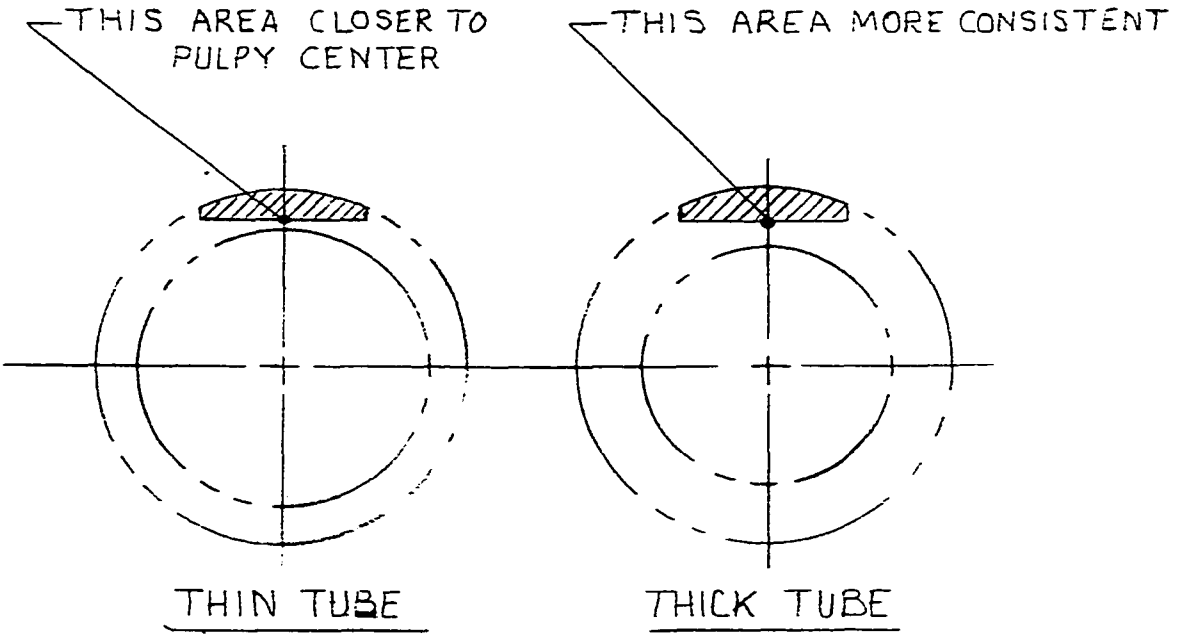


Figure 1

Tube Cane Detail

If one selects a tube that has thicker walls, then there is more of this middle ground region from which to make a reed. An added benefit is that there is more margin of error for the reed maker and one may be able to make a higher percentage of fine playing finished reeds. For this reason, the novice reed maker may wish to select tubes of this type until a certain level of reed making skill is learned.

Cane Aging and Storage

Mr. Hasty does not consciously age his cane. However, since he orders cane well in advance of his needs, he may not use it for several years. When asked about this aspect, he agreed that letting the tubes age like this may improve the cane slightly, but he has not noticed a difference. Mr. Hasty stores his tubes in large wooden drawers built into his workbench which is located in the basement of his home. The tubes are not in plastic containers or bags, just left loose in the drawers. This author noticed that the cane is of golden color, there is no hint of cane immaturity like a green cast and there is no evidence of excess moisture. Although Mr. Hasty uses his basement as a workshop, he does not seem to take any special precautions like dehumidification.

Cane Splitting

Cane is split into four equal sections using a knife. Mr. Hasty likes to saw the tubes into lengths, equal to the length of the blank, before the cane is split. In this way, the rough blank is made as soon as the cane has been split. There are several advantages to this method. By sawing the tubes into equal lengths before splitting, cane of inferior quality may be discarded quickly thus reducing the need for storage. Also by sawing the tubes to length first, there is less chance of tearing the fibers of the cane with the saw. If the tubes are cut to length first, then the tube may be clamped in a vice for sawing and some people find the tube easier to handle this way. This is probably not a big issue, but an observation which may warrant further investigation.

Rough Blank to Finished Blank

At this point, the tube has been cut to length and split. The concave surface inside the tube is still present, and this pulpy material must be removed and made flat. Reed makers have a variety of methods they use to accomplish this process. The objective is to make this split piece of cane flat on the side that was formerly the inside of the tube. When this is accomplished, the piece of cane is called a semi-finished rough blank.

To turn the rough blank into a semi-flat blank, Mr. Hasty uses a simple planing device, which incorporates a wood planer. His particular planing unit is not commercially available, but is similar to others now on the market.[36] The rough blank is held in place upside down. Then he uses a standard wood working planer to slice the rough blank down to the appropriate thickness and give it a flat side.

A unique idea to Hasty is that he prefers to make the flat blank slightly thinner at the butt end than at the tip end. He believes that this enhances the performance properties of the finished reed. He does this by raising the butt end of the blank as its held in place by the planer guide, so that the planer removes more material from the butt end and less material from the tip end. This difference is very slight and should not be exaggerated. See the diagram that follows for some specific dimensions and detail.

This blank can be called "finished" once it has been given a specific taper. Clarinet reeds should be slightly wider at the tip end and narrower at the butt end. In order to shape the blank, Mr. Hasty uses a steel shaper that allows him to cut the

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[36] Vazquez, *A Book for the Clarinet Reed Maker*, 27.

edges of the blank to a taper that he likes. This hand held shaper tool holds the reed in place and allows the maker to cut the sides of the blank with a knife. Again, his shaper is not available commercially, but there are others available that work in an identical way.[37] Mr. Hasty's favorite reed shape is similar to an Oliveri taper. His reeds measure approximately 14.2-mm (0.562-in.) at the tip, 11.9-mm (0.468-in.) at the butt, with an overall length of about 68.26-mm (2.68-in). This is just slightly longer and more tapered than the more often quoted dimensions of 13-mm (0.511-in.) tip, 11-mm (0.433-in.) butt, and 68-mm (2.677-in.) overall length.

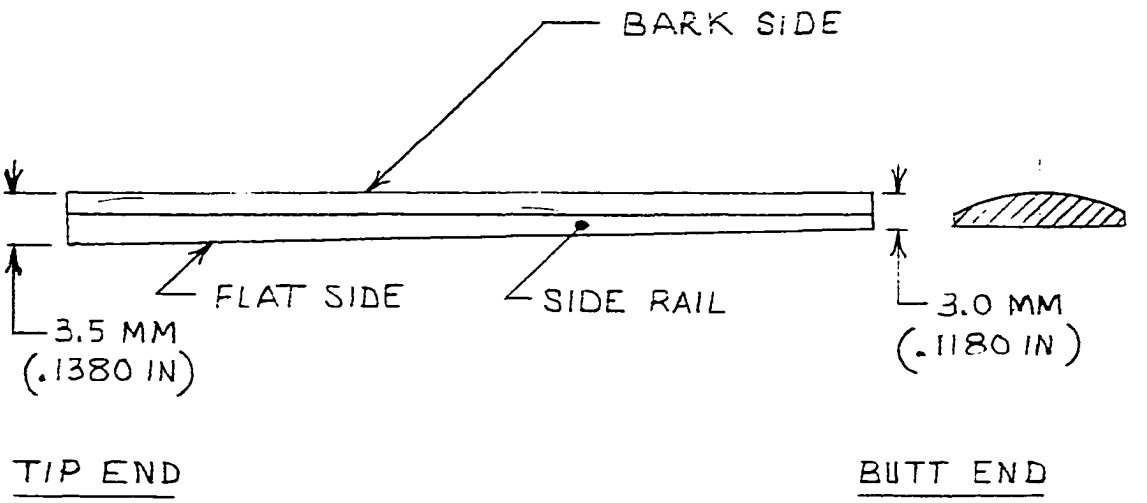


Figure 2

Stanley Hasty Blank Detail

[37] Ibid, 29.

Making the Finished Blank Flat

The next step is to make the blank very flat and smooth. Although the planing process can leave the blank fairly smooth and flat, most reed makers strive for a higher standard in this regard. Since one of the biggest advantages to making ones own reeds is to have more control over this area of reed design, most reed makers are very concerned about this step of the process. Mr. Hasty starts with 220-grit sandpaper and he sands the blank until it is smooth and flat. He does this by placing the sandpaper on a flat surface like glass, places his three middle finger tips on the bark of the blank, and sands with the grain for about twenty strokes.

This sanding procedure is also the beginning of another process called "curing the blank." In order to reduce the warping of a finished reed, Mr. Hasty moistens the reed thoroughly using either tap water or saliva and lets it dry completely. He will then check for warping and sand again, this time with 400-grit sandpaper. This process is repeated until there is no detectable warp and the surface is very flat and smooth. He will finish this process by sanding the reed on 600-grit sandpaper and finally polishing the reed with the back of the sandpaper. Usually, he will have to sand the blank a total of six times before he is convinced the blank is flat and ready to go on to the next step in the process.

Another unique idea to Hasty is that he uses his sense of touch to determine when a reed is completed in this stage. After he has polished the back of the reed, the surface will be very shiny and smooth. He will then wet and dry the reed again. If the reed feels just as smooth as before it was moistened, then it is ready for the next step. If the reed feels rough, then the blank must be sanded again with 600-grit

sandpaper and polished until it stays very smooth and shiny. This method allows for individual differences in the cane. If a piece of cane is more prone to warping, this "soak and feel" test will identify when the cane is ready to move to the next step.

Primary Cutting of the Vamp

This stage of the process is best described as making the blank look like a square-tipped version of a clarinet reed, without removing enough material to allow the reed to play when placed on the clarinet. Mr. Hasty completes this process in two ways. He can do this by hand, or by using the REEDUAL machine.

As for the hand made process, Hasty uses a small bladed knife called a "chipper." This knife is made especially for this step. The knife has a narrow blade that facilitates the technique of "chipping" used during this phase of the process. Hasty uses his left-thumb as a fulcrum and twists the knife forward with the right hand to make a whittling motion directed away from the body. The thumb pushes the knife into the cane while the wrist finishes the motion and removes a sliver of material. This is a difficult process to describe in text, but an eloquent description exists by the author Michael Webster. The following is an excerpt from his essay.[38]

> Then begin stripping the bark by cutting in with the chipping knife and turning it to an angle as nearly parallel to the bark as possible and removing the bark in strips. Throughout all operations, the knife is held in the right hand and the left thumb is used as a guide and pivot point for the blade. This is accomplished by holding the reed in the left hand with the thumb on top, parallel to the reed. The bottom portion of the second joint of the thumb will touch the reed with the first joint curving up toward the knife. This method may seem awkward at first, but will soon be relatively comfortable and very accurate.

[38] Michael Webster, *A Positive Approach*, 22.

As for the REEDUAL method, Hasty will use a commercial reed as a model and complete this primary cut using the machine. It is important to understand that he will stop this process well before the reed is playable. This is the only time he will use the REEDUAL. For him, this machine is incapable of making an acceptable finished vamp profile. Besides this disadvantage, the fact that the machine is electric driven, noisy, dusty and not easily portable, all contribute to his favoring the use of hand tools except when he makes reeds at home. Making his reeds by hand allows him to do this process anywhere, even during a rehearsal, if he wishes. The following diagram shows what the reed would look like at this stage of the process.

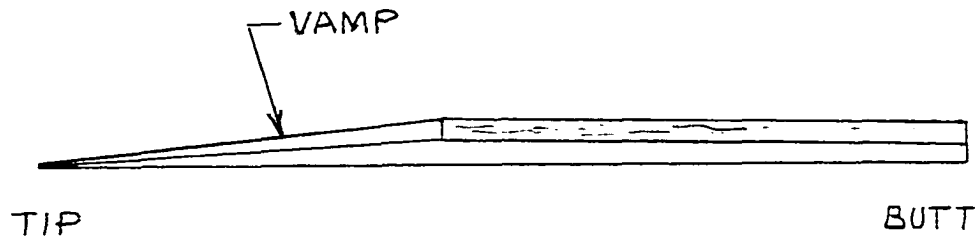


Figure 3

Stanley Hasty Primary Vamp Detail

Finishing the Vamp

Hasty's vamp lengths are noticeably shorter that those of a commercial reed. While most commercial reeds measure 32-mm (1.26-in.) long, Hasty's reeds measure around 30-mm (1.18-in.) or less. When questioned about this, he stated that there was no loss of tone quality or variation in pitch, but he found them much easier to make and balance.

In terms of slope, Mr. Hasty likes to make the slope more pronounced at the back of the vamp and then taper toward the tip in almost a straight line. Therefore, the concave slope of a commercial reed (called "swoop" by Mr. Hasty) is made lower in the back and is made flatter overall in his reeds.

