Musical Instruments have existed from the dawn of human history. They constitute an important item of a nation’s cultural wealth. If there were no musical instruments, there might not have been any music theory or grammar. For, there is no way of measuring vocal sounds directly in the throat itself.

Musical instruments are the tangible and material representation of music which is an auditory art. A study of these helps in tracing the evolution of music and also explains many aspects of the material culture of the group of people to which these instruments belong. For instance, the hair used for making the bow, the wood or clay used for making the drum, or the hide of animals used in the instruments, all these tell us about the flora and fauna of a particular region.

Nature revealed several instruments to man. It is said the early man discovered the holes drilled on the sides of bamboo stems by beetles and chafers which created sweet musical notes. And hence the idea of making a flute by boring holes on the sides of a cut stem of bamboo suggested itself to man. That is how the earliest resonant wood that man discovered is bamboo. Similarly the ‘Bhoomi Dundubhi’ referred to in the Vedas is only a pit dug in the ground, covered with a stretched skin and when beaten with a stick created sound. Similarly, when an arrow was shot, the string of the bow gave a musical note and this paved the way for the development of the harp - the jya of the Vedas and the yazh of South India.
We find various instruments being mentioned in our puranas, epics, sutras, Shikshas, Sanskrit works and music treatises.

The Nandi sutra mentions a number of musical instruments: Maddala, Kadava, Jhallari, Hudukka, Kansala, Kahala, Talima, Vamsha, Shankha, Panava, etc. In Vrhat Kalpasutra we find a classification of musical instruments like Alingya, Vina, Vipanchi, Vallaki, Mahati, Kacchapi, Sughosha, Bhramari, Turna and Dindima.¹

Coming to Puranas, The Harivamsha mentions various instruments which were in use in the period- Veena, Vallaki, Mahati among stringed instruments, Panava, Dardura, Anaka, Muraja, Mridanga, Bheri among membranophonic instruments and Venu among wind instruments. In Vayu purana Mardala, Dundubhi, Ghanta, Jharjhara, Shankha,, Pataha, Bheri, Dindima, Gomukha and Tumburu-vina have been mentioned.

We have plenty of references of musical instruments in the works of Kalidasa too. In Malavikagnimitra Kalidasa refers to Mayuri Marjana of Pushkara. Pushkara was a generic word for drum in ancient times.Marjana was the ancient word for tuning of drums.In mayuri Marjana, the left side of the drum was tuned to the note Gandhara, the right to Shadja and the Urdhvaka or the upper drum was tuned to madhyama.²Among instruments, veena, Vallaki, Venu, Shankha, and drums like Muraja, Mardala and Mrdanga.

Very ancient instruments may be seen as an extension of the human body and we find even today, sticks and clappers. Dried fruit rattles, the dried berries or shells tied to the waist are used for producing rhythm even today. Our body itself is an instrument and is used for keeping rhythm- stamping, clapping, beating, etc, which is why the ancients called the human voice, ‘The Gatra Veena’, while all other veenas are called ‘Daravi veenas’. So any

¹Indian music- Dr. Thakur Jaidev Singh, p. no. 21.
²Indian music- Dr. Thakur Jaidev Singh, p. no. 35.
object that can produce music is a musical instrument. The hand was referred to as the Hasta Veena, where the hands and fingers are used to show the notation system of Vedic chanting, coordinating sound with *mudra*-s -hand gestures.

**The Term Veena:**

Strings of all kinds were called veena. However, it seems to have meant any instrument, including the voice, capable of producing melody. Harps like the Chitra Veena and *vipanchi*, finger board plucked ones like the Rudra Veena, The Saraswati Veena and the Kacchapi veena, bowed ones such as The Ravana Hasta Veena and The Pinaki Veena string instruments similar to the nagaśwara and shehnai were often known as the Mukta Veena. Even today in Hindi *been* means the Rudra Veena as well as the ‘Pungi’, the snake charmer’s wind instrument.

Apart from folk lores and songs, classical literature-right from vedic times – have a fund of information which has yet to be documented. For instance, some of the vedic references are aghati(cymbols), adambara and lambara(drums), nadi(flute), karkari and vana(stringed inbstruments). Ramayana and Mahabharata have: noopura (drums), shankh (conch), venu (flute) and vallaki, a seven-stringed harp.

Another fascinating source is the visual representation in sculptures, icons, reliefs, wall paintings, miniature and illustrated manuscripts. Among the earliest evidences of this kind are finds from the Indus valley scripts and hieroglyphs, we also have illustrations in many cave paintings- right from the pre-historic ones in Madhya Pradesh to Ajanta. Temples and monuments and miniature paintings offer us rich quarries of information.

