CHAPTER 6

STUDY OF THE STRUCTURE OF VEENA AND VIOLIN

6.1. Veena

Veena is a confusing name when one tries to understand the origin. Many of the instruments are called Veena in ancient texts. The Vedic harps which were stringed and did not have the fingerboards. Others like the Ravana Hastha were bowed. These varieties were primitive in their construction and the materials used. The Mahathi also a Veena used in the north and known as Been. There is the Kacchapi described as the dear instrument of goddess Saraswathi. Haripala (1170 A.D) in his treatise Sangitha Sudhakara has described this instrument which resembles the Sitar. The sculpture of the Kacchapi in Nagarjunakonda (c200A.D) shows it has seven strings and looks like the sarod. The present day Veena which is part of the South Indian Music is called the Saraswathi Veena. This Veena with fixed frets numbering 24, 12 for each octave were perfected by Raghunath Nayaka of Tanjavur, assisted by his Prime Minister Govinda Dixitar. Prior to this the number of frets varied between two and twenty.
Figure 6.1: Kacchapi

These frets were sometimes fixed and also movable in other prototypes. This is the Veena about which the structure is described in this chapter elsewhere. Before moving to the description of the structure and building of Veena, it is relevant to understand the structure of both the instruments to further establish the statuses of both. The art of making musical instruments can be dated back to the Vedic times. Saraswathi Veena which is in vogue today has a lengthy history. Then violin although popularly believed to be argument and established facts and recorded history to tell us that the bowed variety of a stringed instrument was very much in use in ancient India. The Villadi Vadyam of Tamil Nadu is the best example of a bow shaped struck
string. However this is a reference for argument’s sake this vadya can be included as this instrument is not capable of producing any

Figure 6.2 : Saraswati Veena

melody. The vadya has only one rope which is struck to produce sound.

VEENA is often described as the national instrument of India. It is definitely considered sacred. The goddess of learning Saraswathi holds a Veena in her hands. It is said that goddess lakshmi is personified in it. That apart, one cannot argue with the sound of the Veena which is divinity itself. History tells us that all the musical instruments in India are a form of Veena. Plucked variety of instruments dominated music scene for many centuries

16 B.C.Deva Musical instruments of India, Page 120
It is according to B.C. Deva this period lasted nearly four millennia (right from 300 BC to about 11th century)

All musical instruments were called the veena. This term was so widespread in describing the instruments it is difficult to imagine the “Mukha Veena” a wind instrument to be classified in the chordophones in the modern interpretation of musical instruments. These details are important to further delve in to the role of Veena in current day concert systems.

“VETTI JAYTE ASMAAT SWARAHA”

This is a description of Veena which means “that which produces swara”. Raaga are the basis of Indian music is a common knowledge. That the Veena occupies centre stage to put this across is as much common fact. The details of music like Raga classification, shruti, gamaka are all revealed by Veena. Even the human voice is named the Gaatra Veena. We get innumerable manes to this beautiful Instrument from all the ancient texts like, Brahma Veena, Manoratha Veena, Kandola Veena, Molli Veena, Kacchapi, Chitraka, Gaandharva Veena, Swaramandala, Ghoshavathi, Audumbaree Veena etc
Apart from this there was Veena which employed 100 strings which was called the shata tantrika and a Koki which had 21 strings etc were are also in use. One variety of nagaswara is also called as Mukha Veena. The present day Veena was designed by Govinda Deekshitar after several stages of developments and modifications from older times. During the late 16th century Veena had 24 fixed frets with the same shape as that of the “Saraswathi Veena” which is the concert instrument currently.

When the two instruments about which this research is conducted are examined purely on the basis of the time factor in the history of concert music the Veena doubtlessly is the instrument about which we can find instances of discussion. Among the many treatises the Chaturdandi Prakshika, in the chapter of Veena venkatamkhi always takes the lead of his father Govinda dixitar when the Raghunatha Mela Veena is dealt with. The Raghunath mela Veena is the Veena by the order of technique in construction which is followed in todays Veena which is sometimes also is called the Saraswathi Veena.