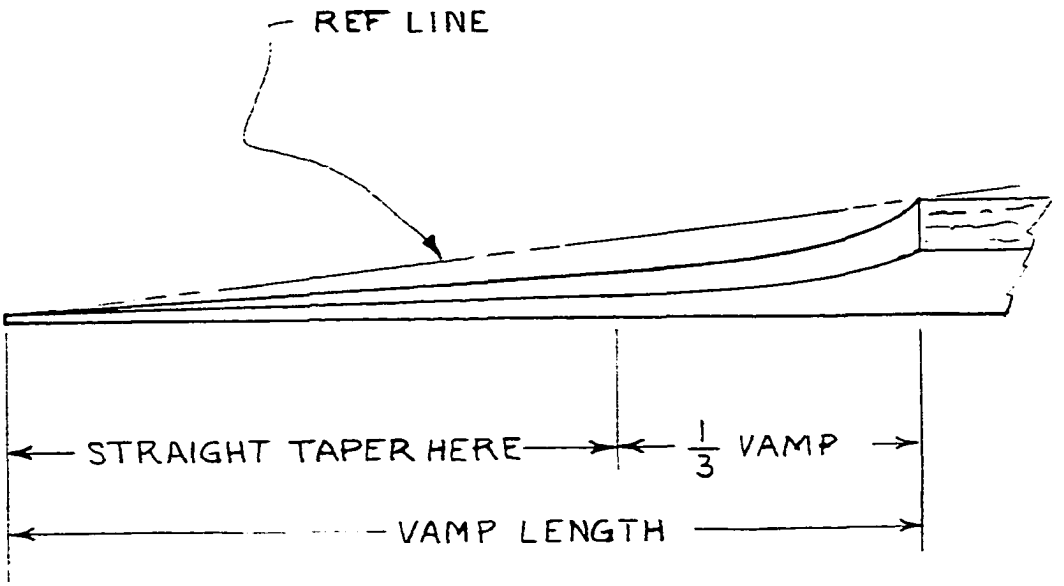


Figure 4

Stanley Hasty Vamp Swoop Detail

In order to finish his reeds, Mr. Hasty uses a combination of a finishing knife and fine grit sandpaper. He uses the knife when the reed is wet and sandpaper when the reed is dry. By alternating between the knife and sandpaper the reed becomes more "cured" (repeated soaking and dryings) and the surface becomes very smooth. These are very important concepts in his reed making method.

Final Finishing

The final stages of reed finishing and balancing for Mr. Hasty involve flexing the tip of the reed, inspecting the smoothness of the vamp with a back lighting view, and play testing the reed for balance and response. He believes that the reed should be broken in with short playing sessions and so these two processes go hand in hand.

In order to flex the tip of the reed, one has to make the reed moist. Then press the tip of the reed against the opposite thumb nail and notice the flexing motion of the tip. By comparing different reeds, both good and bad, one can eventually see when the reed is flexing properly. This process takes a little practice, but is very useful and commonly referred to in numerous sources.[39]

To inspect the smoothness of the vamp Hasty uses a unique procedure. He does not look through the reed but rather over the surface. While many publications deal with viewing the reed by holding it up to a light source and looking through the reed at the fibers and their thickness, Hasty does not find this process useful. Instead, he looks at the surface of the vamp trying to find and eliminate any deviations in contour. If one moistens the surface of a reed and then holds the reed perpendicular to a light source, the reflection of the back light will show any slight depressions in the vamp surface. Mr. Hasty believes that a smooth vamp will greatly enhance one's ability to evaluate a reed's faluts. This is another concept that is difficult to explain in text. A very eloquent description of this process is included in the Webster handbook.[40]

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[39] Daniel Bonade, *The Clarinetist's Compendium* (Kenosha: Leblanc, 1962), 14.

[40] Webster, *A Positive Approach*, 22.

One may begin checking the contour of the reed by holding it up to the light and adjusting the angle of the reed so that the light creates shadows on the surface of the reed (like the long shadows before sunset). Viewing the reed from tip and butt in this manner will show any low points in the cut, so that they may be avoided in further attempts to flatten out the cut. This method of viewing the reed is the most important way of judging its contour and is ruthlessly accurate once one develops his powers of observation. The shadows formed by the light hitting the reed at such an acute angle will show exactly where each low point is.

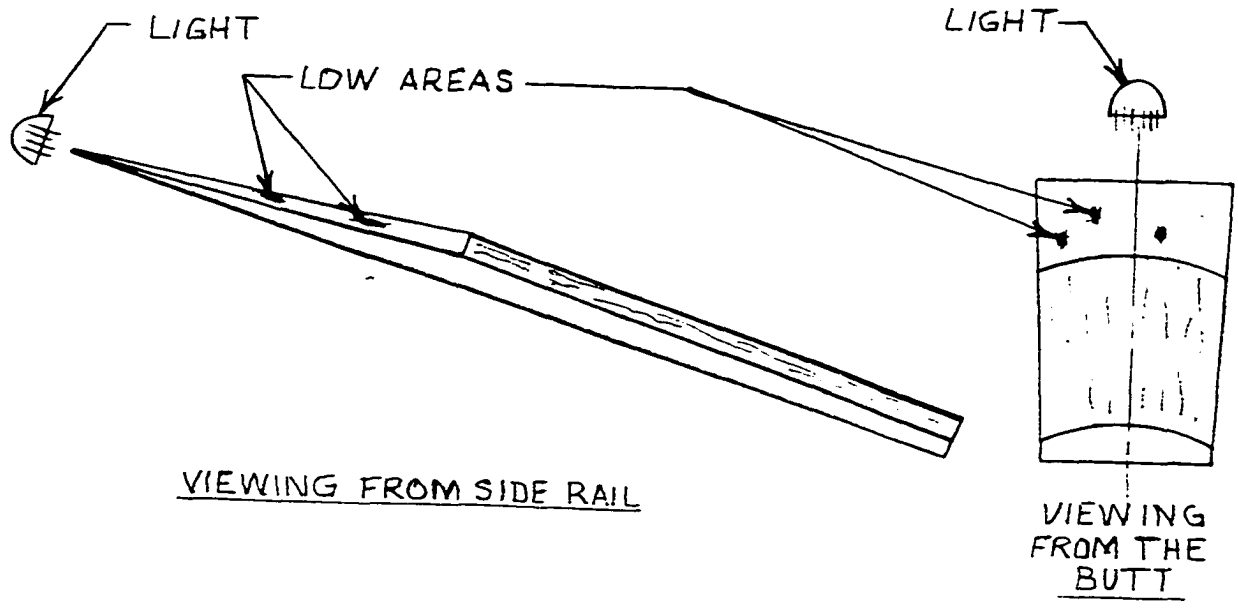


Figure 5

Stanley Hasty Vamp Surface Detail

In terms of play testing for balance and response, Mr. Hasty is in favor of any method that is preferred by the individual. He believes that the most important part to the whole reed making process is how the reed plays for the individual. The tests that he uses are the same ones articulated in numerous journals and other sources.

including the method of shifting the reed from side to side on the mouthpiece,[41] and the method of blowing on only one side of the reed at a time.[42] He then makes the necessary changes in the reed by scraping with the reed knife and sanding with the sandpaper as mentioned earlier.

The final stage in his reed making process is the finishing of the reed tip. This is the only time Mr. Hasty uses a reed clipper, but he prefers a shape that is slightly flatter than the curve of his mouthpiece tip. Mr. Hasty will play on a square tipped reed for some time before he puts on this curved shape. When asked about this feature, he responded by saying that he regarded the shaping of the tip as another type of reed adjustment. He believes that the shape of the tip can aid the reed maker in personalizing the reed. For instance, some clarinetists may prefer the sound and performance characteristics of a more square shape, others may prefer the reed more rounded. This adjustment allows the reed maker to adjust the reed in a way that the commercial reed player cannot. Even after the tip of the reed is cut with a reed clipper, Mr. Hasty finishes the process with the sandpaper making sure there are no stray fibers or sharp edges. He even sands the tip from the vamp angle to remove any "burr" which may have been inadvertently formed. The following illustration shows this aspect, as well as giving specific dimensions of the entire reed. Be sure to notice the reduction of dimensions between the vamp line and the butt thickness, as well as the slight concave feature to the flat side as discussed in the next section.

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[41] Ormand, *The Single Reed Manual*, 78.

[42] Ibid, 36.

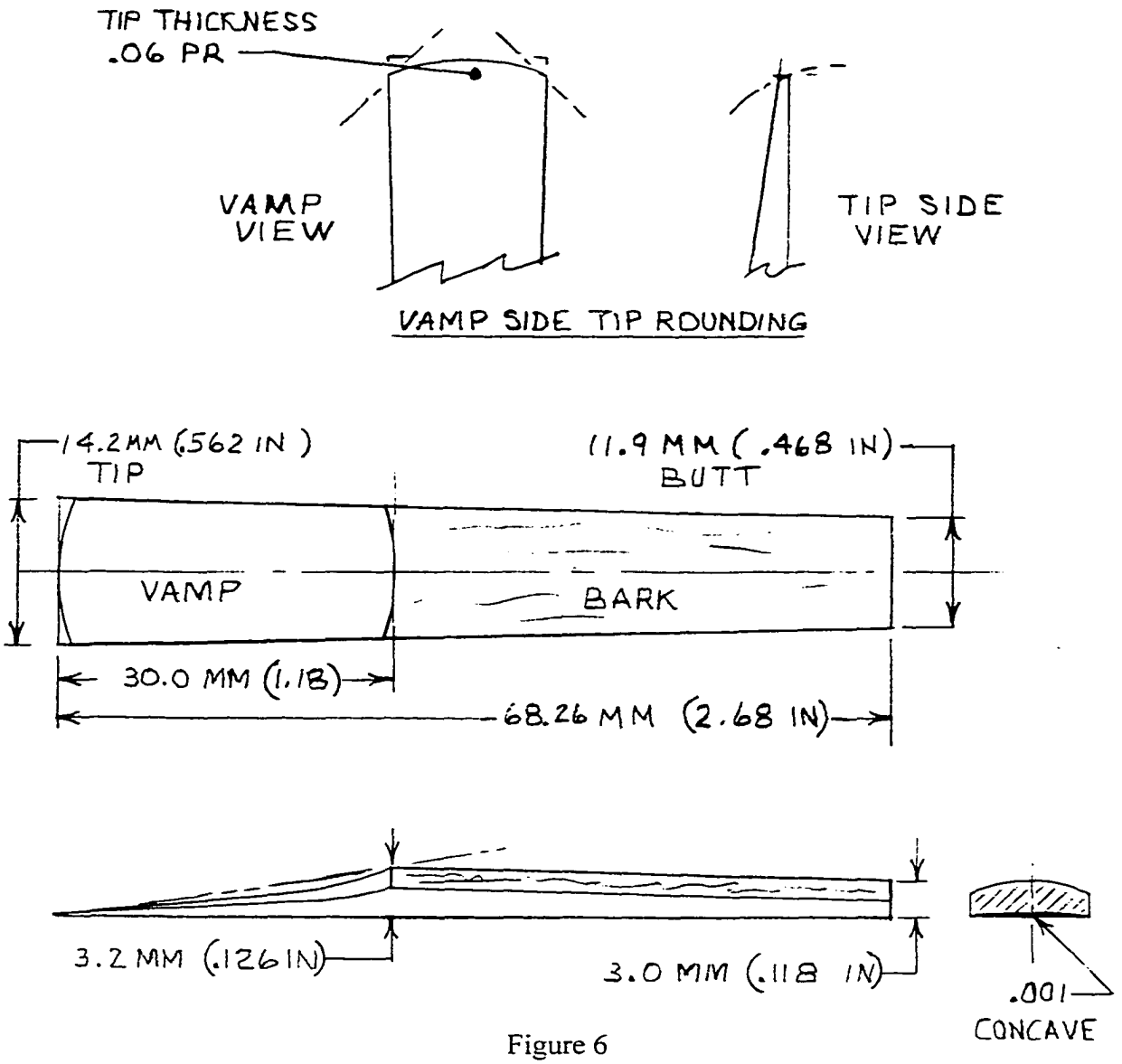


Figure 6

Stanley Hasty Reed Dimensions

Special Tricks

Most of Mr. Hasty's unique ideas are an integral part of his reed making process and have already been articulated in this paper, but there is one that has not been mentioned. Hasty will occasionally sand the back of the reed (normally the flat

side) so that it has a very slight concave surface left-to-right. Think of this as the opposite to what normally happens when a reed warps. Instead of the reed swelling outward from a perfectly flat state, the reed is actually curved inward. Hasty views this as a type of preventative step against reed warping. In this way, the reed can warp slightly and the back of the reed remains flat. In terms of how much concavity he uses, the answer is something not to exceed a .03-mm (.001-in.) at the point of maximum deviation from flat. Although this would not be recommended for a novice reed maker, an experienced one may want to give this a try. This concavity can be achieved by sanding the blank on a curved cylindrical surface equivalent to a radius of between 6-8 inches. This author has found several items that seem to work well, a curved glass photo frame, a large paint bucket and a large wastebasket.