Instrumental music occupies an important position in Indian music. From very ancient times, a boggling variety of instruments have been used in

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1 ‘Musical instruments’ - B.C. Deva, page no.3.
India, be it string, wind, percussion and others. Various Hindu deities are associated with different musical instruments, thus lending to the instruments a divine element. The Trimurti-s; Shiva, Vishnu and Brahma (His ‘consort’ Saraswati) are associated with musical instruments. Naradaplayed the Mahati, and Anjaneya was a vainika. The Tamil word for instrument-Karuvi is found in Sangam literature of the 2nd to 6th century A.D., the literal meaning of which is tool.¹ This is extended to mean instrument in the context of music.

India possesses a rich variety of musical instruments. As many as 500 instruments are found in India² and each has a distinct name, shape, construction and its own technique of play. These instruments are so designed as to fully serve the needs of the melodic system of music, which are highly evolved. In the making of musical instruments care is taken to see that the quality of the tone is pleasing and delightful and with high precision. As Gamaka-s (graces) are the soul of Indian music, keyboard instruments which give only a fixed pitch found no significant importance and development in our country.

Thus the main principles underlying the construction of stringed, wind and percussion instruments were revealed to man thousands of years ago by nature.

Classification:

Musical instruments can be classified according to the material they are made of, according to the method of playing or according to their musical function.

On the basis of their musical utility, in India, three classes were recognised-

¹Musical instruments by B.C. Deva, page no. 6.
²‘South Indian music’ by Prof. Sambamurthy, volume-I, page 11.
those meant for accompanying singing were known as ‘Geetanuga’ and those used in dance as ‘Nrutyanuga’. Solo instruments were Suska.\(^1\)

Sharangadeva, in his ‘Sangeeta Ratnakara’, gives four categories:

- shushkam (solo instruments)
- Geetānugam (songs corresponding geeta-songs or singing)
- Nrityānugam (dance corresponding instruments) and
- Dvayānugam (Those corresponding to both song and dance)\(^2\)

The Chinese classification depended on the materials of construction: kin (metal), che (stone), t’u (earth), chu (bamboo) and so on.

In the 19th century, Mahillon devided instruments into four broad categories. \(^3\)

- Autophones(later called ideophones), which require no retuning once they are made- for example, bells, rods, rings, gongs.
- Membranophones or drums.
- chordophones or strings
- Aerophones or wind instruments.

Kohala before the 6\(^{th}\) century A.D. gives us Ghana, Sushira, Chramabaddha (bound with leather) and Tantri.

The Sangam works of Tamil (2 nd to 6\(^{th}\) century A.D. give us five classes-

- Tole-karuvi (yole meaning leather and karuvi- tool or instrument.
- Narampu karuvi (narampu meaning gut)
- tulai karuvi ( tulai-hole or hollow)

\(^1\)Musical instruments’- by B.C.Deva, page no. 5.
\(^2\) ‘Vadyalapa’ by Sadananda Kanavalli, p. no. 14.
\(^3\)Musical instruments’- by B.C.Deva, page no. 5.
kancha karuvi (kancha-metal)

Mitatri karuvi (human voice)

But the classification prevalent throughout the world now was formulated in India at least two thousand years ago. The first reference is in the Natya Shastra of Bharata, who is said to have lived sometime between 200 B.C. and 200 A.D., though this date is still a matter of discussion.

Bharata’s Natya Shastra mentions four kinds of musical instruments:

\[
gitam \ caturvidhāt \ vādyāt \ jāyatē \ jo \ parājyate \ |
tattatam \ sushira \ m \ cha \ avanaddha \ ghanamiti \ smritāh \ |
\]

1. The Tata Vadya-s or stringed instruments (chordophones), where the sound is produced by setting the strings in vibration.

2. The Sushira Vadya-s or wind instruments (aerophones), where the sound produced by the vibration of a column of air or tube.

3. The Avanaddha Vadya-s or skin-covered instruments or membranophones, where the sound is produced by the vibration of a stretched membrane or skin.

4. Ghana Vadya-s or idiophones, where the sound is produced by the vibration of a piece of metal or wood.

Other than these we have musical instruments made of ceramic, wood and clay and also Jalavadyas (where the sound is produced by water) which also produce sweet sound. Though these instruments do not come under the classification of musical instruments, they belong to the category of musical instruments too. Some of these instruments are also popular.

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1 ‘Karnataka Sangeeta Lakshya-Lakshana’ by Prof. V.Ramaratnam, page no.47.
Tata Vadya-s or Stringed Instruments

(Chordophones):

The *tata vadya* is a category of instruments in which sound is produced by the vibration of a string or chord. These vibrations are caused by plucking or by bowing on the string which has been pulled taut. The length of the vibrating string or wire, the degree to which it has been tightened, determines the pitch of the note and also to some extent the duration of the sound.