Venkatamakhi describes two kinds of Vena, The shuddha mela and the Madhya mela Veena. Both have seven strings. Four for playing the melody and the three for tala and shruthi. The two types of Veena differ in the tuning of the four melody strings. The
string farthest from the player is numbered one, and the nearest numbers one. The current day tuning practices are derived from the tuning of the Raghunath mela Veena. The tuning itself is the core factor which represents not only the convenient playing tuning but the basis of many other references to the ancient practices. The south Indian flute follows the same tuning perforations on it. The madhyama is said to be the adhara to the tuning of these instruments. Ramamatya in his Swaramelakalanidhi (1550) describes two kinds of Veena Shiddha Mela and the Madhya mela. This tuning is followed later by Venkatamakhi.

![The sarod, North India.](image)

**Figure 6.3 : Sarod- North India**

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The sitar. Kashmir. Note again the movable gut frets, as in the rabab and the sitar.

Figure 6.4 : Sitar- Kashmir

The sitar.
North India.

Figure 6.5 : Sitar- North India
Figure 6.6: The Concert Sarangi- North India

Figure 6.7: The Sarinda and the Dotara- Tripura
Figure 6.8 : The Esraj- Bengal and The pena- Manipur

Figure 6.9 : The Pulluvvan Veena- Kerala
Sangitha Ratnakara mentions the fixing of the frets on the Veena called the Kinnari. This Kinnari may not be the same as that of the kinnari Veena which adorns our museums. In the opinion of many experts the fretting of the Veena is fraught with errors. For e.g. the makers often make an error at the trishruthi Dhaivata. This statement is also always accurate. If an error occurs on any part of the fixing of the wax then the whole fretting goes wrong. I would like to draw a comparison with Violin. The expert violin building have a better working prototype as compared to the Veena. We have hardly a problem while an instrumentalist is choosing the violin as the main problems are all taken care of. In the later chapters I have explained an experiment called the Paris experiment in which the musical quality of various types of violins is tested by violinists of repute. The conclusion there was that not much difference was detected when a Stradivarius or a modern instrument was presented to the player. Can we be so fortunate with Veena? Absolutely not. Having a good quality Veena is very essential to even venture into music.
Figure 6.10 : Violin- Indian style of playing

Figure 6.11 : Ravanahasta- Rajasthan
Govinda dixitar was the greatest contributor to the construction being centralised and calibrated according to the changing performance aspect. It can be listed as follows:

**Figure 6.12 : Kinnari**

- In the Suddha mela Veena described by Ramamatya, there were nine long frets which could be played on all four strings and five short ones which could be played only on the sarani. Similarly in the madhayamela Veena also, there were ten long frets across all the
four strings and short ones on the sarani. It is probable that it was Govinda dixitar who used 24 frets of equal length across all the four melody strings.

- We do not find any reference to bee’s wax in Swaramela kalanidhi or earlier works. The frets were movable and were tied with guts as is done on the Sitar. The use of wax keeps the frets fixed while allowing the player to do minor adjustments in tuning applying a little heat to the wax and moving the frets.

Note: the above said minor adjustments are not everybody’s cup of tea. Still it is possible when we give the same thought of “minor Adjustment” to violin also it is unthinkable. This is perhaps one of the minority advantages the Veena has over the violin.