CHAPTER IV

THE REED MAKING METHOD OF CHRISTOPHER SEREQUE

Biography and General Impressions

Christopher Sereque joined the Seattle Symphony in 1979 as Associate Principal clarinet and was promoted to Principal Clarinet in 1983. He has been a featured soloist for the *Masterpiece, Chamber Music, American Music,* and *Discover Music!* series. He collaborated with Music Director Gerard Schwarz and the Seattle Symphony for performances of John Corigliano's Clarinet Concerto in March 1987, and Carl Nielsen's Clarinet Concerto in January 1990. He joined Seattle Symphony's former Associate Conductor Christopher Kendell in a performance of Aaron Copland's Clarinet Concerto for the *American Music* series in October 1989, and played Debussy's *First Rhapsody* with Hermann Michael conducting in April 1997. Of the Copland performance, *The Seattle Times* wrote: "Sereque mastered its frisky rhythm-tricks and flourishes with spry aplomb."

As a chamber musician he has appeared with Chamber Music Northwest, the Seattle Chamber Music Festival, the Santa Fe Chamber Music Festival in Santa Fe and Seattle, Belles Artes Concerts, and the Cascade Head Festival, where he collaborated with Sergiu Luca in a performance of Brahms' Clarinet Quintet.

Before coming to the Seattle Symphony, he was Principal Clarinet with the Fort Wayne Philharmonic. He also served as Principal Clarinet with the National Symphony of Peru.[43]

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[43] Contreras, ed., *Seattle Symphony Program*, vol. 18, no. 10, (Seattle: Seattle Symphony Orchestra, 1999), 16.

It was when Mr. Sereque studied clarinet at Indiana University and later performed in the Fort Wayne Philharmonic that he first saw people using a REEDUAL. He studied reed making by hand with Kalmen Opperman while briefly living in New York City in 1961-71, had played his own hand-made reed exclusively for eight years, and had been aware of the machine's potential for some years before purchasing one during the summer of 1978. Mr. Sereque is a very thoughtful, patient, quiet, focused, and orderly person. He is obviously proud of his career, the Seattle Symphony, and the growth of this city. He is proud of his recordings and quietly confident in his abilities. These personality traits are reflected in his reed making process.

Mr. Sereque was chosen to be a part of this study for several important reasons. Not only is he a world class performer, but he is one of the best representatives of a school of reed making that uses the commercially available machine the REEDUAL. Mr. Sereque has been a successful clarinet reed maker for thirty years and has used this machine for over twenty-two years and has been tested in the arena of a professional orchestral performer. Mr. Sereque has also developed a method of reed making using this machine which can be called a "multiple model method." This simply means that he uses several different model reeds during the cutting process which give his reeds a distinct shape and contour. He got this idea from Robert Marcellus, who suggested using a Morré reed with typical adjustments as a model reed to adjust other unadjusted Morré reeds.

The Sereque Process

Tube Cane Selection

Mr. Sereque looks for tube cane that has straight grain with no obvious deformities in color or texture. Although Mr. Sereque is attentive to cane density and thickness, he does not select tubes in this way. Instead, he is careful to label each tube by supplier and, when split, will also label the split pieces with a number to indicate from where it came and the year it was purchased. In this way, when he makes a reed that proves to be particularly outstanding, he knows from what batch of cane it came, and what specific tube. Therefore, his selection process is approached more from the perspective of where successful playing reeds were found, rather than from visual inspection.

Cane Aging and Storage

Mr. Sereque does not consciously age his cane. Although, he admits he rarely uses cane soon after it was purchased. He orders cane in quantities of a kilogram or more, from several suppliers, well in advance of his needs. When questioned about this further, it was evident he rarely ages his cane more than two years. In terms of storage, he does not make any special arrangements. He keeps the cane in tubes, usually in the boxes in which it was shipped, and these boxes are kept on shelves in his basement reed making room.

Cane Splitting

The cane is split into four equal sections using a reed knife. Mr. Sereque will then assign each split section the same tube number, so he can track from where the reeds came. This number will be transferred to the reed blank and will stay with the reed throughout the process. This numbering system could be customized according to the needs of the individual and situation. Mr. Sereque will assign a letter and a year to indicate the cane source (M for Muncy Winds, or R for Rigotti, etc.) and then number each tube consecutively as it is split. Later, if he finds a superior reed is labeled 98M256 for instance, this would indicate that this reed came from an order of Muncy cane purchased in 1998, tube number 256. In this way Mr. Sereque can easily identify what tubes of cane are giving him the best results and then return to those tubes for more reeds of similar performance characteristics. It is important to notice that Mr. Sereque does not make more than two finished reeds from any given tube during the initial process. He waits until he finds superior results from a particular tube and then returns to that tube for more reeds. This process also saves a lot of time and energy. Since Mr. Sereque is confident in his reed making process, once he has identified a superior cane tube, he can take his time and proceed slowly knowing that this particular reed will yield superior results.

Rough Blank to Finished Blank

At this point the tube has been split and cut into a 70-mm (2.75-in.) length. The concave section inside the tube is present and this pulpy material must be removed and made flat. He then splits off the curve with a reed knife and then uses a

DiLutis planer set to give an overall thickness of about 3.3-mm (0.130-in.). After the reed blank is sanded flat it will measure about 3.0-mm (0.120-in.) and the final thickness before cutting the vamp should be between 2.8-mm and 2.9-mm (0.110 and 0.115-in.). This measurement is slightly less than the thickness of a Vandoren V-12 commercial reed. Mr. Sereque also prefers to have the flat side of the blank parallel to the bark side, thus not using any reverse taper like that of Stanley Hasty.

In terms of reed shape, Mr. Sereque does not use any commercially available guide. He prefers to do this by hand. This is a surprising trait since most reed makers find this step of the process very tedious and consider it crucial for consistent results. When questioned about this, Mr. Sereque explained this is an adjustment he likes to make by hand, since altering these dimensions can bring out more of the potential of the cane and aid in final adjustment and customization. Most importantly, it is easier for him to get the grain of the cane in the center of the blank, and to make both sides of the blank of equal thickness. The dimensions he uses at this stage measure 13.5-mm (.531-in.) at the tip, 11.0-mm (.433-in.) at the butt with an overall length of 70.0-mm (2.75-in.). Mr. Sereque considers this stage complete when he rough profiles the blank, by hand, using Opperman's three basic cuts.

Making the Finished Blank Flat

The next step is to make the blank very flat and smooth. Mr. Sereque also uses this step to prepare and season the blank with repeated soaking and drying cycles. This curing process is central to stabilizing the reed blank against excess warping and maximizing the reed in terms of performance and longevity. Mr.

Sereque uses a very strict schedule of soaking and drying which uses saliva only. He uses a minimum schedule of four soakings a day for seven days and sands the flat side of the reed only once or twice with 220-grit sandpaper. He sands the blank in a circular motion both clockwise and counter-clockwise to insure the reed stays flat. He also believes that burnishing the reed or using finer sandpaper will remove too many fibers and this makes the reed sound bright. Mr. Sereque tries to maintain the measurement of 2.8-mm (0.110-in.) in overall thickness. He believes the thinner profile equates to less resistance and more response. He will typically prepare reed blanks well in advance of his needs.

Primary Cutting of the Vamp

Since Mr. Sereque already removed a large portion of the excess material by hand before curing the blank, the next step is the first REEDUAL cut. For this first cut, Mr. Sereque uses a 3-1/2 Vandoren Black Master model reed. He likes this commercial reed for its slope and tip measurements. The blank is put into the left-hand side of the REEDUAL and the model reed in the right-hand side. The REEDUAL machine removes all the excess material from the blank so what remains is a copy of the model reed. Mr. Sereque likes to check the tip measurement of the new reed with a dial indicator to make sure that this new reed has the same dimensions as the model reed. If this newly manufactured reed is removed from the machine and played on the instrument, the result should be a reed that plays slightly resistive and fuzzy in tone. Mr. Sereque likes to play the reed dry during this stage. He is looking for performance characteristics that can best be described as slightly

hard to blow, a big sound that is slightly unfocused, and an ability to play easily in the high register with little flexibility of pitch. This combination of features means that the front part of the reed has the correct slope and measurements for this stage of the process.

Finishing the Vamp

For this step in the process, Mr. Sereque puts the new reed back into the REEDUAL and changes to the second model reed. He replaces the original bumper tubing on the machine with one that is longer. This alteration is what gives his reeds a shorter vamp length. This second model reed is a 3-1/2 Rico Grand Concert (thin cut version). He likes this commercially available reed for its dimensions on the back part of the vamp. He uses this model to remove excess material from the back half of the new reed. Since each piece of cane is different, Mr. Sereque has to slowly remove material until he has achieved the correct dimensions for this new reed. The end result however, is a double concave slope to the finished reed that resembles the front part of the first model and the back part of the second model. The following diagram shows this double vamp profile.

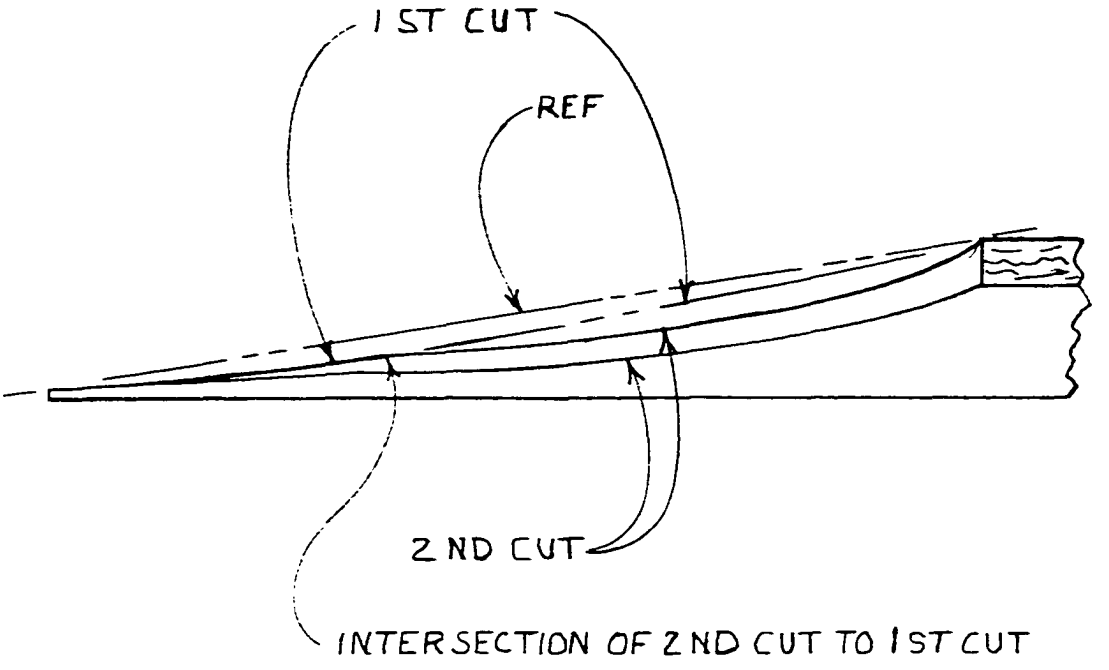


Figure 7

Christopher Sereque Vamp Profile Detail

Final Finishing

Chris Sereque's vamp measurements are noticeably shorter than commercial reeds. He strives for a vamp length of about 30-mm (1.18-in.) or less. His reeds measure an overall thickness of 2.8-mm (0.110-in.) and the slope of the reed vamp is in general lower in the back and higher in the middle than a commercial reed. For specific dimensions of an idealized reed of his design, see the diagram that follows.