The Chordophones can again be classified into two groups:

I. Plucked and
II. Bowed.

The 'Plucked' can further be classified as:

1. Without frets or fretless and
2. With frets

Examples of stringed instruments without Frets are:

i. Gōtuvādyam

ii. Tamboora

Examples of stringed instruments with frets are:

i. Veena

ii. Mandolin

**Gōtuvādyam:**

Gōtuvādyam is also called by various other names- Chitraveena, Hanumad Veena and Mahānātaka veena. It started to be known as Gōtuvōdyam, the name bestowed upon it by Sakha Rama Rao of Tanjore, who was responsible for bringing it back on the concert screen.
It is played mainly in South India, though its origins can be traced back to Bharata’s Natya Shastra, where it is mentioned as a seven stringed fretless instrument. It has undergone numerous developments, and is today among the more prominent solo instruments in Karnataka music. It is also often seen in collaborative world music concerts and north-south Indian jugalbandis. The fretless nature of the instrument makes it the closest instrument to vocal standards.

**Construction:**

The wood that is used for stopping the strings in the Gōtuvādyam is made of blackwood, rosewood, buffalo horn, ivory or the core of the tamarind tree. This wood is called Kodu in Tamil. An instrument played with this wood came to be known as Kodu Vadyam, which becomes kottuvadyam according to Tamil grammar. The name *gottuvadyam* occurs in the Telugu kavya ‘Shringara Savitri’ written by Raghunatha Naik in the early 17th century.

The instrument has six main playing strings used for melody which pass over the very top of the instrument. It has three tāLa strings (drone) at the side, and a series of about twelve sympathetic strings running parallel and below the main strings. The approach to tuning is in some ways similar to the sitar. In other ways it is similar to the Saraswati Veena. But in many ways Gotuvadyam is unique.

**Method of playing:**

It is played with a slide in a manner somewhat like a Hawaiian guitar. It is played with a slide like a Hawaiian steel guitar and the north Indian vichitra veena. The first two fingers on the right hand are usually used with plectra to pluck the metal melody strings while a cylindrical block made out
of hardwood (often ebony), buffalo horn, glass, steel, or Teflon held by the left hand is used to slide along the strings to vary the pitch.

The chitravina was popularised in South India by Sakharam Rao of Tiruvvidaimarudur. It was later taken up and further popularised by Götuvađyam Narayan Iyengar, who was a palace musician of the old state of Mysore. His grandson Chitraveena N. Ravikiran plays the instrument and is the inventor of a variant, the Navachitraveena.


**Tamboora:**

The tambura, also known by the names tanpura and tamburi is a long-necked plucked stringed instrument found in different forms in Indian music culture. Hindustani musicians speak of
'tanpura' whereas Karnataka musicians say 'tambura'; 'Tamburi' is a smaller instrument used for accompanying instrumental soloists. For practical use, all these types are called 'tanpura' in the text. The first unambiguous reference to the tanpura is in Sangeeta Parijata (1620). It is neither mentioned by the earlier texts nor does it find a place in sculptures. The name tanapura is probably derived from tana, referring to a musical phrase, and pura, which means "full" or "complete". The Tanpura is unique both in its musical function and the way it works. It does not partake in the active part of the music, but it supports and sustains the melody by providing a colourful and dynamic harmonic resonance field based on one precise tone, the basic note or key note. Also, it is not played in rhythm with the music, as the precise timing of plucking a cycle of four strings in a continuous loop is a determinant factor in the resultant sound. Tanpuras come in different sizes and pitches: larger "males", smaller "females" for vocalists, and a yet smaller version is used for accompanying sitar or sarod, called tamburi. One or more tanpuras may be used to accompany vocalists or instrumentalists.

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1 Shri Ashok D. Ranade: Hindustani Classical Music, Keywords and concepts, New Delhi: Promilla & Co 1990.
Construction:

The body shape of the tanpura somewhat resembles that of the sitar, but it has no frets – as the strings are always plucked at their full lengths. It has four or five wire strings, which are plucked one after another in a regular pattern to create a harmonic resonance on the basic note or keynote (bourdon or drone function). Tanpuras form the root of the ensemble and indeed of the music itself, as the tanpura creates an acoustic dynamic reference chord from which the ragas derive their distinctive character, colour and flavour. The strings pass over a wide, arched bridge, the front of which slopes gently away from the surface of the strings.