Yajnanarayana dixitar son of Govinda dixitar and brother of Venkatamakhi mentions wax in his description of the Veena. It seems that it is again Govinda Dixitar who deserves credit for this innovation. There can be traced & distinct stages of development on this Glorious Instrument. Till the 7th century the Veena did not have fixed frets and was known as the “YAAZH”. This is a form of Veena was used as an accompaniment to vocal renderings. The strings were all tuned to a particular raga or melody. Yaazh was
played by plucking the strings. This type of tuning made it difficult to play Embellishments or gamkaas. As the raga system itself underwent periodic changes and as the raga system evolved, many new gamaka’s were added. These gamaka’s became the salient feature of particular Raaga. This paved the way for Yaazh to go on obscurity as many of these gamakas could not be employed on Yaazh. To play these gamakas frets were added to the Yaazh. This in turn underwent many changes early on and the present day Veena was born. Some features of the Yaazh however were retained. The Yali Mukha is one such feature. The Veena occupied the coveted place of the Yaazh. The Raga alpana paddhati, the important branch of performing art music contributed to the changes done on the Veena forcing the yaazh with its limitations to exit the scene of classical music. The experiments and improvements on the Veena continued over the centuries by musicians and musicologists of those times.

These changes and improvements were noted by musicians and were written about in ancient texts. SANGEETHA SUDHA a treatise written by Govinda Dixitar during the 17th century has details about these. In the book the modern day Veena with 24
frets and the making has been documented. The present day veena has 4 main strings, 3 tala strings and 24 frets.

Figure 6.13 : Thanjavur veena
6.2. Construction of Veena

The Veena consists of a large pear shaped bowl called Kudam. It is hollowed out of a single block of wood and the Mysore manufacturers use black wood for the purpose. The block of wood that is intended for the Veena bowl is preserved for a long time and portions are scooped out at long intervals. In the later parts of this section the more detailed description and other types of technique of building the kudam is made.

The mellifluous tone of a Veena be it a tanjore to Mysore or any other variety is not an easy one to achieve. There are some rules of the thumb but it is a sad thing that it is always luck which determines one procuring a Veena of good tonal quality. The art of
the Wax fretting is all but disappearing. This can be a major factor in a student getting derailed by the Instrument itself in learning good music. A wrongly fretted Veena can kill musician’s perceptions of Shruthi. To a beginner this is a complete letdown. Much needs to be done on this front.

However a few noble efforts have been made in this direction. Sir. C.V. Raman has worked out exact amplification of the broad curved bridge on the Veena (1931) the vina gives out in plucking, a particular overtone not heard in the strings of the violin. These are some factors relating to the difference of tones in these two great Instruments. And like most other areas of art the liking and disliking or tolerating these are purely subject to individual tastes of the listener. Undoubtedly these choices a Carnatic music lover has of tones and varieties add to the music being continually evolving, bettering and the glory always upheld.

Construction of any musical Instrument requires the greatest expertise in the makings and definitely musical knowledge. The greater the musical ear the more perfect is the result. This is an art followed by Instrument maker of our country from time immemorial. The Veena particularly takes a keen ear and perfect knowledge in all the departments of the making like the wood quality, metal
properties, perfect tune sense etc. The complexities of the Veena’s structure by itself are a fascinating one. This is one of the larger instruments used in the concerts. In the Carnatic music scene only one other instrument Gotuvaadya is as big as or sometimes bigger than the Veena. Both these share a lot in common. This comparison is a vast subject in itself.

Three main parts are prominent in the present day Veena. The resonator or the Kudam, the Dandi, and the vyali face. The part which rests on the left thigh of the player is known as the sore burude or the Gourd head. The seven strings comprise of the 4 main playing strings and 3 taala strings also are called the drone or the shruti strings. The names of the seven strings, their gauge numbers and notes to which they are tuned are as follows:—

- Sarani – Madhya sthayi shadja-
  - Generally gauge No.31 steel.
- Panchama- Mandrasthayi panchama
  - Gauge No.29 steel.
- Mendham- Mandra sthayi shadja-
  - Gauge-26 brass.
- Anumandra- Anumandra sthayi panchama

- Gauge -24 brass.

- Pakka sarani-madhya sthayi

- Gauge-33 steel.