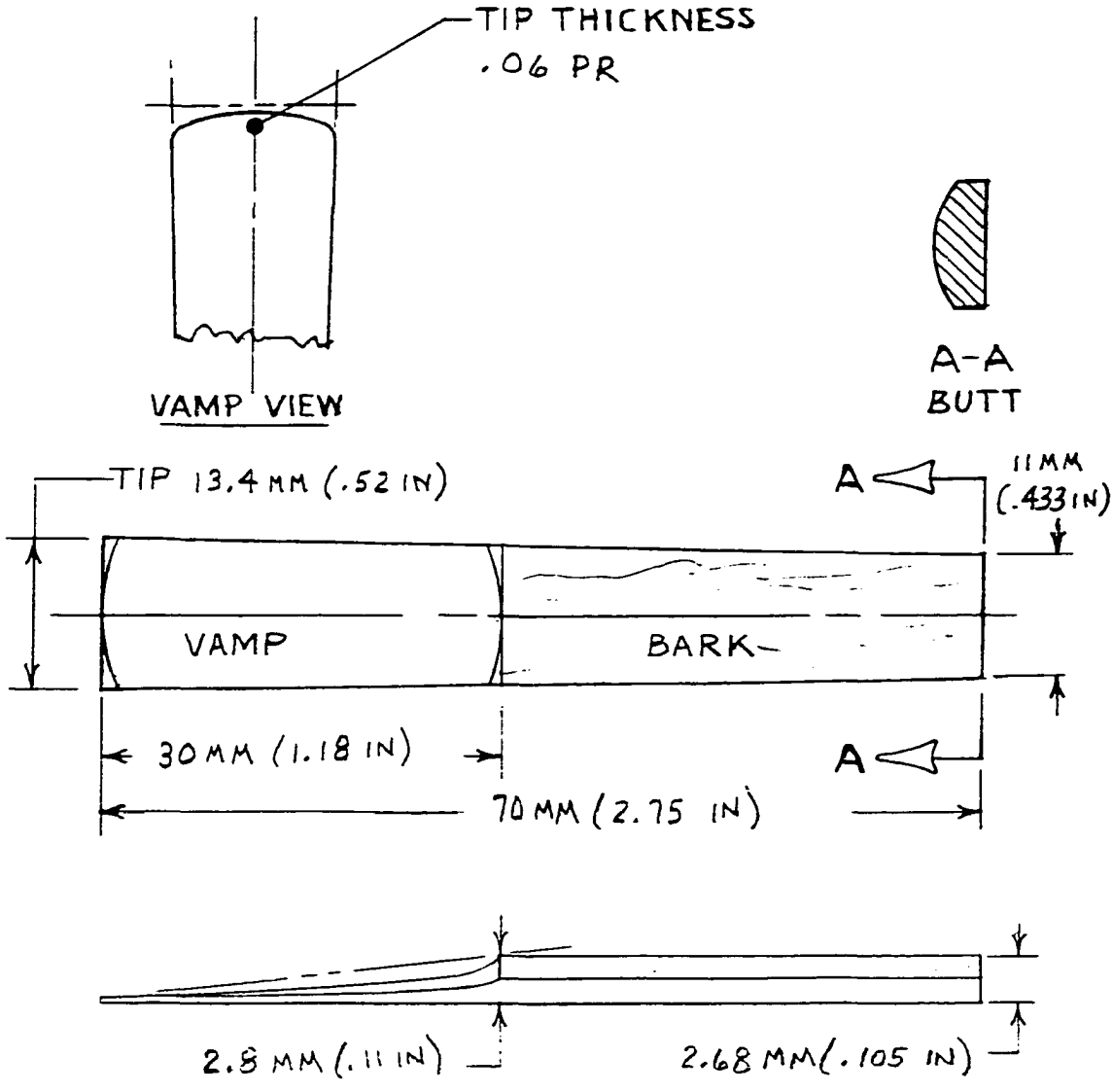


Figure 8

Christopher Sereque Reed Dimensions

His reeds have a great deal of stability of pitch combined with a full resonance and large projective sound. He will sometimes finish a reed by using a third model reed, which is handmade, that is slightly lower in dimensions just behind the tip. This is particularly helpful for those who use a more open mouthpiece facing or for particularly dense cane. By using this third model, the integrity of the first cuts remains intact while being able to reduce this specific region of the vamp. Once the reed has been adjusted to meet his standards and he is satisfied with this process, Mr. Sereque will clip the tip of the reed with a reed trimmer. His reed trimmer of choice is actually one designed for soprano saxophones (Cordier). When asked about this, he commented that a flatter arch to the tip of his reeds fits his mouthpiece well. In terms of the break in process and preservation, he breaks his reeds in slowly by practicing on them at home until he feels comfortable enough to bring them to rehearsals. He does not use any process to preserve his reeds. He mentioned that his reeds typically last two to three months of rotation playing and he will typically use about fifty reeds a year.

Special Tricks

So much of Mr. Sereque's method is unique that it is difficult to isolate those features that would fit into this category. Most of these individual features are associated with the REEDUAL machine itself. For instance, those familiar with the REEDUAL have noticed that the machine will typically remove more material from one side of the reed than another. Mr. Sereque's remedy is to place a small piece of paper under the model reed to elevate the side that is typically left too thin. Mr.

Sereque lubricates the slide rod with a light lubricant (he uses transmission fluid) so the sliding action is very smooth. This translates into a smoother vamp cut and reduces minor imperfections in the vamp slope. Another trick is to replace the rubber bumper on the slide rod of the machine with ones of varying lengths. This is an excellent way to adjust the vamp lengths of the reeds. The longer the bumper (thus reducing the amount of travel in the slide carriage) the shorter the vamp lengths will be. He has various lengths of rubber hose bumpers which he uses to adjust this feature. In this way, he can adjust the vamp length of a reed to alter its performance characteristics.

CHAPTER V

THE REED MAKING METHOD OF DANIEL GILBERT

Biography and General Impressions

Mr. Daniel Gilbert, a native of New York City, began his musical studies at the 92nd Street Y School of Music, and graduated from the Pre-College Division of the Manhattan School of Music. He holds a Bachelor of Arts degree from Yale University and a Master of Music degree from the Juilliard School. His teachers have included David Weber, Robert Marcellus, Stanley Hasty, Richard Waller, Burt Hara, and Judith Kalin-Freeman. Mr. Gilbert currently holds the Second Clarinet position with the Cleveland Orchestra, a position he has held since 1995. He played Principal Clarinet in the New Haven Symphony Orchestra from 1992 to 1995, and appeared regularly with such groups as the Metropolitan Opera Orchestra, the Stamford Symphony, New Jersey Symphony, Philharmonic Orchestra of New Jersey, Soloisti New York, and the New York Symphonic Ensemble. During 1994-1995, Mr. Gilbert was a member of the Quintet of the Americas. He has given master classes and solo and chamber recitals throughout the U.S. and has appeared as soloist with the New Haven Symphony, Solisti New York, and the Aspen Chamber Symphony. He has been associated with the Tanglewood Music Festival, and spent eight summers at the Aspen Festival, where he held two fellowships. Mr. Gilbert is currently on the faculty of the Oberlin Conservatory of Music and the Kent/Blossom Music Festival.[44]

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[44] Pyne, ed., *ClarinetFest 1998 Program* (Columbus: The Ohio State University, 1998), 91.

In terms of reed making, Gilbert began making reeds with a REEDUAL and also purchased an early version of the Robert DiLutis Reed Machine. He made many successful reeds using these methods and developed his basic reed making method by talking with other professional clarinetists and sharing ideas. He mentioned the thesis by Michael Webster and was kind enough to lend a copy of it to me for this paper. It is obvious by watching his process that Mr. Gilbert has spent several years experimenting and researching this topic. Mr. Gilbert is known today, and was chosen for this paper, for his work using the reed-making machine made by Wilfried Schmidt called the Blattkopierschleifmaschine BKM 4. This machine, henceforth referred to as simply BKM 4, is a more sophisticated version of a REEDUAL. Since there are very few written sources available that discuss this machine, and those that are available are written in German, some general remarks about this machine will be helpful. The BKM 4 compares similarly to the REEDUAL. Both machines use a sandpaper abrasive wheel that is driven by a belt drive electric motor. Both machines use a model reed and attempt to make a copy of the model reed dimensions on to the new reed blank. Both work best when attached to a vacuum that removes the dust from the reed blank. Where the REEDUAL has the belt drive mechanism exposed, the BKM 4 has this apparatus encased in a steel cover. This makes the machine much safer and quieter to use. The BKM 4 has a higher speed and more balanced electric motor for a smoother and faster cut, uses closer tolerances in the slide rail for a smoother action, and is more rigid and heavy overall. The general impression one gets from using the BKM 4 is that it is a more substantial product that works faster, smoother, quieter, and safer than its counterpart. The negative aspects to this

machine can be summed up in terms of cost, portability, and flexibility. In terms of cost, the BKM costs almost four times that of a REEDUAL. This machine is also not suitable for transportation. It easily weighs twice as much as its counterpart and would be difficult to transport for fear of damaging the machine. In terms of flexibility, although this machine is made with closer tolerances and will make a more accurate duplicate of a model reed, experienced users of the REEDUAL have developed methods to overcome these deficiencies and turn them to their advantage.

The Gilbert Process

Tube Cane Selection

Mr. Gilbert selects tubes of cane that have straight grain, thick walls, and a honey brown color. He avoids tubes, or parts of tubes that are curved or not symmetrically round. Although his finished reeds are not noticeably thicker than some commercial ones, he likes to use tubes that have more material so that he can be sure to avoid the edges of the blank being too close to the bark. This idea is similar to others interviewed. When asked about a particular type of cane he prefers, he responded that he has had good results from all the cane manufacturers, but has recently found good success with cane from Marcelle Ghys in Antibes France. Please see the appendix for complete addresses and phone numbers.

Cane Aging and Storage

Mr. Gilbert does not age his cane or believe that aged cane is superior in any way. When asked specifically about this area, he admitted that he had heard others

express this idea, but he was comfortable with his results and was reluctant to devote a lot of time and energy in this regard. He, like others, does order his tube cane in substantial quantities and it does take him a while to use it, so there may be a year or so of aging that occurs before he actually uses some of his stock. His tube cane is also stored in his basement in the original cardboard shipping boxes. Therefore, Mr. Gilbert does not believe in any particular storage method.

Cane Splitting

The cane is split into four equal sections using a knife. After splitting the tubes, Mr. Gilbert inspects the sections and finds those areas within the sections that would be most suitable for a reed. At this point, he is looking for straight grain and bark that is parallel to the internal surface. Once a segment is identified, it is cut to length 70-mm (2.75-in.).

Rough Blank to Finished Blank

In order to remove the pulpy center of the cane and to achieve a flat surface, Mr. Gilbert prefers a planing process and he uses the Robert DiLutis version of this machine. He uses the standard settings on this unit, which correspond to dimensions slightly thinner than the Vandoren V-12 reed. When asked about this thickness issue, Mr. Gilbert responded that he had achieved good results using this relatively standard dimension and felt that having a consistent dimension was more important than having a particular one. Mr. Gilbert prefers to have a blank that is parallel with

regard to bark side and flat side. He is also very careful to achieve symmetry of arch to insure that the edges of the reed are of the same thickness.

To taper the blank, Mr. Gilbert uses the DiLutis shaper. This shaper is slightly more tapered than a standard Vandoren reed and has a tip measurement of 13.2-mm (.519-in.). Therefore, Mr. Gilbert prefers fairly standard reed blank measurements. They are 13.2-mm (0.519-in.) at the tip, 12-mm (0.472-in.) at the butt, and an overall length of 69-mm (2.71-in.).

Making the Finished Blank Flat

Although the planing process leaves a fairly smooth flat surface on the reed blank, Mr. Gilbert prefers, like most reed makers, to hand sand the flat side for optimum smoothness and bring it to the final thickness measurement. Also, like other reed makers, he will use this stage of the process to "cure" the blank by soaking and drying the blank several times to reduce or prevent the tendency of reed warpage.

The first step in this process is to wet and dry the reed blanks. Mr. Gilbert simply gathers a few blanks in his hand and holds them under cold tap water for a few moments. He then lays them flat side up on the desk until they dry. When he decides that they are dry (several hours later) he will gently sand the flat side of the reed on 400-grit sandpaper for a few strokes using a back-and-forth motion with the grain. He is careful to sand on a flat surface like a smooth flat desk or a piece of glass. It is important to realize that he uses a light touch and spaces his fingers out over the entire surface of the blank, so as to avoid sanding irregularities into the flat surface. He will repeat this process numerous times until he can see that the reed is no longer

warping after the wetting process. A visual inspection of the reed during and immediately after sanding will show him when the reed is ready to move to the next step in the process. He mentioned the pedagogical aid of drawing lines on the flat surface of the reed with a pencil before sanding and then noticing their removal with the sandpaper. If the pencil lines disappear evenly, then the blank is sanding flat. This is a good method and is often cited in other reed making sources. Although Mr. Gilbert did not quote a specific number of times this process has to be repeated, when questioned more specifically, he estimated that he commonly repeats this process between ten and fifteen times. Usually, he will finish this process by using the finer 600-grit sandpaper. This will give the reed a very smooth finish, but he added that he has noticed the tone of the finished reed is sometimes made brighter by using this finer sandpaper. Therefore, sometimes he will finish the reed with 400-grit sandpaper.

Primary Cutting of the Vamp

Since the BKM 4 machine uses a sandpaper abrasive, it is recommended that the bark be removed from the reed blank before cutting the vamp. This is accomplished by using a reed knife or a utility knife and simply removing the bark from an area similar to the length of the vamp. This operation will preserve the sandpaper on the machine and allow the user to make more reeds before changing the sandpaper.

The next step involves placing the blank into the machine and using the machine to make a rough copy of the model reed. In Mr. Gilbert's case, he uses a well playing commercial reed or another well playing hand made reed as a model.

