

Gamba

Newsletter of the Pacifica Chapter
of the Viola da Gamba Society of America

NEWS

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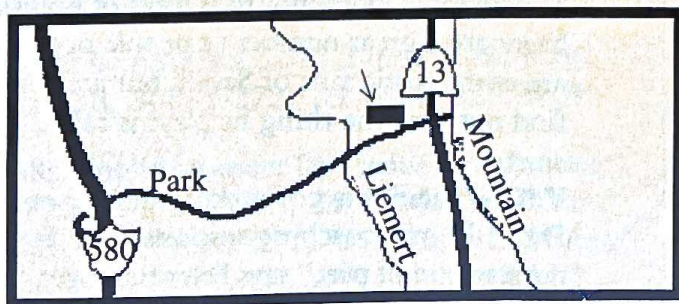
Coaches for Consort Meetings

David Morris to Coach Sept. 12

David Morris, a professional gambist and baroque cellist who has been a favorite instructor and conductor at many early-music educational events, will be our in-house consort coach. Mr. Morris will be available during the morning session. He will be with us on Sept. 12; for his other coaching dates, please see the schedule inside.

At each meeting there will be a \$5-per-participant charge for all playing members in coached consorts; those in preformed consorts at those meetings where coaching is available are not obliged but strongly encouraged to pay the fee and so be able to take advantage of Mr. Morris's skill and expertise.

Our September 12 meeting will be held at Zion Lutheran Church, 5201 Park Blvd., Oakland, at 9:30 AM. The church is just downhill from Highway 13. Please consult the sketch map.



Please bring a music stand; coffee, John Mark's self-clumping nondairy whitener, music and consort groupings (by request) are available, the latter based on the information you send on your reply postcards.

Neil Hendricks of Reno has donated all his rental viols to VdGS/Pacifica. He continues to give generously of his time and energy by repairing his instruments for us free of charge. VdGS/Pacifica has recognized his generosity, and his role as a provider of first instruments for so many people, by declaring him our first and only honorary life member.

Ballinger New Board President

Peter Ballinger of Albany has succeeded Julie Jeffrey to the presidency of the VdGS/Pacifica board. Mr. Ballinger is a retired chemist known to many as the proprietor of PRB Productions, the publisher of a wide range of ancient and modern music, much of it for viols. He has long been active in VdGS/Pacifica, having in the past been president and newsletter editor.

Julie Jeffrey, the departing president, will be less visible next year, due to concert commitments including dates on the East Coast and in Europe.

Gamba NEWS

Volume 11, Number 10 • June 1999

From abattoir to concert hall

A gut-string maker describes his art

By Dan Larson

For thousands of years, the choices of musical string materials were few. Usually they were limited to some indigenous material adapted to the task. If you lived in the East the logical choice would be silk, where the fibers were processed, twisted and braided into musical purity. Horsehair would be used if you lived in Scandinavia. In tropical regions plant fibers would be twisted and spun into a cord. The European West chose an equally unlikely material — animal intestines.

Gut still defines the standard of violin tone. The highest praise that can be lavished on one of the new synthetic strings is that it sounds "as warm as a gut string." No one knows exactly when gut was first used for musical strings. Legend has it that Apollo was the first string maker. When he came across the tortoise and had the inspiration to make the first lyre he used the poor animal's own intestines for the strings. The first actual proof of the use of gut strings came in 1823, when some of the earliest extant musical instruments were discovered in the tombs of Thebes. These harps had gut strings that allegedly still made a tone after some two thousand years in storage.

Gut strings are made from the small intestines of sheep. The process begins at the abattoir. The intestine is also known as a casing and is referred to in the trade as a set. The intestine must be pulled from the

Coached-consort meeting June 12

Our June 12 meeting will be held at Zion Lutheran Church, 5201 Park Blvd., Oakland, at 9:30 AM. The church is just downhill from Highway 13. Please bring a music stand; coffee, music and consort groupings (by request) are available, the latter based on the information you send on your reply postcards..