When a string is plucked, it has an intermittent periodical grazing contact with the bridge; this intermittent grazing of the string on the curved bridge will move around in the sonation process, as the points of contact will gradually shift, being a compound function of amplitude, the curvature of the bridge, pitch and string tension. When the string is plucked, it has large amplitude, moving up and down and contacting the bridge on the down-phase. As the energy of the string's movement gradually diminishes, the contact point of the string with the bridge slowly creeps up the slope of the bridge like a wave out of the sea spending itself on the beach. Depending on scale and pitch, this can take between three and ten seconds. This dynamic process can be fine-tuned using a cotton thread between string and bridge: by shifting the thread, the grazing contact sequence is shifted to a different position on the bridge, changing the harmonic content. The special overtone-rich sound and the audible movement in the inner resonances of tone is achieved by applying the principle of jivari or 'jawari' which creates a sustained "drone or buzzing" sound in which particular harmonics resonate with focused clarity. Jiva refers to "soul", that which gives life, implying that the tanpura embodies an "animated" tone quality. Every single string produces its own cascading range of harmonics and, at the same time, builds up a particular resonance. According to this
principle, tanpuras are attentively tuned.

**Tuning:**

Male vocalists pitch their tonic note (Sa), often at C♯; female singers usually a fifth higher, though these tonic notes may vary according to the preference of the singer. The male instrument has an open string length of approximately one metre; the female is three-fourths of the male. The standard tuning is PA-sa-sa-SA. For ragas that omit the fifth tone, pa, the first string is tuned down to the natural fourth: Ma-sa-sa-Sa. With a five-string instrument, the seventh or NI can be added: PA-NI-sa-sa-SA or MA-NI-sa-sa-SA.

**Tanpuras are designed in three different styles:**

**Miraj style:**

This is the favourite form of tanpura for Hindustani performers. It is usually between three to five feet in length, with a carved, rounded resonator plate (tabli) and a long, hollow straight neck, in section resembling a rounded capital D. The round lower chamber to which the tabli, the connecting heel-piece and the neck (dandh) are fixed is cut from a selected and dried gourd (tumba). Wood used is either tun or teak; bridges are usually cut from one piece of bone.

**Tanjore style:**

This is a south Indian style of tambura, used widely by Karnataka music performers. It has a somewhat different shape and style of decoration from that of the miraj, but is otherwise much the same size. Typically, no gourd is used, but the spherical part is gouged out of a solid block of wood. The neck is somewhat smaller in diameter. Jackwood is used throughout; bridges are usually cut from one piece of rosewood. Often, two rosettes are drilled out and ornamented with inlay work.
Tamburi:

Small-scale instruments, used for accompanying instrumental soloists. It is two to three feet long, with a wooden body with a slightly curved tabli. It may have from four to six strings. Tamburis are tuned to the higher octave and are the preferred instruments for accompanying solo performances by string-playing artists, as the lighter, more transparent sound does not drown out the lower register of a sitar, sarod, or sarangi. In the hands of masters the tanpura will reveal the precise tonal shade that is perfectly suited for the chosen raga that will be played or sung.

An electronic tanpura, a small box that imitates the sound of a tanpura, is often used in contemporary Indian classical music performances instead of, or in addition to a tanpura.

String Instruments with Frets:

Veena or Saraswati Veena:

Saraswati veena is the instrument associated with Saraswati, the Goddess of learning and the arts. This instrument is common in south India and is an important instrument in Karnataka music. It is called simply veena, the "Saraswati" part being implied.

When the raga alapana emerged as an important branch of classical music, the fretted veena developed throwing into background the yazh.
Construction:

The veena has an interesting construction. It has a body made of wood, generally, this is jack wood. The highest quality veenas have the entire body carved from a single block of wood, while the ordinary veenas have a body which is carved in three sections (resonator, neck and head). There are 24 frets made of brass bars set into wax. There is another resonator at the top of the neck. This is no longer a functioning resonator, but is mainly used as a stand to facilitate the positioning of the instrument when it is played. Because it is no longer functioning it is not unusual to find that this upper resonator may be made of acoustically neutral materials such as paper mache, cane or other similar materials. Unlike north Indian instruments like the sitar, the saraswati veena has no sympathetic strings. It has four playing strings and three drone strings which are used to indicate TaLa. The frets are made of steel, bronze or silver. The main bridge is a flat bar made of brass. This bar has a very slight curve. It is this light curve which gives the Veena its characteristic sound. A major centre for the manufacture of the Saraswati Veena is in Tanjore.

Saraswathi Veena at Jaganmohana Palace Art Gallery
Tuning the Veena:

The four strings are tuned like this:
The first string which is the main string is tuned to *madhya sthayi shadja* (Adhara shadja). The second string is tuned to the corresponding panchama below i.e. *mandra sthayi panchama*. The third string is tuned to the shadja below. I.e. *mandra shadja* and the fourth string which is the last string is tuned to the corresponding shadja below again which is *anu mandra shadja*. The three drone strings which are used for Tala are tuned to adhara shadja, madhya sthayi panchama and *Tara sthayi shadja* respectively.