- Pakka panchama-Madhya sthayi panchama

- Gauge -34 steel.

- Hecchu Sarani-Tara sthayi shadjgauge-36 steel.
Figure 6.15: Parts of Veena
The resonator is a semi spherical hollow of the wooden log. Mainly the jack wood that too of the black variety is used to carve this part. This bowl is about 2 inches in thickness of the wood. The top of this bowl is covered with wood either from the same source or other seasoned wood. It is about three fourths of an inch thick. Depending upon the makers this can also be thinner up to even quarter of an inch thick. The thinner variety is prevalent in the Mysore variety of the Veena A small hole is made at the centre of this piece of wood which is also known as EDE HALAGE in Kannada. This hole is the BRAHMARNADHRA. A bridge made out of ebony or redwood or ivory covered with a metal piece of the width and breadth to match is fixed on the Veena with the help of a thin piece of metal on either side. This is usually an iron nail with the head cut-off. Sometimes in the older Veena this headless nail is not used as the tension of the strings passing on the bridge itself holds it firmly in place. This piece anchors the 4 main strings. One side of this bridge is usually elevated to about 3 cms usually made of a thin and sturdy piece of rose wood with 4 groove cuts to enable the strings to pass through. In turn the strings are attached to one side with the main Lunge or the anchor. This Lungar has another double piece of metal wires with a metal ring which is used to secure the end of strings. This is called the Nagapasha. The
nagapasha if it extends beyond the curve of the veena’s resonator is secured by a nail or is glued on. These wires are held in place by either carving small holes and tying them on to the face of Veena or sometimes a circular metal piece is used to achieve the same result. The circular shape is sometimes of different shapes other than round. The other end of the string passes over the frets and is tied to pegs on the yali muka end. These pegs are mainly in black wood with a decorative head. There are small holes in the middle of the peg hands. The strings are tied by passing it through one end of the hole and securing them on the other side by locking it by turning the pegs and tightening the strings. All the 4 strings are tied in this way. There is a curved metal piece of about a width of half an inch is placed on the side of this bridge. This is the bridge which holds the tale strings. This can be either in steel brass or some rare occasions in ivory or a deer’s horn. Three groves are cut on this on the side of the Nagapasha end to enable the taala strings to pass through them before securing the strings on the pegs on the dandily as against the tala strings are on the side of the player and not on the side facing the audience. The strings are tied in a similar fashion as that of the main strings except that the pegs on the tying side is secured in the middle of the dandi. The dandi itself is attached to the Resonator on one side and the
Yalimukha on the other with the help of wooden nails. Sometimes this is secured using glue or metal pieces or nails.
6.3. Detailed Description of the Construction of Various Components of the Veena

6.3.1. Kuda or the Resonator

The resonator is the very visible and important part of the Veena. This is the part where the sound gets magnified as also enriched by the clashing of vibrations occurring non all the 7 strings of the veena. The kuda is made with the jack wood. This is an elaborate process and takes a long period of time to select the wood, season it and only after these the wood is carved out with care and precision. The kuda is usually of a thickness of 2 plus inches all along. Some schools of Veena making scoop out the wood along their natural curve so as not to waste the wood. The sizes of veenas as a result are never uniform as also the resonance and the timbre also vary accordingly. The Tanjavoor Veenas are but an example where in there are many similarities even when veenas are made from different wood and by different artisans. This is a result of following the rules of the art laid down by all those great Instrument makers or the “Jyakaras” as they were known, from ancient times to this day.
The emphasis is not to attain any given size but for the tonal quality. We see many Veenas which may be small in size emanate grand sound. This process of preparing the kuda is a long and laborious one. Many Veena makers have almost called it curtains owing to the lack of skilled artisans, procurement of the right wood reasonable returns for the labour involved etc.