Consort coaching will be provided by David Morris. David has taught at UC, the San Francisco Conservatory of Music, the Crowden School in Berkeley, and Mills College. He is the founder and music director of the baroque-opera company Teatro Bacchino. He performs as 'cellist and gambist with Philharmonia Baroque Orchestra, American Bach Soloists, and the Mills College Baroque and Classical Players; and has recorded for the Harmonia Mundi, New Albion and New World record labels.

animal immediately after slaughter while the gut is still hot. This will ensure that the blood vessels that run into the casing will be broken off close to the gut wall. To allow the organs to cool will risk having these veins break off away from the

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casing wall. This creates "whiskers" that lower the quality of the gut for musical string use.

The gut must then be separated from the fat, stripped of manure and put into cold running water. Once a group of five or so sets are stripped they are bunched and knotted in the center. This is known as handling the casing "on the double" – that is, at the center. Such an arrangement makes it easier to handle the thirty yards of length and eases the strain on the material.

These bundles are put into large containers and await collection by the dresser, who soaks them in cold water. Soaking softens the submucosa membrane ("C" in the diagram of an intestine in cross-section, right) and prepares the set for the next step, stripping and crushing, in which all membranes are removed except for the muscle fibers that will be used in making the strings.

Traditionally stripping and crushing was done on wooden boards with a metal-bladed scraper. This is hard work. Fortunately, the crusher/scrapper machine (photograph at far right) has been developed to do this task. The sets are sent through the crusher/scrapper doubled at the middle. They go through a set of three rollers. The first two sets crush the mucosa membrane and squeeze the gut tube to push the liquefied membrane down through the casing. The third set squeezes the last of the mucosa out of the tube and separates the outside serosa membrane ("A" in the diagram) from the muscle layers. The casing leaves the scraper as a clean tube of muscle fiber ("B") twenty-five to thirty yards long.

It is now ready for sorting. Sorting takes place on the sorting table. This is a stainless steel or rubber surface about waist high that has one or two water spigots set into it. First, the casing is checked for length. Then one end of the tube is filled with water to inflate a section of the tube about eight to twelve inches long. This inflated section is used to gauge the caliber of the casing. The gauging system separates the casings by outside diameter. Casing caliber is checked with a small rack that consists of six or seven slots of varying width. The first slot is 18 mm wide, the next is 20 mm, then 22 mm and 24 mm, and so on. Workers will test the inflated tube in the various slots until the most comfortable caliber is established. Then the water in the filled section will be run down the length and the caliber checked again at several points. As the water is moved through the tube it is also checked for holes. Small pin holes are to be expected. These are where the blood vessels entered the tube. At the site of large holes, the casing is cut.

At the same time the casing is being checked for color and general condition. Quality can vary with breed and age of animal, elapsed time since slaughter, weather conditions

and handling. Great judgement is required to take all of these factors into consideration and select the best use for a casing. Intestines are not the same diameter along the entire length. The upper section is wider in diameter for about 20 yards than the lower section. This is referred to as the first cut, being the first part of the casing and the most valuable to the dresser. First cuts are usually 22 mm – 24 mm and are valuable for sausage casings. The lower section of the casing is known as the second cut and can measure from eight to fifteen yards. Second cuts are typically 18 mm – 20 mm. These are the best for strings.

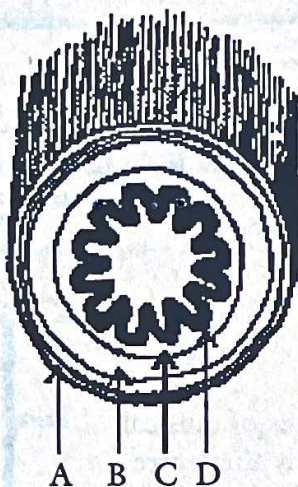
First and second cuts also differ in structure. The function of the upper section is to pulverize food in the digestive tract, so the muscle fibers are shorter and oriented more around the circumference of the tube. As the food is moved down the intestine the muscle fibers lengthen because the function is more to push the used material down. These longer fibers make stronger, more stable strings.

Selected casings are grouped together in "hanks" of about 100 yards of material. Hanks are stored in salt; the salted hanks are stored in barrels in a semi-dry condition until the string maker is ready for them. The first task of the string maker is to rehydrate the hanks of gut

and wash the salt out. This is usually done with an alkaline solution of some kind – lye, wine lees or potash. Today soda ash is customary. The strength and temperature of the solution is critical. It is possible to reduce the gut to a gelatinous mass if the solution gets too strong or too warm.