The playing position:

The performer sits cross-legged on the floor (as shown in the picture), the small vestigial gourd rests against the left thigh while the main resonator rests on the floor. The right hand plucks the strings while the left hand frets the instrument.

There are quite a few Veena artists in Karnataka music who have brought fame to this instrument:

Past Exponents:

Present Exponents:


Mandolin:

A mandolin is a musical instrument in the lute family usually with four courses of strings, tuned in perfect fifths and plucked with a plectrum.

Mandolins evolved from the lute family in Italy during the 17th and 18th centuries. The original instrument was the mandore, which evolved in the fourteenth century from the lute. Over time and as the instrument spread around Europe, it took on many names and various structural characteristics. The instrument is also very popular in Goa (a former Portuguese colony).

There are many styles of mandolin. Three varieties are common, the bowl-backed mandolin, the carved-top mandolin and the flat-top mandolin. Bowl-back instruments are primarily instruments of European classical music. They get their name from the shape of the back of the instrument, which is shaped like a large bowl. The carved-top or arch-top mandolin has a much shallower bowl in the back, as well as an arched top, both carved out of wood and is used for folk music. The flat-top mandolin is similar to a guitar, using thin sheets of wood for the body, braced on the inside for strength. Each style of instrument has its own sound quality and has been adopted for a particular form of music. There have also been instruments made with sixteen-strings (four strings per course).

Construction:

A mandolin typically has a hollow wooden body with a tailpiece that holds one end of the strings, a floating bridge, a neck with a flat (or slight radius)
fretted fingerboard, a nut, and mechanical tuning machines to accommodate metal strings.

Normally we find two variations in the original form of the mandolin - the acoustic and the electric (solid block).

The mandolin in its original form is typically an acoustic stringed instrument about 60cm (2 ft) long with deeply vaulted ribs and a table slanted downward at the lower end. It has a neck-cum-peghead attached to a hollow oval shaped sound box. It has four pairs of loop-ended double rib fastened metal strings secured to hooks on the body on one end, and passed across a low bridge (on the sound box) and a nut (on the finger board) to the pegs inserted into a rectangular peg-box. A small flexible plectrum is used to vibrate the strings. A feature of mandolin playing is the constant reiteration of all long pitches, which counteracts its weak sustaining power.

The thinnest string is called 1st string, the next string is the 2nd string which is slightly thicker, the third still thicker and the fourth thickest of all.

Like any plucked instrument, mandolin notes decay to silence rather than sound out continuously as with a bowed note on a violin. Its small size and higher pitch make mandolin notes decay faster than larger stringed instruments like guitar, to create sustained notes or
chords. The mandolin's paired strings facilitate this technique: the plectrum (pick) strikes each of a pair of strings alternately, providing a more full and continuous sound than a single string would.

Various design variations and amplification techniques have been used to make mandolins compatible in volume with louder instruments and orchestras. Some musicians play electric mandolins through amplifiers.

Adaptation of the instrument in India:

Mandolin music was used in Indian movies as far back as the 1940s by the Raj Kapoor Studios in movies such as Barsaat. The movie Dilwale Dulhania Le Jayenge (1995) used mandolin in several places. Adoption of the mandolin in Karnataka music is recent and involves an electric instrument. U. Srinivas has, over the last couple of decades, made his version of the mandolin very popular in India and abroad. Many adaptations of the instrument have been done to cater to the special needs of Indian Karnataka music. This type of mandolin is also used in Bhangra, dance music popular in Punjabi culture.

The acoustic Mandolins are unsuitable for Karnataka music. The electrically modified Mandolin is the one used by U. Shrinivas which is suitable for "gamakas" or sustained notes. A rather inconspicuous member of the western orchestra, Shrinivas has revived and raised the mandolin, an unknown instrument and given it a respectable status in classical music. His music acumen towards this instrument has assumed many dimensions. He has evolved and executed the most intricate fraction-ridden swara combinations on this foreign instrument.

One other popular exponent of this instrument in south India is U. Rajesh, the younger brother of Srinivas.
Bowed String Instruments:

Bowed instruments are usually used as an accompaniment to vocal music and are referred to as Geetanuga.¹ They are divided into two broad categories—the upright and the inverted. In the first category the fingerboard is held straight up as in the case of Sarangi and in the second category, that is, in the inverted variety, the board or resonator is held towards the shoulder and the fingerboard dandi is held across the arm of the player as in the case of the Ravanhastaveena, the Banam, the Violin.

Bowed String Instruments in Karnataka Classical Music:

Under this head, in Karnataka Classical Music we have the Violin.