Since the BKM 4 makes a much closer replica of the model reed, the user simply has to make allowances for the individual cane densities of the reed blank. Mr. Gilbert usually removes a significant amount of material during this phase and brings the blank down to a nearly finished reed dimension. He knows at what setting the machine usually makes a close copy of the model reed, so he stops just short of this dimension, removes the almost completed reed from the machine, and measures it using a PerfectaReed dial caliper. Since Mr. Gilbert knows approximately what he likes his reeds to measure, this step insures that the reed making process is going as planned and he will usually play test the new reed at this point to make sure it plays slightly too heavy.

Finishing the Vamp

Now that the new reed has been play tested and measured, Mr. Gilbert is ready to finish the reed. The new reed is placed back into the machine and the settings are adjusted so the new reed will be brought down to its final dimensions. After this step, the reed is again play tested, measured, and then put away. At this point, the reed is essentially finished.

Final Finishing

Mr. Gilbert uses a standard reed clipper for the clarinet and places a curved profile on the reed tip. Since the BKM 4 does such an accurate job of copying the model reed, there is very little final finishing to do after this step. Mr. Gilbert will usually play the reed for short periods of time at first, gradually lengthening these

periods until he feels comfortable using the reed for more extended practice sessions or public performances. Mr. Gilbert does do some hand adjusting, but he tries to limit this by finding good model reeds that produce good results on the BKM 4 machine. For specific dimensions of an idealized reed of his design, see the diagram below.

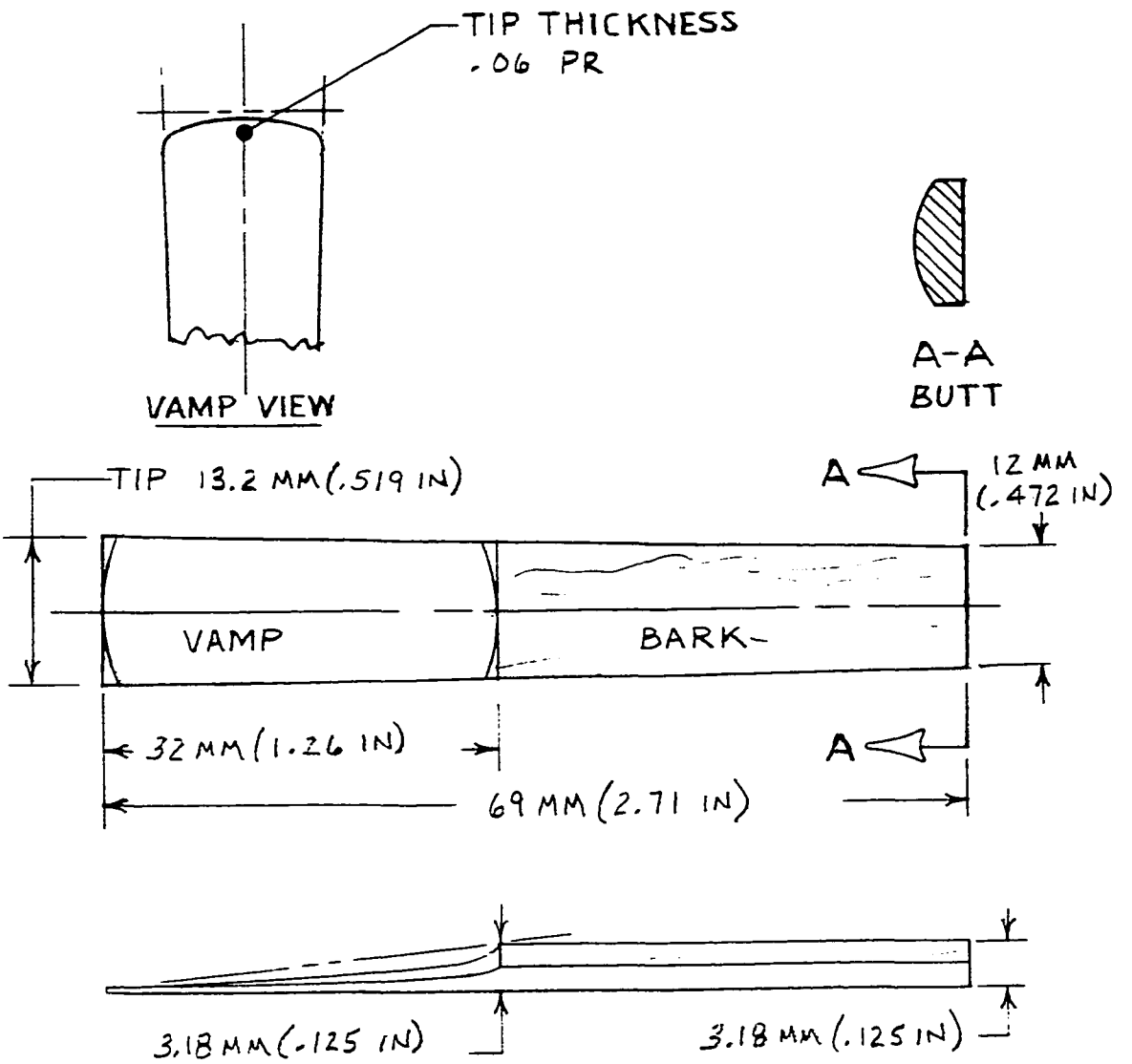


Figure 9

Daniel Gilbert Reed Dimensions

Special Tricks

Mr. Gilbert does believe in keeping accurate records of reed dimensions. He uses the PerfectaReed to measure the vamps of reeds that play well for him and others. By comparing these measurements, he knows what range of measurements seems to work best for him. He acknowledges that varying cane densities can cause measurements to fluctuate. However, by slightly adjusting the model reeds he uses, or by choosing model reeds that fit these dimensions, he can accurately fall within a range of dimensions that work well for him.

CHAPTER VI

THE REED MAKING METHOD OF ROBERT DILUTIS

Biography and General Impressions

Mr. Robert DiLutis has performed as Second and E-flat clarinetist with the Rochester Philharmonic Orchestra since 1996. Prior to his position in New York, he performed as Assistant Principal and E-flat clarinetist with the San Antonio Symphony. He is best known however as the inventor of the "Reed Machine," a professional reed making device for the clarinet and saxophone. Making his Carnegie Hall debut in 1989, Mr. DiLutis has performed as featured soloist with the Seattle Wind Symphony, the River City Consort in San Antonio, Texas, the Rochester Philharmonic and the Peabody Sinfonietta. He has served on the faculties of the Baltimore School for the Arts, Incarnate Word University and St. Mary's University in Texas, and Nazareth College in New York. In 1993, he co-founded the Greater San Antonio Music Institute for music students between the ages of 5 and 20, and is still very active in the development of young musicians. His many clinics and master classes as a Boosey & Hawkes Artist have included appearances at Ithaca College, New England Conservatory and the Eastman School of Music. He received a Bachelor degree in clarinet performance from the Juilliard School where he studied with David Weber. Previous to his studies in New York, he studied with William Blayney at the Peabody Conservatory in Maryland.[45]

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[45] Etheridge, ed., *ClarinetFest 2000 Program* (Norman: The University of Oklahoma, 2000), 70.

Mr. DiLutis was chosen to be a part of this study because he is not only a world class performer, but he has invented a new type of reed making machine and a complimentary line of reed making tools and accessories that have rapidly become standards in the clarinet reed making community. The "Reed Machine" is a small portable tool that resembles a bassoon or oboe reed gauger. Like these machines, it uses a blade fastened within a carriage mechanism that removes the cane of a reed blank to match that of a model reed. The RDG/Laker machine also uses a blade like this, but the RDG machine does not allow the blade section of the mechanism to rotate from side to side. Mr. DiLutis' invention uses a double hinged mechanism that resembles the motion of the hand used by reed makers that use a reed knife. The reed duplication principle involved is similar to the Reedual, except that a blade removes the excess material instead of sandpaper and it requires no electricity since the cutting motion is controlled with the hand. The advantages of the machine are that it works quietly and accurately, is easily transported and removes excess cane material as tiny wood chips instead of fine reed dust. The fact that the blade removes material is also attractive since there is no need to change sandpaper or worry about changing dimensions associated with sandpaper wear. The disadvantages are that the machine is relatively new, and works slower than the electric powered machines. Some reed makers who like to make their reeds in high volume numbers are more attracted to the electric motor driven machines. Mr. DiLutis also produces a planer unit and reed profiler that are also in demand by clarinetists. Since his products are relatively new, Mr. DiLutis can be seen demonstrating his equipment at clarinet festivals.

The DiLutis Process

Tube Cane Selection

Mr. DiLutis looks for tube cane that is straight with a golden color and has a thicker texture. He prefers the thicker tubes but does not make his blanks more than a moderate thickness. He actually prefers a rough blank thickness of 3.15-mm (0.124-in.). This measurement corresponds to a Vandoren V-12 thickness and when questioned about this he stated that he gets the best results when he uses this moderate thickness and is very careful to maintain consistency in this regard.

Cane Aging and Storage

Mr. DiLutis does not consciously age his cane. He does admit to ordering his cane in advance of his needs but does not believe that aging the cane improves the end result. He is much more concerned with accurate dimensions and reed blank curing. When asked about his favorite type of cane he mentioned that Rigotti has given him good results and that he has also had good results from cane ordered from the Proboe Shop in Bloomington, Indiana. Mr. DiLutis stores his cane in cardboard boxes in his basement. He is concerned with keeping his reeds and cane at a consistent humidity so he uses a humidifier and dehumidifier to maintain a consistent 65%-75% relative humidity.

Cane Splitting

The first step in Mr. DiLutis' process is to soak the tubes of cane in tap water overnight. He chooses a few tubes and places them in a pan of water making sure the water completely covers the tubes. He allows them to soak overnight before he begins the splitting process. When asked about this procedure, he mentioned that he prefers to work with the cane wet because it splits and planes easier and the soaking process aids in curing the cane against warpage.

The cane is split into four sections, but are not necessarily equal sections. Mr. DiLutis looks carefully at each tube and finds the straight sections and those areas that seem to visually show the best grain appearance. He then marks with a pencil on the cross section of the tube where he wants the split to occur. Using a hammer and chisel, he carefully splits the tube according to his pencil lines. He is not interested in quantity of blanks from a tube, but rather the best sections of a tube to make the blanks. In this area of his reed making technique, Mr. DiLutis is careful and very discriminating. The rough blanks are formed when the split sections are cut to length. For this process he uses a pipe cutter or fine tooth saw. He strives for a length that is slightly longer than a standard commercial reed of 70-mm (2.75-in.).

Rough Blank to Finished Blank

At this point the tube has been split and cut into a section of about 70-mm (2.75-in.) long. To remove the pulpy material from the center and to give the reed a flat side and consistent thickness Mr. DiLutis uses his own design and manufactured planer. This planing unit is similar to others commercially available but is very

precise and works smoothly and efficiently with a Stanley low angle plane (model 12-960). Mr. DiLutis has the unit adjusted to cut a reed thickness of 3.16-mm (0.124-in.). At the end of this procedure the flat side of the reed is smooth and parallel to the bark of the blank. Each planed blank has a uniform thickness and consistency of measurement that will require minimum sanding.

In order to give the blank a slight taper from tip to butt, Mr. DiLutis uses his own shaper. This shaper works by clamping the blank in between two pieces of tapered steel and holding it in place so that one can cut the edges of the reed with a knife. This process is the same one used by many reed makers but his tool is different because both the top and the bottom of the steel "sandwich" are of the same taper dimensions. This gives the knife more area to rest against while shaving the sides of the blank. There is no chance that the angle of the knife blade will change during cutting and give a wavy appearance to the edges of the blank. Besides this feature, he also makes the top piece of steel concave on the inside in order to aid in centering the cane as well as giving more contact area to hold the cane in place during cutting. The end result is a finished blank that has slightly more taper than a Vandoren reed but far less taper than an Oliveri reed. These dimensions are 13.6-mm (0.538-in.) wide at the tip, 12.04-mm (0.474-in.) wide at the butt, 70-mm (2.75-in) long and an overall thickness of 3.16-mm (0.124-in.).

Making the Finished Blank Flat

The next step involves curing the blank by soaking and sanding as well as refining the planing and shaping process by sanding the surfaces with an abrasive.

For this procedure Mr. DiLutis uses 220-grit sandpaper. He sands the flat side of the reed using a motion of a figure eight. In the machining industry this is called "laping" and insures that the reed is sanded evenly and without distortion. After he is convinced that the back is flat, he also sands the sides of the reed making sure they are perpendicular to the flat side of the reed. Since Mr. DiLutis recommends working with only four reeds at a time this procedure goes relatively quickly. He advocates soaking and drying the reeds three to four times a day for three days for a total of nine to twelve cycles. He soaks the blanks using saliva for about five seconds and then places them on a table flat side up. Allowing at least a half-hour of drying time, the process is then repeated except that this time the reeds are allowed to dry with the flat surface down. He alternates this flat side up and then flat side down drying cycle until all curing is completed.