The gut comes to the string maker as a long tube, but it is not a straight tube. In the body the intestine curves back and forth so that a long length can be packed economically into a small space. One side of the intestine, the outside of the curve, is longer than the inside. So, when you stretch out a whole gut, the inside will become tighter. To twist a number of these whole guts together is to have a string that does not distribute the tension evenly between the muscle fibers. To solve this problem the Germans developed a device called the splitting horn, also known as a *soutil* or *subtle*, taken from the Italian word *sottile*, narrow or slender. This tool will divide the gut length into two or more ribbons. The ribbons can then be stretched more straight and the tension spread more evenly through the muscle fiber structure. The two ribbons are referred to as "rights," or "smooth side," and "lefts," or "rough side."

Both ribbons have special uses in string making. The rights are cut from the outside of the casing where the fibers are a little more pure. When the ribbon is laid flat the edges are smooth and straight. The rights are used for the treble strings up to a diameter of one millimeter or so. Lefts are made up of the inside of the casing. The villi and other

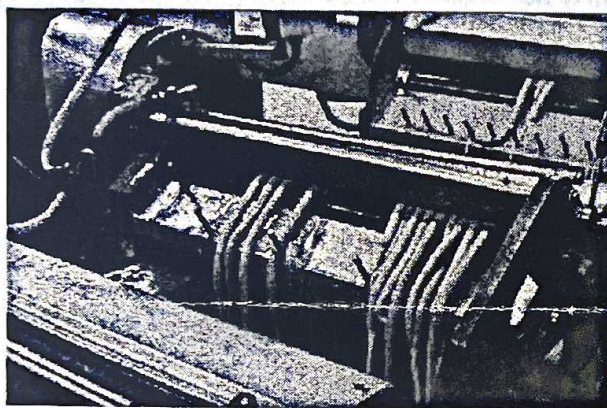


Illustrations courtesy of Dan Larson

blood vessels are located at this point on the gut. When the lefts are laid flat the edges are rough and irregular. Lefts are used for larger strings, requiring a buildup of mass but not so much strength.

After a batch of gut is split it is ready for cutting and processing. The processing is basically a controlled fermentation of the gut. Enzymes in the gut are activated by the alkaline solution and heat. Careful monitoring of the solutions and frequent changing of the water cause the oils and fat to break down in the gut, leaving a pure fibrous collagen structure. Solutions are changed four times a day and the gut will be scraped at least once a day. I use a black plastic board as a base to scrape on. The wet gut becomes translucent over the black background and it becomes easy to see flaws and imperfections in the material. This process goes on for four days. If done correctly the gut comes out as long, beautiful white ribbons. If the solution is too warm or too strong the gut will break down and become useless.

If the gut is brought straight from the processing solutions to the twisting bench, the strings will come out some shade of yellow-brown. The tradition has developed to whiten and clarify the gut. There are two primary ways this is done. One is with sulphur fumes and the other is with a bleaching solution. In the fuming process the strings are first twisted on racks and the racks of strings are gathered in a small room that can be tightly sealed. The strings are still slightly damp and freshly twisted. Sulphur powder is placed in the room and set on fire. The room will then be tightly sealed to prevent the infiltration of air. In the sealed room the sulphur will consume the oxygen and create new sulphur dioxide compounds in the air that will whiten the gut strings.



The other method of whitening is to immerse the gut in a bleaching solution of hydrogen peroxide and water for three or four hours. The gut is allowed to rest overnight before it is twisted.

The twisting bench consists of a long table with spindles at one end and a bank of hooks at the other. Gut ribbons are bundled together and twisted between spindles and hooks. The ultimate diameter of the dry string depends on the width of the gut ribbon and the number of ribbons that are twisted together. More ribbons creates more mass and

therefore a thicker string. The ribbons are counted out and tied to a string loop that is hooked onto the spindle. The string bundle is then combed through with the fingers to straighten the ribbons and distribute the tension evenly between them. Then the bundle is tied to another string loop at the other end.

The ribbons are not pulled tight, but rather sag in the middle. This is referred to as the "swing." Thicker strings require more swing than thinner strings to develop the necessary angle of twist. Ratios of swing to string length to diameter to twist angle are proprietary to each shop and greatly influence the quality of the finished string. The strength of the twisted structure will decrease somewhat as the angle increases, but the flexibility of the string will increase. Balancing between the two is the essence of the art of string making.