This can be one of the many reasons to the reduction in the number of learners and as a result the number in Veena solo concerts. The top cover on the bowl is then attached to this resonator after it prepared and ready. The “Ede Halage” as it is known in our state is prepared by making provisions to fix the “Bridge”. This is the place where the strings are passed on. Many small holes or two bigger holes are drilled or made on this plank of wood. These holes increase the resonance. It is also decorated using many materials such as pieces of different coloured wood, carved plastic to mimic the ivory decorations which were used previously and sometimes painted to achieve a design around these holes. The sound board is responsible for sound quality as much as the kudam. This board is very thin or thick according to the school of Veena making involved. In the Mysore variety sometimes it is very thin. (5mm)
The bridge or the anchor is placed on this plank. The bridge is built using a piece of wood of good quality and is carved beautifully. The top of the bridge is fitted with a plate of brass and sometimes a piece of steel is used. The Mysore variety has a piece of steel only on the first string or the sarane which is the first string from the side of the player. Rest of the top plate is brass. This results in a different tonal quality between the two main playing strings the Sarane and the Pinkham.

6.4. A Note on the Reverse Playing of Veena

It appears there was a Veena player who could play the Veena in the reverse position. He was known as savyasachi (Ambidextrous Veena Player) the Veena was reversed for such a playing. The strings had to be put in the reverse order to achieve this.\textsuperscript{18} In Mysore there was a player who earned the name Savyasachi in Veena play who could play the Veena both with the gourds on the left while playing on the frets with the left hand and changing the string positions in the opposite way to play with the right hand.

6.5. Study of the Structure of Veena and Violin

\textsuperscript{18} Prof.P.Sambamoorthy, South Indian Music Book
6.5.1. Veena

The Veena can be tuned to almost all the shrutis possible. This is true because the Veena when tuned at the pitch of D sharp can be employed in playing for the pitch of G or 5\(^{th}\) mane or the female 5\(^{th}\) tuning. This can be done by shifting the ‘S’ to the Antara gandhara or the 4\(^{th}\) fret. Similarly a pitch of ‘E’ can be converted to ‘G’ again by making the Shuddha Madhayam the ‘S’ or the adhara shruthi. This is perhaps the only Instrument other than the Voice which can employ on so many shrutis.

Usages of this variety of shruti on a single instrument are many. We have the knowledge that the Veena was in use on many levels in most temple rituals. Dance was an important part of this. When a Veena was used as accompanying Instrument in such times the multiple shruti was very convenient as the Nattuvanga or the vocalist got the mellow or the fast paced support from the Veena as the requirement arose. Veena was also a majestic presence in the Nattuwangam of these recitals. These players were held in highest regard in our society.

Currently the same setup is in place by and large. But there have also been many changes owing to the needs or the populist employ of such recitals. We get to hear more of the flute and violin
in comparison. This brings me to explore the reasons for this reduction in the number of appearance of Veena on concert platforms not only in the dance recitals but as a main musical instrument in an art music rendering area. There are a great many practitioners of this Instrument throughout the history and the epics as we know. It is said that the Demon ‘Ravan” was adept in playing the veena.

I have dealt briefly about many historic aspects of concert music involving Veena earlier in the work. To elaborate the discussion of the various platforms the concerts took place can be revisited. The concert music has been an important part of day to day life in our country. The role of group orchestra is very important in this context. The earliest orchestras are during the Vedic times. The group music was called the Kutapas then. It is referred to in Bharata’s Natya Shastra .Sangita Ratnakara of Sarngna deva. In it the ‘vrinda lakshana’ is discussed in the chapter 3.The sangita Raja by Kumbharaana also refers to kutapas.* King’s courts employed these orchestras during visits of distinguished guests. King Sarfoji (1798-1832) maintained an exclusive classical music orchestra to perform during these visits. We know some remnants of this type of rendering are in practice
even today. In tanjore the descendents of the above said kutapa still perform.