Violin:

The violin, the most commonly used member of the modern string family, is the highest-sounding instrument of that group. Its four strings are stretched over a high arched bridge that permits the playing of one or two strings at a time, as well as the nearly simultaneous sounding of three or four as chords. The overall length of the violin averages about 60 cm (23.5 inches), whereas the sounding length of the strings, from bridge to the nut at the end of the fingerboard, is about 32 cm (12.75 inches). The instrument is held on the left side of the body, while the right hand holds the bow. The wider end of the instrument is placed between the player's left shoulder and chin,

¹Vadyalapa by Sadananda Kanahalli, page no.14.
while the left hand encircles its neck, the fingers stopping the strings to produce the various pitches. Sound is produced by drawing the bow across the strings to make them vibrate, or by plucking the strings.

Many consider that violin making reached its pinnacle in the work of Antonio Stradivari and Guiseppe Guarneri in the 18th century. Although the basic construction of the violin has been long established, the subtle variations which make an outstanding violin are the stuff of legend.

**Construction:**

The modern violin consists of about seventy parts. Parts include the belly, the back and the ribs, inside blocks, inside lining, bass bar, purfling, finger board, neck, scroll, nut, lower nut, tailpiece, loop, end button, pegs, strings, bridge, and the sound post. The body of the violin is a hollow box which measures about 35.5 cm in length. The back, the neck, the ribs and the bridge are usually made of maple. The belly, linings, and the sound post are usually made of spruce. Scrupulous care is taken in selecting and shaping the belly and back. They must be adjusted to certain frequencies before assembly in order for the main wood resonance of the instrument to be of the appropriate strength and pitch.

**Violin Bridge:**

The action of the violin bridge is essential to the tone of the instrument. Its shape and function have been developed over centuries. Underneath the

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1. Sangeeta Shastra Chandrike by L.Raja Rao, p. no. 120.
treble side of the bridge is the sound post which extends from the front to the back plate of the instrument. Since this side of the bridge rests on this post, it is essentially fixed and acts as a pivot for the rocking motion of the remainder of the bridge. It does however couple the sound energy from the top plate to the back plate of the instrument.

Underneath the bass side of the bridge (where the G string rests), a long, thin wooden strip called the bass bar is attached, almost parallel to the strings. This bass foot of the bridge is more free to move, and its motion is the point of transfer of energy from the strings to the top plate of the instrument. The extended bass bar helps it to transfer the energy to a larger area of the top plate. The amplitude of motion is larger for the bass strings. This is desirable for balance of loudness, since the sensitivity of the ear drops off a bit toward the lower frequencies of the instrument.

The violin is believed to have been introduced into Karnataka music some 190 years ago. Over the ensuing years, many great violinists have adapted this instrument to Karnataka music and made it an integral part of the concert stage. There have been pioneers in the field, who introduced and popularised the violin in Karnataka music.

**Great Violinists of Karnataka Music:**

The Sushira Vadyas or Wind Instruments
(Aerophones):

Aerophones are known as Sushira vadyas. ‘Sushira’ means Hollow. Here Nada is produced from the air blown into a hollow column made of bamboo, wood or metal. The pitch of the note is determined by controlling the air passage and the melody is played by using the fingers to open and close them in the instrument. The simplest of these instruments is the flute.

Like the drums, wind instruments – particularly trumpets and flutes – have strong socio-religious associations and functions.

There is reference in the Vedas to an instrument-the VēNu which was used as an accompaniment to chanting and recitation. There is also mention of a kind of a flute called the Nadi. The Toonava and the Nadi were also flutes.¹

The flute has a variety of names like Venu, Vamshi, Bansuri, Murali and so on in the north, and Pullankuzhal, Pillankarovi and KoLalu in the south.²

The wind instruments are roughly divided into two categories on the basis of how sound is produced.

They are:

- Reed instruments
- Wind instruments without reeds.

¹ Musical instruments by B.C. Deva, p. no. 62.
² Musical instruments’ by B.C. Deva, p. no. 62.
Reed Instruments:

In this type of instrument the reeds are bound together with a gap between them before inserting into the body of the instrument. The body of the tube is conical in shape, narrow at the blowing end and opening out gradually with a metallic bell at the farther end to enhance the volume of the sound. A set of spare reeds, an ivory or silver needle for adjusting and cleaning the reeds are also hung from the mouth piece of the instrument. Reed instruments like the Nadaswaram, clarionet, saxophone, shehnai, etc, have one or two reeds inserted in the hollow beak or tube of the instrument; these vibrate when air is blown into them.

Nagaswaram:

The nagaswaram is one of the most popular classical musical instruments in Tamil Nadu and Karnataka. It is a wind instrument similar to the North Indian shehnai but much longer, with a hardwood body and a large flaring bell made of wood or metal. It is the world's loudest non-brass acoustic instrument. Due to its intense volume and strength it is largely an outdoor instrument and much more suited for open spaces than indoor concerts.