Primary Cutting of the Vamp

The first step in this process is to remove the bark from the blank. Mr. DiLutis uses a utility knife for this process. He measures down approximately the length of the vamp and removes the bark from this section of the reed blank. This aids in the curing process and keeps this very hard material from making the blade to the Reed Machine dull. It is during this stage that Mr. DiLutis recommends that the blank be soaked using saliva and dried another three days as described in the previous section.

When this phase of the curing process in complete the blank is now ready to be sanded by 400-grit sandpaper. Mr. DiLutis sands the reed while wet on 400-grit sandpaper using the same figure eight pattern as was used earlier. Now the blank is

ready for the primary vamp cut. The blank in placed into the machine and a model reed is also installed. It is very important to always use a model reed that has the same thickness measurement as the new reed. If these two measurements differ the result is a distortion copy of the original model reed. At this point the new reed should be shaved down until it is within a one-half turn from complete using the fine adjustment knob on the machine. Now this new reed should be removed and undergo another three-day soaking and drying cycle.

Finishing the Vamp

The first step is to wet the new reed and sand using the figure eight pattern on 600-grit sandpaper. The result will be a very smooth and shiny flat surface. Mr. DiLutis recommends polishing the flat surface by turning the sandpaper over and polishing the reed on the smooth side of the sandpaper. This process is called burnishing and is common among clarinetists. This forms a moisture barrier and essentially seals shut the flat side of the reed. When this process is completed the reed is again placed into the Reed Machine and reduced down to within a one-quarter turn from complete using the fine adjustment knob. The reed should be play tested and fine-tuned on the machine until the player is comfortable. This is achieved by continuing to turn the adjustment screw until it no longer turns.

Final Finishing

At this point the reed needs only to be clipped with a reed clipper (Cordier) and the vamp polished with sandpaper. Mr. DiLutis dates the reed on the bottom for

reference and then slowly breaks the reed in over the next several days or weeks by rotating it among his other reeds in ten-minute periods. After three days the new reed should be used when needed and stored at a constant relative humidity level of 65%-75%. His reeds last about four months on average.

For specific dimensions of an idealized reed of his design, see the diagram that follows.

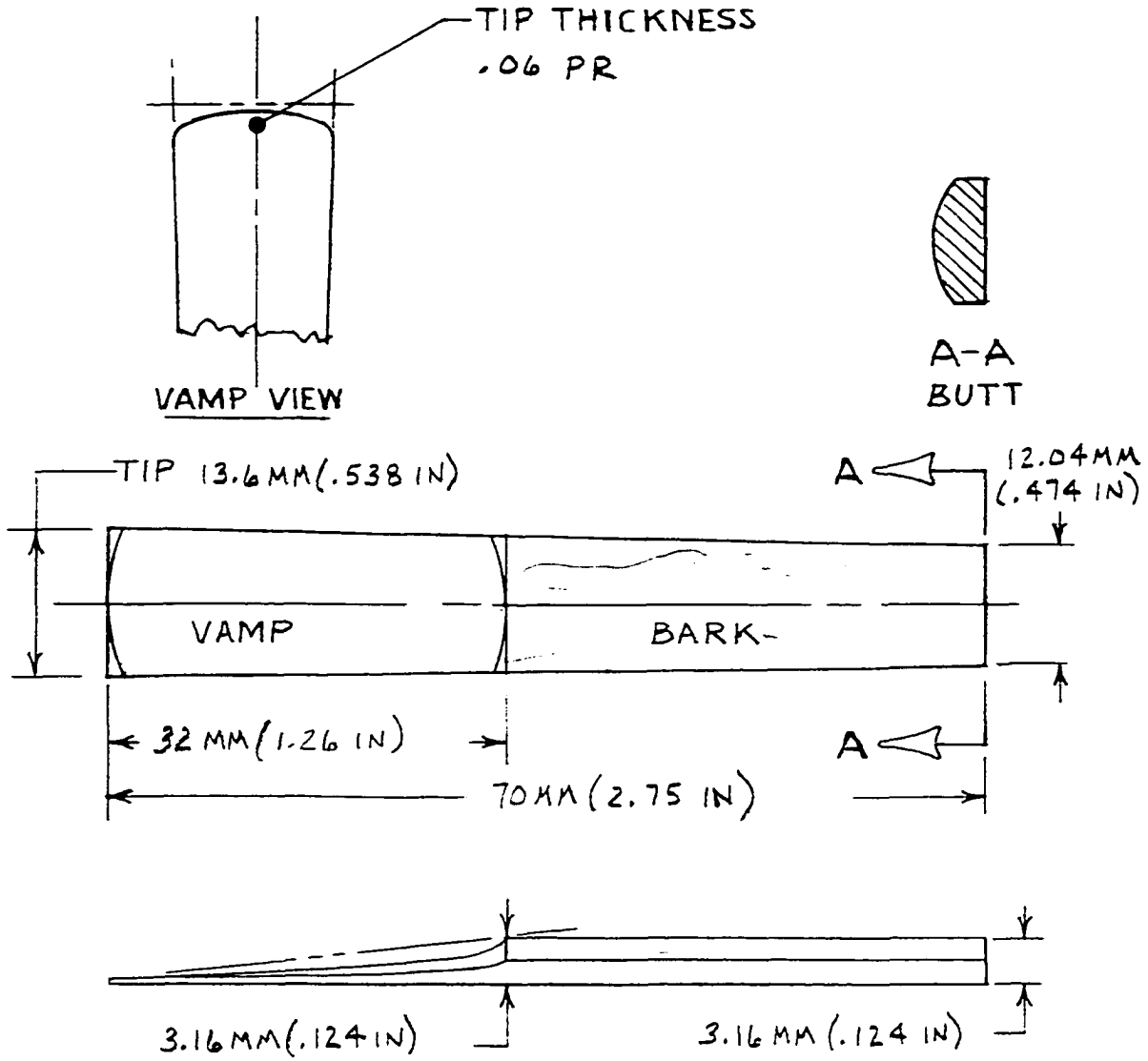


Figure 10

Robert DiLutis Reed Dimensions

Special Tricks

Mr. DiLutis' innovations lie in the invention and manufacture of his machines and related equipment. Having spent so much time working closely with the manufacturing industry, he brings to the art of clarinet performance a strong desire for consistency and reliability. He admits that the process of creating the reed making equipment has influenced the way he makes his own reeds and this is evident by his attention to detail and consistency with measurement.

CHAPTER VII

A SUMMARY OF THE REED MAKING METHODS

Biographies and General Impressions

A summary of the biographies of the interviewees reveals an impressive collection of accomplishments and influence within the contemporary classical music scene. Not only do these individuals have international reputations as performers in some of America's best symphony orchestras, but also each has performed as a soloist and released recordings either as a soloist or with orchestras, which are distributed globally. These clarinetists have also established their reputations as educators. This is important because they all have tremendous influence on the successive generations of clarinet performers who study privately with them or attend the fine music conservatories at which they are teaching. These include such names as the Eastman School of Music, the Juilliard School, Cleveland Institute of Music, Indiana University, and the Oberlin Conservatory of Music. Even more specifically, each interviewee has established an international reputation as being a clarinetist who has mastered the craft of reed making by performing and giving demonstrations on reed making at international clarinet festivals.

In terms of reed making technique, all four of the interviewees approach the process from a different viewpoint. By choosing individuals that have a diverse reed making philosophy, the synthesis of these methods will have greater meaning. More specifically, Stanley Hasty represents the hand made approach; Christopher Sereque represents the REEDUAL approach, Daniel Gilbert the BKM 4 machine, and Robert

DiLutis represents his own the "Reed Machine" approach. It would be almost impossible to find four more diverse methods of reed making in the clarinet community. The following illustration will serve as a summary of this logic.

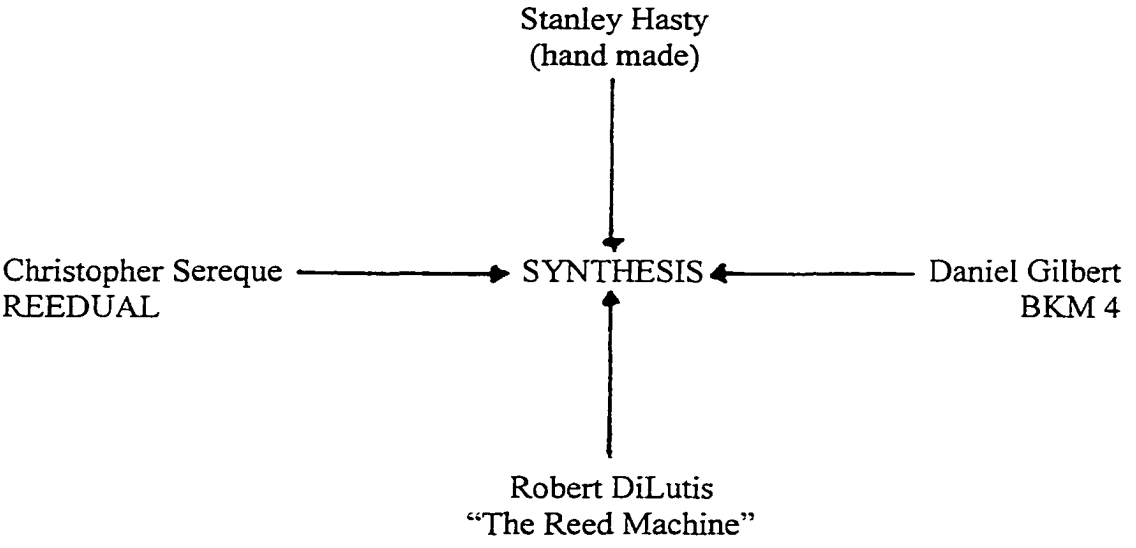


Figure 11

Reed Making Methods

The general impressions of their reed making process can best be described as a synthesis of their reactions to the simple question: Why do you make your reeds from tube cane rather than simply purchasing your reeds already made? Their answers can be summarized as follows: 1) Since the reed is such an important feature to the clarinetist in terms of tone quality control and comfort, the more control over this aspect the better. 2) Dissatisfaction with the commercial product in terms of reed design, cane selection, and most importantly cane curing. 3) A dissatisfaction with

the short life and inconsistent aspect of reeds which is directly related to reed warpage. In short, each interviewee felt that a higher performance standard is the result of their process and that it was well worth the time, and expense required.

The Reed Making Process

Tube Cane Selection

Each person interviewed agreed that the tubes should be straight, have no obvious defects, straight grain and a golden brown rather than green color. Each mentioned that the selection aspect of the cane material was one of their primary concerns and one of the best reasons to make their own reeds rather than purchase the commercial product. Although two of the interviewees preferred cane that was thicker, none of the interviewees make their reeds much thicker than a commercial Vandoren V-12 and none thinner than a standard commercial Vandoren.

Cane Aging and Storage

None of the interviewees consciously age their cane. This was a surprise since there is a substantial body of literature in the form of articles that recommend this. Although they do not consciously age their cane however, none actually use the cane immediately after purchase. Since cane is sold by weight in increments of a pound or kilogram, and they are ordering cane well in advance of their needs, the interviewees rarely had a chance to use the cane soon after it was purchased. The author estimates that the typical period of aging was probably a year or two. In terms

of storage, only one subject made a conscious attempt to keep the cane in a consistently humid environment. Most just kept the cane in cardboard boxes on shelves in the basements of their homes.

Cane Splitting

All subjects split the tube into four sections. This aspect was also a surprise since several printed sources recommend that the cane be split into thirds. All the interviewees agreed that these sections should be chosen based on the appearance of the cane in the tube state. This means that the sections should be made to capitalize on the best areas of the tube and minimize the lesser areas. All but one of the subjects split the cane while the tube was dry.

All were very concerned about choosing what sections from the split tube to make the reed segment. All mentioned how important it was to find a section that had very straight grain without any imperfections. All subjects used a section that measured from 68 to 70-mm (2.67 to 2.75-in.) in length.

Rough Blank to Finished Blank

All the interviewees used a table mounted planer unit for this step in the process. All were very careful about maintaining a thickness that was just slightly higher than their target thickness to minimize hand sanding. All agreed that the blank should be symmetrical in appearance.

For the shaping operation, all but one used a shaper to speed up the process and all subjects prefer a shape that is slightly more tapered than a standard

commercial reed. All interviewees mentioned the effect of the shape on the finished reed and it was obvious that a great deal of thought was given to this aspect.

Making the Finished Blank Flat

All subjects combined this process with the "curing process." All were very concerned about the reed being resistant to warpage and felt that this curing process was the key to making the reed last longer, resisting warpage, and being more consistent than the commercial product. This curing process involves repeated soaking, drying and sanding of the flat side of the reed blank. Some subjects used tap water, saliva or a combination. There was considerable disagreement on how many cycles this would take and for how long the reed was soaked. But all agreed that the first few cycles were the most crucial and it became a method of diminishing returns as the number of cycles extends over twenty.