The Mysore kings were great patrons of music. The Band which plays now during the world famous Dakar Festival is the palace band which was maintained and nurture by the Wodeyars. These bands have vainikas and violin players among other musicians even today. The instrumentalist here has a democratic role to play. The music is fixed and individual player will have specific responsibilities. The Veena perhaps will be drowned in the sound of other louder instruments in such group renderings but for the contact mikes which are just a basic requisite for any Veena rendering in modern times.

We can clearly see the path of instruments taking on individual or solo performances by the study of the orchestra. We can also see the induction of many other instruments into our system by the same. The violin and its induction may be a result of the band music Sri. Baluswami dixitar heard and noticed the violin. It owes it place to the efforts of many future violinists who added and improved the techniques to suit Carnatic style.
6.6. Structure of Violin

‘Where ignorance is bliss it is a folly to be wise’ goes a wise saying. Whenever one discusses or mulls over the structural aspects of any given musical instrument this saying gives a whole new perspective to a learner. The fact that the structure and the materials used in making an instrument ultimately dictates the sound quality is delectable. Yet the music produced is another matter entirely.

Here we can try and get the details of the sound post of the violin. Any violinist worth the name knows that the whole tone of the violin depends on the position of the sound post, in relation to the position of the bridge. The placing of the sound post itself is a fine art, for, when the violin gives way owing to tropical heat or onboard the ship it has to be re-pasted or re-glued. There is no one carpenter who can do this adjustment satisfactorily to the needs of a violinist. The approximate positions are the bridge to be in the line of the centre of the ‘f’ holes and the sound post just behind the right foot of the bridge. One can see it all right by reference to the true upper partials heard in all strings and particularly on the SA (2nd) string. The bridge may lean to the front when the violin is in use. One must adjust it on the top only. But
never change the position of the feet of the bridge, when the violin has got its proper tone. If by accident, the bridge gets broken, or the indents thereon become deep.

Figure 6.16 : Violin

6.7. Violin Construction

Violin is a foreign instrument. These are best made in Europe as that is the origin and the place of manufacture from many centuries. The description of the making of the violin is done here with this in mind. Traditionally Stradivarius violins are known to be best. The best woods, especially for the plates, have been seasoned for many years in large wedges, and the seasoning
process continues indefinitely after the violin has been made. Glue joints of the instrument are held with hide glue, since other adhesives can be difficult or impossible to reverse when future repairs are in order. Parts attached with hide glue can be separated when needed by using heat and moisture, or by careful prying with a thin knife blade. A well-tended violin can outlive many generations of players.
Figure 6.17: Parts of Violin