Once the gut has been twisted it must be dried and seasoned. The drying process must be very slow for the collagen in the gut fibers to bond together properly. Twisting should be done in a very damp environment. As the string is twisted, water is wrung out of the fibers. The balance of the moisture is absorbed in the air around the string. When the string loses this moisture it also loses diameter and gains in length, and the string becomes slack between the two hooks. It is therefore necessary to add more twist to the string to tighten it again. Usually the

string is wetted and tightened in this manner numerous times a day over two or three days before it settles down and becomes stable. The string is then allowed to dry and season for two to four weeks before it can be polished. The usual historical method was to rub the strings with horse hair pads that were treated with oil and pumice powder. This method did nothing to true the string or make the diameter regular. Consequently history rings with complaints about strings being false and irregular.

In the 1800's, a maker came up with a way to make the string a regular diameter throughout its length, and the purpose of polishing became to

rectify the cylinder of the string to make it round and uniform. This was first performed with a flat bed polisher, a long table with hooked spindles at each end. The spindles were connected from end to end so that they turned at the same rate. Strings were mounted on the hooks and rotated as on a lathe. With the strings spinning, two boards lined with sandpaper were moved back and forth along the bed., sanding the string to a regular cylinder.

While this machine was an improvement it did not work perfectly, and a lot of strings were still false. The concept

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of the centerless grinder was introduced to the string making world sometime in the mid 20th century and revolutionized the trade. With the introduction of this machine the string maker could almost guarantee that each string would be perfect in fifths. The mechanism consists of two abrasive wheels turning in opposite directions with a space between them. One wheel is set at an angle and acts as a drive wheel that pulls the string through at a regular rate. The other wheel is an abrasive stone that removes material from the string. By regulating the space between the wheels the diameter of the string can be controlled to perfection. The freshly twisted, unpolished string is usually reduced by 20 per cent to form a regular cylinder. Strings are twisted in many different sizes so that each

string can be polished to a specific diameter without compromising its twisted structure.

I feel that is important that violin makers, repairers and players have some understanding of the art of gut string making. Although modern string materials have been developed that do more or less the same job with fewer problems, there is no sound more beautiful than the tone of a good gut string.

Thanks to Dan Larson for permission to print a shortened form of his article, which can be read complete (including sources) on his web site: www.daniellarson.com.

Dan Larson, 26 N. 28th Ave. E., Duluth, MN 55812. Toll-free phone/fax : (888) 724-8099

A Concert of Renaissance and Baroque Musical Duets played by JOHN DORNENBURG, bass viola da gamba, and LYNN

TETENBAUM, bass viola da gamba, Sunday, June 20, 1999, 2:00-3:00PM. Environmental Education Center, Tilden Nature Area, East Bay Regional Park District, Berkeley; tel. (510) 525-2233. Admission Free.

MARY SPRINGFELS will be coming to the second week of the SFEMS summer baroque workshop in Marin, not the first as reported. Master classes from instructors at the workshop may be available; for more information call Anna Carol Dudley at (510) 527-3748.

Tentative dates for our next season of consort meetings are now available, thanks to JOHN MARK. They generally fall on the second Saturday of the month, and are as follows:

Sept. 11; Oct. 9; Nov. 13; Dec. 4 (the first Sunday of the month); Jan. 8; February date at Stanford

with John Dornenburg TBA; Mar. 11; no April meeting, on account of the North/South meeting in Fresno (April 28-30); May 13; no June meeting on account of the Berkeley Early Music Festival.

Announcements

CAROL HANSULD of the VdGSA board writes: The Berkeley Early Music Festival and Exposition is coming! The VdGSA and the Pacifica Chapter will again be renting and hosting exhibit space. You can help plan!

We will need performers, stage managers, booth volunteers and ideas! We want to showcase the viol in as many ways possible, for example, mini-concerts to show off the solo viol, viol consorts, and mixed ensembles.

Helpers may "booth-sit," demonstrate the viol, organize a round table discussion, help with a "petting zoo," and more. Donate your time, energy, and/or ideas by contacting Carol Hansuld at 13661 Del Prado Dr. S., Largo, FL 33774 or <Marsaudio2@aol.com>!



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