All subjects used a combination of sandpaper coarseness ranging from 320-grit to 600-grit and placed the abrasive on a flat surface like a glass table. Most subjects mentioned a specific sanding pattern to minimize sanding the blank too thin on one side. This was either altering the position of the reed, making a circle or figure eight on the paper, or a combination of these methods.

Primary Cutting of the Vamp

All interviewees divided the making of the reed vamp into several distinct stages, this being the first one. Most continued the "curing process" into this stage. All agreed that the bark should be removed first and all did this with a knife blade in a

whittling motion away from the body. Most measured down an approximate length from the tip of the reed and removed the bark from this section. The last step at this stage involves removing vamp material so that the reed at the conclusion of this stage was simply a gradual taper to the tip. All the interviewees ended up with the same result but their process was different depending of their methods.

Finishing the Vamp

This is the stage in the reed making process that the reed is made to play. During this phase, each interviewee was very careful to focus their concentration and use extreme caution to avoid ruining the final product. Areas of universal concern were: 1) making sure that the vamp was perfectly smooth and in accordance to their dimension goals, 2) being careful to be in complete control of all machinery or tools, and 3) numerous visual inspections and eventually play testing the reed for idiosyncrasies in cane and personal taste of the performer.

Final Finishing

During this final phase of reed making all the interviewees agree that the reed should be tested for balance and resistance. This is the time for the tip of the reed to be rounded and for very subtle adjustments to be made over the "break-in process." This is when the reed is played for several days or weeks and very slight adjustments are made to prepare the reed for public performance. If the reed maker feels the need to do so, this is the phase in which reed preservation processes are employed and reeds are selected for specific performances.

Special Tricks

Since each reed maker had their own unique ideas to contribute, and they are articulated at the end of each chapter, this section does not lend itself to a summary. However, each reed maker had several important ideas that added a new dimension to their own distinctive style. These ideas were specific to their own process, but this was where some of the richest ideas were found.

CHAPTER VIII

EPILOGUE:

THE CLARINET REED MAKING METHOD OF RANDALL PAUL

Biography and General Impressions

Mr. Paul is an active solo recital performer, educator and symphonic musician. He performs solo recitals throughout the country including performances at the International Clarinet Society Convention, the Oklahoma Clarinet Symposium, at The High Museum of Art in Atlanta, and at Lincoln Center and Carnegie Hall. His performance at Carnegie Hall in 1985 received critical acclaim as "...a dapper performance..." in *The New York Times*.

Mr. Paul is currently an Assistant Professor of Music at Wright State University in Dayton, Ohio where he teaches courses in applied clarinet, musicology, ear training, woodwind techniques and chamber music. As the founder and director of the WSU Clarinet Choir, he has commissioned several new works for this ensemble and led them in two performances at international clarinet festivals. He has also served on the applied faculties of The University of Dayton, The University of Cincinnati College-Conservatory of Music (SMI), and Miami University (Ohio).

Mr. Paul has over fifteen years of professional performance experience as a clarinetist with the Dayton Philharmonic, the Springfield Symphony (Ohio), the Dayton Ballet Orchestra, and Richmond Symphony Orchestra (Indiana). He has been the Ohio Chairperson for the International Clarinet Association since 1988 and has served as host for the 1997 Clarinet/Saxophone Festival at Wright State University.

His education includes study at Jacksonville State University, Ithaca College, University of Cincinnati College-Conservatory of Music and The University of Oklahoma. He has authored articles for *The Clarinet* and *Counterpoint Magazine*. He has recently completed several recording/CD projects, "An American Cinderella" for the Dayton Ballet, "Alice" for the Grand Rapids Ballet, and "The Brahms Clarinet Quintet" with the WSU String Quartet. Mr. Paul is proud to represent the Selmer Corporation as an Artist/Clinician performing on the new "Signature" series clarinet.

As a performing and teaching clarinetist I am proud to say I have been playing reeds of my own design and manufacture exclusively for over three years. I first began experimenting with making my own reeds in the 1970s when I got a chance to use a REEDUAL at Jacksonville State University, with Carl H. C. Anderson. As an undergraduate student and a very inexperienced clarinetist, I was ill equipped to understand the intricacies of reed design, but I did understand the potential advantages to making ones own clarinet reeds. Since this time I have been fascinated with this topic and have been gathering information from all available sources with the goal of improving my own reeds and one day making them from tube cane. Through this project and the help of my mentors at The University of Oklahoma, I have recently succeeded in achieving a professional level of success with this skill.

The purpose of this chapter is to detail what I have found to work for myself and my students at Wright State University. By following the guidelines of this chapter, a student new to the skill of reed making, may avoid years of frustration and achieve a level of success that will motivate them to continue perfecting the reed making skill and aid them in their quest to be a better clarinetist.

The Paul Process

Tube Cane Selection

Tube cane is selected based on the appearance of color, presence of straight grain and most importantly, thick walls. Thick walled cane is important because I know that the reed blank will have a uniform density of material and I have found that cane like this gives me a more consistent finished reed. I prefer to make my reeds slightly thicker than standard commercial reeds and I believe that this extra thickness makes the tone of the finished reed warmer and more resonant.

Cane Aging and Storage

I prefer to age my cane for several years before use. Although I have had good results with cane recently purchased, my experience has been that aged cane is slightly more resistant to warpage, breaks in easier, and has a warmer sound. The best reeds I have ever made were made with cane that was aged for over twenty years.

Tube cane is purchased from a wide variety of sources. Like most clarinetists, my students and I are always searching for good sources of tube cane. I prefer to purchase it in quantities of a pound or a kilogram and let it sit around for a year or more in the cardboard box it was shipped. The advantage to keeping it in its original container is that later you will know where and when you purchased it. Although I do not label the individual tubes of cane, I do label and date the box for future reference.

Cane Splitting

I like to split the tube after it has soaked overnight in a pan of tap water. In this regard I agree with Robert DiLutis. After the tube has soaked this way, it splits easily and the cane has undergone one gentle soaking process. At this point the cane is so porous that it dries quickly and it is easier to see what portion of the split section looks best for making the blank. I split the tube into four sections using a reed knife and then select from these split sections the specific 72-mm (2.83-in.) section I choose to make into a rough blank. It is during this process that the reed maker has the greatest control. I am very careful to find areas that have perfectly straight tight grain, no flaws in color or texture, and perfectly parallel cane walls. Once the selection has been made I use a guillotine to cut the split section of tube into rough blank lengths. In the 1980s I purchased a RDG/Laker clarinet reed making system. Although I prefer to use the REEDUAL machine now, I still like to use certain features of the RDG system. This guillotine is very fast and easy, but more importantly, it cuts the cane from the inside out. This means that the cut is very clean and any torn edges are from material that will be removed eventually anyway. I prefer to have blanks that are considerably longer than conventional commercial reeds. I start with a length of at least 72-mm and usually 73-mm (2.87-in.). Besides giving my reeds a distinctive and cosmetically attractive look, the extra length allows me to re-cut a reed several times if I make a mistake, and this gives me more material to remove from the tip of the reed as well. If the finished reed turns out to have an overall length of between 71 and 72-mm, a measurement that matches the table length of my mouthpiece, I would consider that ideal.

Rough Blank to Finished Blank

In order to give the rough blank a flat side, I again turn to the RDG/Laker system. This system has two planing thicknesses. I prefer to use the thickest one. This thickness will just barely remove enough material to give me a flat side. Since I choose only very thick tubes, this usually gives an overall thickness at this stage of about 4-mm (0.157-in.). Although I own the DiLutis planer and have achieved terrific results, I also use the RDG/Laker system for this step. With the RDG system one pushes the rough blank into and through a blade, instead of passing a planer over the stationary rough blank. I find them both easy and very effective to use.

The next step in the process involves tapering this flat blank. For this process I use the DiLutis shaper. This shaper was discussed in a previous chapter and it should be pointed out that I own several others, but I prefer this one. This shaper allows me to have a tip on the reed slightly larger than 13-mm (0.511-in.) and it holds the blank more securely than others do. I also found the taper to be satisfactory for most types of cane.

Making the Finished Blank Flat

For this phase of reed making I prefer to use at least three grades of sandpaper. Since this step is also combined with the "curing" process of repeated wetting and dryings, I like to take my time and finish this over the course of weeks. For the first sanding, I use 320-grit wet or dry sandpaper. This is a course grade but the first sanding needs to remove a lot of material and this grade of sandpaper helps it go faster. I secure the sandpaper to a glass-covered desk with double-sided adhesive

tape and I am very careful to make sure the sandpaper lie perfectly flat against the glass. Then using a figure eight pattern on the sandpaper with my three middle fingers evenly placed on the bark of the reed blank, I sand with light pressure until the reed measures 3.6-mm (0.142-in). To finish this step I will also sand the sides of the reeds and make sure that the edges are perpendicular and straight the entire length of the blank. At the conclusion of each step the reed blank must be soaked in syliva for several minutes and allowed to dry with the flat side up. This drying process will take several hours.

For the second sanding I follow the same procedure except that I use 400-grit sandpaper. Instead of measuring the reed I just sand lightly for twenty patterns and then soak and dry. The third sanding follows the same scheme except that I use 600-grit sandpaper and then this routine must be repeated for a total of twenty soakings and dryings. By doing this, one can be sure that the reed blank has been prepared so that the chances of reed warping has been minimized. The results will be a reed that will last for many months and will be resistant to humidity changes.

Primary Cutting of the Vamp

I prefer to do this step when the blank is wet. Moisten the blank thoroughly and then draw a pencil line 30-mm (1.18-in.) down from the tip of the reed blank. Using a utility knife score the bark and peel it away using a whittling motion. Be sure to push the blade away from the body. If the blank is sufficiently wet, this process is easy. Some reed makers prefer to soak the blank in water for several minutes before this step. Be sure to allow the reed to dry thoroughly before going on to the next step.

The next step involves the REEDUAL. Install the first model reed. For this I use a German Vandoren 3-1/2 just like Mr. Sereque advocates. Put the model reed in its place and put the new blank in its corresponding location. Make sure the settings on the REEDUAL are made very high so that this first cut leaves plenty of material on the reed blank. After this cut is made the reed should be very heavy and have a tip that is many times too thick.

This is an excellent stage for the novice reed maker to develop some skill with the machine. I will usually let my students do this step while watching over them from behind. Since there is very little chance to make a mistake at this stage of the process, it is a good way to allow the student to develop a "feel" for the machine. Most students develop adequate skill and confidence with the machine after sanding a few reeds during this step.

After one more sanding with 600-grit sandpaper to be sure the blank is perfectly flat, it is time to bring the dimensions of the new reed down to the next level. Remove material until the tip measures 0.06 on the PerfectaReed gauge. Remove the reed and play test it dry, on the clarinet. Play an open "G" and the sound should be loud, resonant and fuzzy. If too hard, keep bringing the dimensions down until the tip measures 0.05 on the PerfectaReed. One can actually go even thinner, but experience will be the best judge. When the reed plays resonant, slightly resistive and slightly fuzzy, this stage is completed.

The next step involves changing the model reed to a Rico Grand Concert (thin cut-blue box) 3-1/2. This is the second model reed and its purpose is to reduce the dimensions of the back portion of the reed without altering the front (tip) portion. I

prefer a process that is essentially a variation upon the double model method used by Chris Sereque. Put a small piece of plastic book binding tape over the first half of the model reed and do not change any machine settings. The purpose of placing tape on the vamp is to insure that this second model reed removes material from only the back half of the reed. Experience will determine the exact placement of this tape. If you find yourself removing a lot of material by hand, or your reeds are consistantly too resistive, you may want to move the tape more forward on the model thus removing more cane from the vamp. This process will give a double profile to the vamp and the reed should play much better at this point. The effect of this double profile is to make the reed play less resistive with a clear tone. If the reed does not play to your satisfaction at this point do not worry. You can return to the first model and take the reed down to a slightly lower dimension, or just remove material from the vamp by hand during the next phase of this process.

Finishing the Vamp

Over the next several days and weeks play the reed gently and for brief periods of time. It is common to have the reed change slightly during this phase and it may even get harder and warp slightly. It is for this reason that finishing the vamp of the reed and the break in process are done simultaneously. Using only the 600-grit sandpaper, gently sand the back of the reed flat, just like before during the curing process. If the vamp requires some additional adjustment, use small squares of 600-grit sandpaper and gently sand the vamp smooth. You will see the ridge of the double model vamp profile and this may have to be reduced for optimum performance.

In order to help myself keep track of where the reed is during the reed making process; I finish the tip of the reed in several stages. The figure that follows will illustrate this point.