- Fine Tuners (4)
- Tailpiece
- Chin Rest
- Bridge
- Sound Post
- Waist
- F Holes
- Strings Violin: GDAE
- Violin: CGDA
- Scroll
- Tuning Pegs
Two arched plates fastened to a "garland" of ribs with animalhide glue constitute the body of a violin. The "sides" of the box is also commonly known as the ribs. The rib garland includes a top block, four corner blocks (sometimes omitted in cheap mass-produced instruments,) a bottom block, and narrow strips called linings, which help solidify the curves of the ribs, and provide extra gluing surface for the plates. From the top or back, the body shows an "hourglass" shape formed by an upper bout and a lower bout. Two concave C-bouts between each side's corners form the waist of this figure, providing clearance for the bow. Typically the top (also known as the belly)--- is made of quarter-sawn spruce, book matched at a strongly glued joint down the centre, with two sound-holes (or "f-holes", from their resemblance to a stylized letter "f") precisely placed between the C-bouts and lower corners. The sound-holes affect the flex patterns of the top, or table, and allow the box to breathe as it vibrates. A decorative inlaid set of three narrow wooden strips, usually a light-colored strip surrounded by two dark strips, called purfling, runs around the edge of the top, and is said to give some resistance to cracks originating at the edge. It is also claimed to allow the top to flex more independently
of the rib structure. Some instruments have two lines of purfling, or have knot-work type ornaments inlaid in the back. Painted-on faux purfling on the top is usually a sign of an inferior instrument. A slab-sawn bass bar fitted inside the top, running lengthwise under the bass foot of the bridge, gives added mass and rigidity to the top plate. Some cheaper mass-produced violins have an integral bass bar, carved from the same piece as the top. Ideally the top is glued to the ribs and linings with slightly diluted hide glue, to the back and ribs are typically made of maple, most often with a matching striped figure, called "flame." Backs may be one-piece slab-cut or quarter-sawn, or book matched two-piece quarter-sawn. Backs are also purfled, but in their case the purfling is less structurally important than for the top. Some fine old violins have scribed or painted rather than inlaid purfling on the back. The small semi-circular extension of the back known as the "button" provides extra gluing surface for the crucial neck joint, and is neglected when measuring the length of the back. Occasionally a half-circle of ebony surrounds the button, either to restore material lost in resetting the neck of an old instrument, or to imitate that effect.
The neck is usually maple with a flamed figure compatible with that of the ribs and back. It carries the fingerboard, typically made of ebony, but often some other wood stained or painted black. Ebony is considered the preferred material because of its hardness, appearance, and superior resistance to wear. Some very old violins were made with maple fingerboards, carrying a veneer of ebony. At the peg end of the fingerboard sits a small ebony or ivory nut, infrequently called the upper saddle, with grooves to position the strings as they lead into the peg box. The scroll at the end of the peg box provides essential mass to tune the fundamental body resonance of the instrument, and provides a convenient grip for spare fingers to brace against when tuning one-handed, with the violin on the shoulder. Some "scrolls" are carved representations of animal or human heads, instead of the classical. The maple neck alone is not strong enough to support the tension of the strings without distorting, relying for that strength on its lamination with the fingerboard. For this reason, if a fingerboard comes loose (it happens) it is vital to loosen the strings immediately. The shape of the neck and fingerboard affect how easily the violin may be played. Fingerboards are dressed to a particular transverse curve, and have a small lengthwise "scoop", or concavity, slightly more pronounced on the lower strings,
especially when meant for gut or synthetic strings. The neck itself is not varnished, but is polished and perhaps lightly sealed, to allow ease and rapidity of shifting between positions.

Some old violins (and some made to appear old) have a grafted scroll, or a seam between the peg box and neck itself. Many authentic old instruments have had their necks reset to a slightly increased angle, and lengthened by about a centimetre. The neck graft allows the original scroll to be kept with a Baroque violin when bringing its neck to conformance with modern standard.

The bridge is a precisely cut piece of maple, preferably with prominent medullary rays, showing a flecked figure. The bridge forms the lower anchor point of the vibrating length of the strings, and transmits the vibration of the strings to the body of the instrument. Its top curve holds the strings at the proper height from the fingerboard, permitting each to be played separately by the bow. The mass distribution and flex of the bridge, acting as a mechanical acoustic filter, have a prominent effect on the sound. Tuning the violin can cause the bridge to lean, usually toward the fingerboard as the tightening of the strings pulls it. If left that way, it
may warp. Experienced violinists know how to straighten and centre a bridge.

The sound post, or "soul post", fits precisely between the back and top, just to the tail ward side of the treble bridge foot. It helps support the top under string pressure, and has a variable effect on the instrument's tone, depending on its position and the tension of its fit. Part of adjusting the tone of the instrument is moving the sound post by small amounts, both laterally and along the long axis of the instrument, using a tool called a sound post setter. Since the sound post is not glued and is held in place by string tension and by being gently wedged between the top and back, it may fall over if all the strings are slackened at once. The tailpiece may be wood, metal, carbon fibre, or plastic, and anchors the strings to the lower bout of the violin by means of the tail gut, nowadays most often a loop of stout nylon monofilament that rides over the saddle (a block of ebony set into the edge of the top) and goes around the endpin. The endpin fits into a tapered hole in the bottom block. Most often the material of the endpin is chosen to match the other fittings, for example, ebony and rosewood.
At the scroll end, the strings ride over the nut into the peg box, where they wind around the tuning pegs. Strings usually have a colour "silk" wrapping at both ends, for identification and to provide friction against the pegs. The peg shafts are shaved to a standard taper, their peg box holes being reamed to the same taper, allowing the friction to be increased or decreased by the player applying appropriate pressure along the axis of the peg while turning it. Various brands of peg compound or peg dope help keep the pegs from sticking or slipping. Peg drops are marketed for slipping pegs. Pegs may be made of ebony, rosewood, boxwood, or other woods, either for