In South Indian Hindu culture, the nagaswaram is considered to be very auspicious, and it is a key musical instrument played in almost all Hindu weddings and temples of the South Indian tradition. It is considered as a mangala vadya-mangala meaning auspicious and vadya-instrument. The instrument is usually played in pairs, and accompanied by a pair of drums.
called thavil(dolu). It can also be accompanied with a drone from a similar oboe called the ottu.

**Construction:**

The nadaswaram contains three parts namely, kuzhal, thimiru, and anasu. It is a double reed instrument with a conical bore which gradually enlarges toward the lower end. The top portion has a metal staple into which is inserted a small metallic cylinder which carries the mouthpiece made of reed. Besides spare reeds, a small ivory or horn needle is attached to the instrument, and used to clear the reed of saliva and other debris and allows free passage of air. A metallic bell forms the bottom end of the instrument. Traditionally the body of the nadaswaram is made out of a tree called aachal although nowadays bamboo, sandalwood, copper, brass and ebony are also used. For wooden instruments, old wood is considered the best, and sometimes wood salvaged from demolished old houses is used.

The nadaswaram has seven finger-holes, and five additional holes drilled at the bottom which can be stopped with wax to modify the tone. The nadaswaram has a range of two and a half octaves, similar to the Indian bansuri flute, which also has a similar fingering. Unlike the flute where semi and quarter tones are produced by the partial opening and closing of the finger holes, in the nadaswaram they are produced by adjusting the pressure and strength of the air-flow into the pipe.

Some of the greatest early nadaswaram players include: Thiruvavadudurai Rajaratnam Pillai, Thiruvengadu Subramania Pillai, Thiruvidaimaruthur P.
S. Veerusami Pillai, and The brother teams of the Keeranur, Thiruvezhimizhalai, and Semponnarkoil families, Namagiripettai Krishnan and Padmashree Sheik Chinnamoulana.

Like the mandolin, there have been wind instruments of western music adapted into Karnataka music like The Clarionet and the saxophone, which are played with reed.

**Clarionet:**

A clarionet or clarinet is defined as a woodwind instrument having a straight cylindrical tube with a flaring bell and a single-reed mouthpiece, played by means of finger holes and keys.\(^1\) A person who plays the clarinet is called a clarinetist or clarinettist.

The English form clarinet is found as early as 1733, and the now-archaic clarinet appears from 1784 until the early years of the 20th century.

There are many types of clarinets of differing sizes and pitches, comprising a large family of instruments. Johann Christoph Denner invented the clarinet in Germany around the turn of the 18th century by adding a register key to the earlier chalumeau. Over time, additional keywork and airtight pads were added to improve tone and playability. Today, the clarinet is used in jazz and classical ensembles, in chamber groups, and as a solo instrument.

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\(^1\) Collins English Dictionary.
**Construction:**

Clarinet bodies have been made from a variety of materials including wood, plastic, hard rubber, metal, resin, and ivory. The vast majority of clarinets used by professional musicians are made from African hardwood, African Blackwood or Honduran rosewood. Historically other woods, notably boxwood, were used.

Metal soprano clarinets were popular in the early twentieth century, until plastic instruments supplanted them. Metal construction is still used for the bodies of some contra-alto and contrabass clarinets, and for the necks and bells of nearly all alto and larger clarinets.

Mouthpieces are generally made of hard rubber, although some inexpensive mouthpieces may be made of plastic. Other materials such as crystal/glass, wood, ivory, and metal have also been used. Ligatures are often made out of metal and plated in nickel, silver or gold. Other ligature materials include wire, wire mesh, plastic, string or leather.

**Reed:** The instrument uses a single reed made from the cane of Arundo donax, a type of grass. The ligature fastens the reed to the mouthpiece. When air is blown through the opening between the reed and the mouthpiece facing, the reed vibrates and produces the instrument's sound. Reed and mouthpiece characteristics work together to determine ease of playability, pitch stability, and tonal characteristics.
Clarinetists of Karnataka music:

- A.K.C. Natarajan
- His disciple, Munikumar
- Mohan

Saxophone:

The saxophone seems to be the strangest instrument in the musical world as it has the colour of a brass instrument, but a reed like a woodwind; and a bell like a tuba or a horn, but the fingerings of a clarinet or a flute. However, the composition of the instrument is key to both its sound and its role in music, whether it is being played in an orchestra or a jazz solo.

History:

The saxophone takes its name from its creator; Adolphe Sax. Sax was a Belgian instrument maker working in Paris in the 1840s. He wanted to create an instrument that would have the same sort of volume and intensity of sound of a brass instrument, while at the same time having the ability to play a range of notes similar to a woodwind. He accomplished this in the creation of the saxophone, for which he drew on his experiences with the clarinet. Sax's design remains largely unchanged except for a change in the placement of some of the keys.