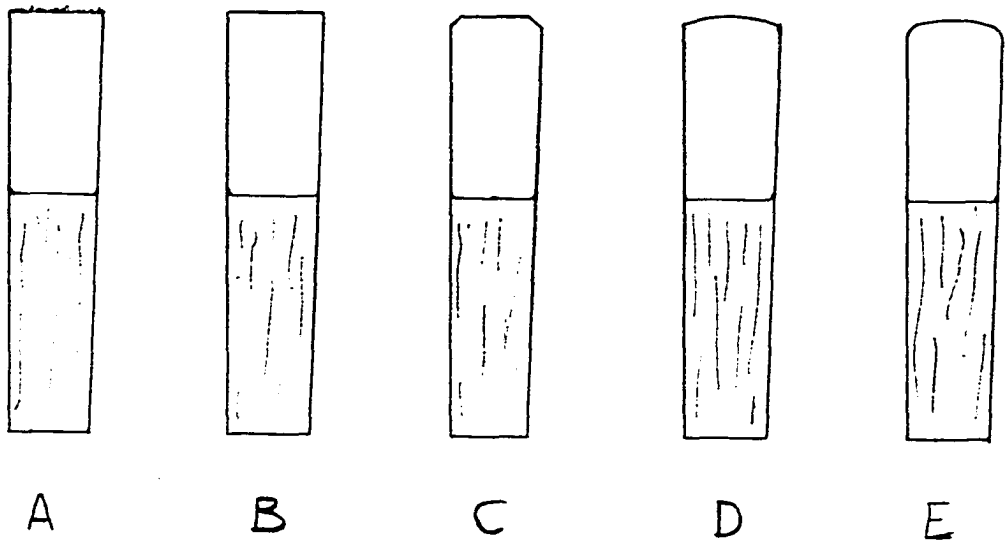


Figure 12

Randall Paul Reed Tip Detail

Notice that the reed labeled "A" represents a reed after it has completed the REEDUAL process. I leave the tip of the reed in this condition until I am satisfied that the reed making process is completed with regard to the machine. Once I am sure that the reed will no longer be placed back on the machine, I trim the imperfect tip edge of the reed with a pair of sharp scissors. This makes the reed look like the reed labeled "B." A reed will continue to look like this until I am satisfied that the vamp is finished. By this, I mean that the reed is performing well and does not require any but the smallest adjustments. When the reed is ready for the next step in this process and I plan to play the reed on a regular basis in rehearsal, I clip the

corners of the reed at a 45-degree angle with the scissors. A reed in this stage of the process will look like the reed labeled "C." Once the reed has been played for several days or weeks and I am comfortable that it is a reliable performance reed, I will clip the tip of the reed with a standard reed clipper. At this point the reed will look like the reed pictured as "D." The final illustration shows a reed that has had the corners rounded smooth. This is done to give the reed a darker tone quality, and I only do this when it is desired. Therefore, the reed labeled "E" does not illustrate a more finished reed, just one that has been adjusted for a different tone quality.

Final Finishing

During this phase of the process I prefer to leave my reeds square tipped with the edges clipped at a 45-degree angle. After I have established that the reed is playing with a good clear sound and has a level of resistance that I like, it is time for the adjustment phase typically called "reed balancing." Although this process is detailed in numerous other printed sources, I will describe it in my own way and illustrate it here for convenience. The term "balance" refers to the notion that the reed performs best when it vibrates evenly across the vamp surface. There are three generally held methods of determining if a reed is balanced. The first is the "flex against the thumb nail" test the second is the "moving the reed on the mouthpiece" test and the third is "blowing on only one side of the reed at a time" test. These may sound silly, but are very important to clarinetists striving for ultimate performance from a reed. For the purpose of this essay, I will describe only the second method. I have found this one to be much more successful with students.

How to Balance a Reed

Most serious clarinet students are familiar with the technique of variable reed placement techniques. Most clarinetists know that if a reed plays slightly too soft or with an uncomfortable light resistance, the reed can be made to play artificially harder by raising the reed position slightly higher on the mouthpiece. This placement may even cause the tip of the reed to overlap slightly the tip of the mouthpiece. Conversely, a reed can be made to play artificially softer, by lowering its position on the mouthpiece to be slightly lower than the tip rail of the mouthpiece. This technique is excellent because, the performance characteristics of the reed can be altered without adjusting the reed in any permanent way. This same method can be applied to ensure that the reed vibrates evenly from one side to another. The following diagram shows the relative position of a reed on a clarinet mouthpiece.

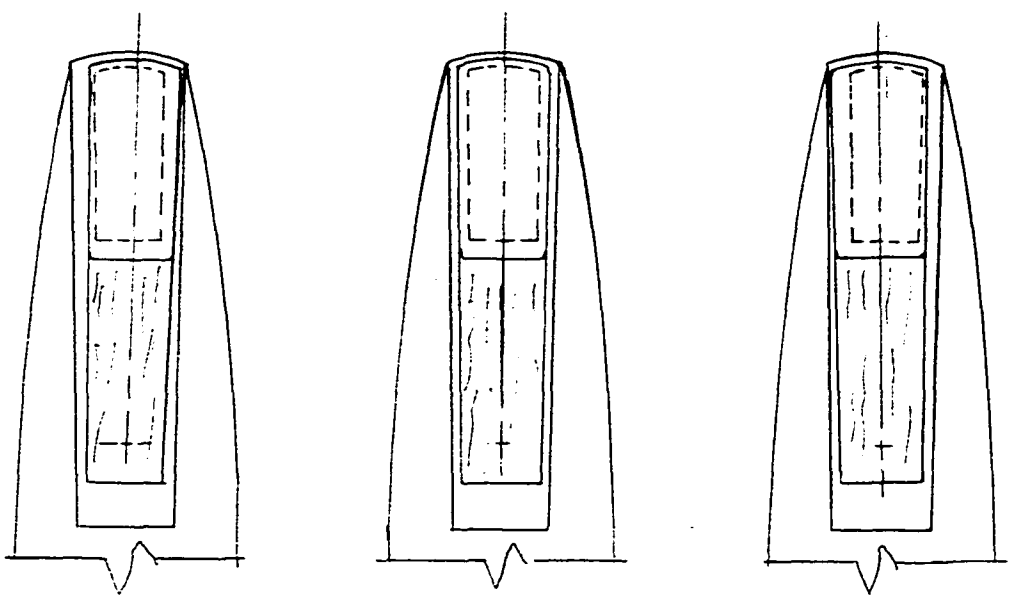


Figure 13

Randall Paul Reed Balancing Detail

The figure in the middle shows the reed in a neutral position. A reed would be considered to be perfectly balanced if it played clear and strong in this position. Usually this is not the case. In most instances the reed will play slightly fuzzy, which is a good indicator of an unbalanced condition. The figure on the left shows a reed shifted into a position that makes the reed play artificially softer on the left-hand side. Notice that the left-hand side of this reed is below the left rail similar to the way a reed in the lowered tip position is below the tip rail. When a reed is shifted so that the edge of the reed is toward the window of the mouthpiece (broken lines), that portion of the reed will play artificially softer. This is why I call this position the "soft position." The figure on the right shows a reed with the "soft position" on the right.

How to test for balance

Put the reed on the mouthpiece in neutral position and play an "open G" on the clarinet. For added convenience hold the reed in place with your left-hand thumb instead of using the ligature. Play this note at a medium dynamic and notice the amount of fuzz in the tone. Shift the reed into the "Left-Soft Position" (like the figure on the left side of the page) and play the "open G" note again. Like before, listen for the amount of fuzz in the tone and make a point to remember the sound. Now, move the reed into the "Right-Soft Position" and play the "open G" note again. If the reed is unbalanced, one of these positions will be superior to the others.

What to do

If the reed plays best in the neutral position, but still has fuzz in the tone, the reed is balanced but too hard. The remedy for this position is to sand the entire vamp surface lightly and evenly. If the reed plays best (clearer) in the Left-Soft Position, sand the vamp on the Left side and repeat this process. If the reed plays best (clearer) in the Right-Soft Position, sand the vamp on the right side and repeat the process. When the reed plays with the same amount of clarity in all positions then the reed can be called balanced. When my reeds are balanced and suit my taste for tone and resistance levels, I consider the reed completed. At this point I will clip the reed with a standard reed clipper. For specific dimensions of an idealized reed of my design, see the diagram that follows.

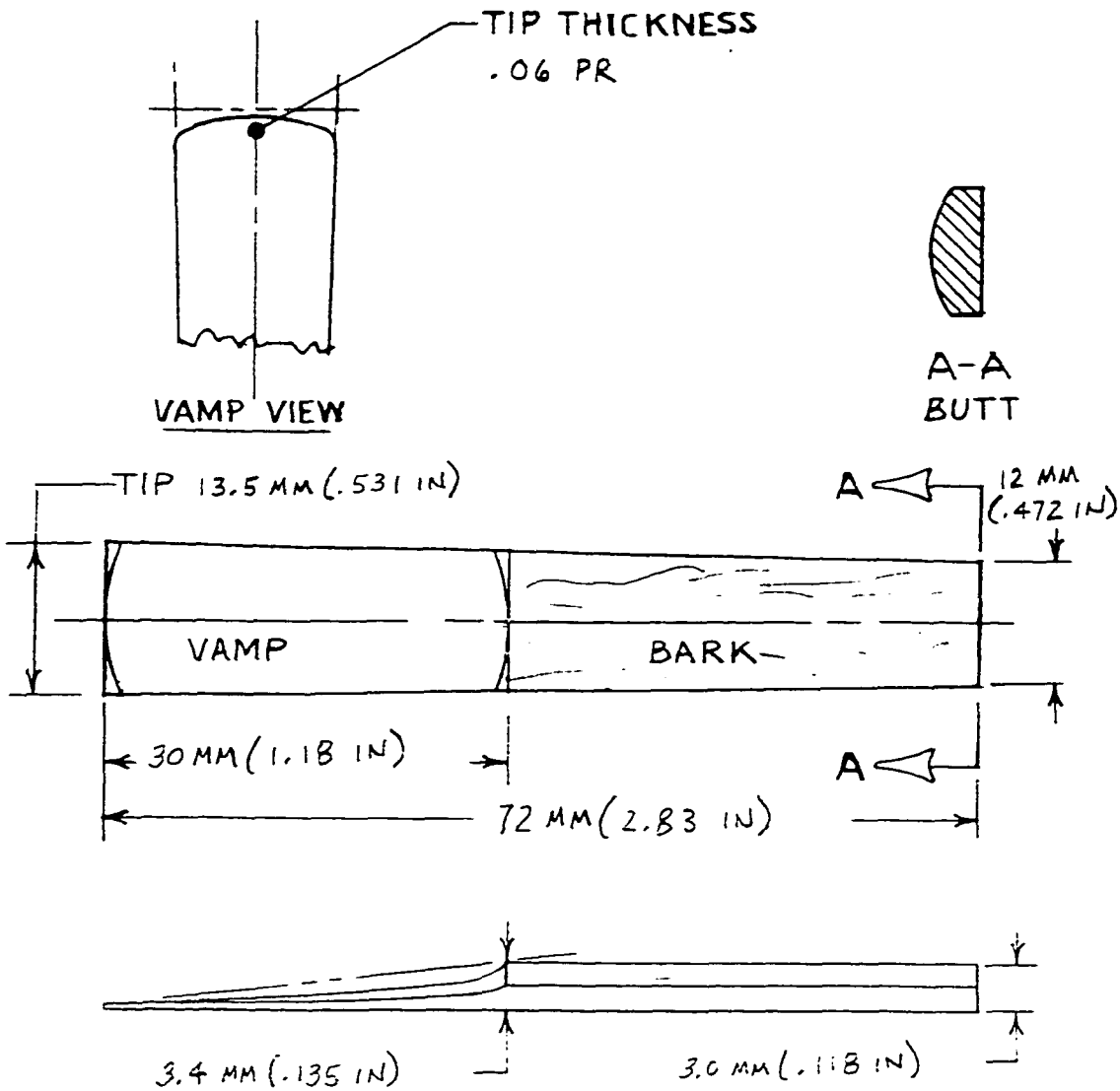


Figure 14

Randall Paul Reed Dimensions

Special Tricks

I have found several preservation tricks useful. Soaking the reed overnight in olive oil preserves the reed by making it more impervious to moisture and has a tendency to make the reed play harder and darker. Polishing the reed surfaces on the back (non-abrasive) side of the sandpaper works well also, but this can be taken a step further. Rub a little paraffin wax on to the surface of the smooth side of the sandpaper and then polish the reed as before. The wax will fill the tiny pores of the reed surface giving a highly glossed finish and sealing the reed very tightly. If this is done on both surfaces, the reed becomes very impervious to moisture and has a brilliant tone color. If you like this effect but would like to have the tone less brilliant, repeat the same process using bees wax instead of paraffin. This wax is heavier and changes the vibrational characteristics of the reed.

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APPENDIX

A SELECTIVE LIST OF RETAIL SUPPLIERS OF CANE AND EQUIPMENT

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