The bow consists of a stick with a ribbon of horsehair strung between the tip and frog (or nut, or heel) at opposite ends. At the frog end, a screw adjuster tightens or loosens the hair. The frog may be decorated with two eyes made of shell, with or without surrounding metal rings. A flat slide usually made of ebony and shell covers the mortise where the hair is held by its wedge. A metal ferrule holds the hair-spreading wedge and the shell slide in place. Just forward of the frog, a leather grip or thumb cushion protects the stick and provides grip for the player's hand. Forward of the leather, a winding serves a similar purpose, as well as
affecting the balance of the bow. The winding may be wire, silk, or whalebone the stick is traditionally made of pernambuco or the less expensive Brazil wood, although some student bows are made of fibreglass. Recent innovations have allowed carbon-fibre to be used as a material for the stick at all levels of craftsmanship. The hair of the bow traditionally comes from the tail of a white male horse.

Strings. Wound strings avoid the flabby sound of a light-gauge string at low tension. Heavier Strings were first made of sheep's intestines (called "catgut"), stretched, dried and twisted. Contrary to popular belief, violin strings were never made of actual cat's intestines. Plain gut strings are used in both modern and "period" music though in recent years the "baroque" (historically accurate performances) players seem to use them more often than those musicians who play later period music or play baroque music in a "modern" style. Gut strings are made by a number of specialty string makers as well as some large string making companies.

In the 19th century (and even earlier though not yet prevalent) metal windings were developed for the lower-pitched gut ain-gut strings at a suitable tension are inconvenient to
play and difficult to fit into the peg box. The core may be synthetic filaments, solid metal, or braided or twisted steel filaments. The uppermost E string is usually solid steel, either plain or wound with aluminium in an effort to prevent "whistling." Gold plating delays corrosion of the steel and May also reduce whistling. Stainless steel gives a slightly different tone. Synthetic-core strings, the most popular of which is Perlon (a trade name for stranded nylon) combine some of the tonal qualities of gut strings with greater longevity and tuning stability. The violin makers have come to be more experts as compared to the technical details in building musical Instruments. As Indian musical instrument maker even today relies, mostly on his auditory abilities in identifying the problems. To a large extent it is trial and error. This fact cannot be replaced entirely as the musician who is the owner of such an instrument also takes an active part in repairs and corrections. This process of understanding the making is a fine art. Many of our own Instrumentalist s is also experts in making minor repairs themselves. In the realm of the modern day concerts, when an artist travels so widely this skill becomes essential. When a Veena artist travels to other parts of the world and if the Veena requires
some urgent adjustments she or he will have to make them. One cannot always find a repair person handy in such situations.

A note comparing the problem of minor repairs and the relationship of this to the concert:

As discussed above the Veena not only because of the bulkiness but because of its extra sensitive nature is more delicate in comparison to violin. A violinist perhaps can get a replacement of his instrument elsewhere in the country and outside the country. How many times can this be true for a Veena artist? Even though we have many numbers of Veenas in other parts of the world the condition of the instrument may not always be conducive to play a concert on the borrowed instrument. Even within India most of the people who own a Veena usually ignore its safety and often it will be in many stages of misuse and damage.