Features:

The most notable feature of the saxophone, and the key to its sound, is that it is literally a brass instrument. The majority of the instrument is made from brass, from the central tube to the bell, and including the various keys and pads that control the notes played. In modern instruments the pins on which the keys rotate are generally made from stainless steel, and the key
touches where the musician's fingers touch the instrument are of a decorative material such as mother of pearl (or plastic in less expensive instruments). There have been a few made out of other metals such as copper or bronze, but brass is most common.

**Types:**

The saxophone itself comes in four types, based on the range of notes it plays. These are the sopranino, soprano, alto, tenor and bass. Likewise, there are a number of different finishes that are used to coat the brass instrument. These coatings help protect the brass from tarnishing and keep it shiny. A clear or coloured acrylic lacquer is the most common coating. Silver plating is also commonly used, creating a silver-coloured saxophone. Gold has also been used, but it is expensive.

**Indianization of the instrument:**

Mysore Lakshmi Narasimhayya introduced saxophone to Karnataka classical music. He was the court vidwan of Sri Nalwadi Krishnaraja Wodeyar-IVth.

Kadri Gopalnath has also successfully adapted this western instrument to Karnataka classical music. He has popularised it as a mainstream instrument in Indian classical music. Fascinated by the sound of saxophone in a brass band that he attended at the Mysore palace at the age of fifteen, he started learning to play the instrument, though it was not easy to get the necessary glides, oscillations, note ornamentations and embellishments on
an instrument like the saxophone. He had to make certain modifications to the conventional alto saxophone to play Karnataka music.

‘The Saxophone was an instrument that wasn't available in India. It was a norm to buy the instrument in the UK. My dad paid Rs. 850 to buy the instrument. Today, it costs Rs. 8.5 lakhs. It took me twenty years to learn and master the complexities of the wind instrument’, says Kadari 1

Free reed and bellow:

Harmonium:

The pump organ or harmonium is a type of reed organ that generates sound with foot-pumped bellows. Smaller, cheaper and more portable than pipe organs, reed organs were widely used in smaller churches. In India harmonium means the smaller hand-pumped variety.

During the mid-19th century, missionaries brought French-made hand-pumped harmoniums to India. The instrument quickly became popular here as it was portable, reliable and easy to learn. It has remained popular to the present day, and the harmonium remains an important instrument in many genres of Indian music. For example, it is a staple of vocal North Indian classical music concerts. It is commonly found in Indian homes. Though derived from the designs developed in France, the harmonium was developed further in India in unique ways, such as the addition of drone

1 Interview with Kadari Gopalanath by Anu Gopalakrishna in 2011, published in ‘The Hindu’.
stops and a scale-changing mechanism.

In Kolkata, Dwarkanath Ghose of the Dwarkin Company modified the imported harmony flute and developed the hand-held harmonium, which has subsequently become an integral part of the Indian music scenario. Dwijendranath Tagore is credited with having used the imported instrument in 1860 in his private theatre, but it was probably a pedal-pumped instrument that was cumbersome or possibly some variation of the reed organ. Initially it aroused curiosity, but gradually people started playing it and Ghose took the initiative to modify it. It was in response to the Indian needs that the hand-held harmonium was introduced. All Indian musical instruments are played with the musician sitting on the floor or on a stage, behind the instrument or holding it in his hands. In that era, Indian homes did not use tables and chairs. Indian music, being melodically based, only one hand was necessary to play the melody and the other hand was free for the bellows.

The harmonium was widely accepted in Indian music, particularly Parsi and Marathi stage music, in the late 19th Century. Many of the harmonium's qualities suited it very well for the newly reformed classical music of the early 20th century: it is easy for amateurs to learn; it supports group singing and large voice classes; it provides a template for standardized raga grammar; it is loud enough to provide a drone in a concert hall. For these reasons, it has become the instrument of choice for accompanying most North Indian classical vocal genres, with top vocalists like Bhimsen Joshi) routinely using harmonium accompaniment in their concerts.

A popular usage is by followers of the Hindu and Sikh faiths, who use it to accompany their devotional songs (*bhajan* or *kirtan*). There is at least one harmonium in any mandir (Hindu temple) or Gurdwara (Sikh temple) around the world. The harmonium is commonly accompanied by the *tabla*
as well as a dholak. To Sikhs, the harmonium is known as the vaja or baja. It is also referred to as a peti (literally, box) in some parts of North India and Maharashtra. The harmonium plays an integral part in Qawwali music. Almost all Qawwalis use the harmonium as their sole musical accompaniment. It has received international exposure as the genre of Qawwali music. It has been popularized by renowned Pakistani musicians, including Nusrat Fateh Ali Khan.

Vidyadhar Oke developed a 22-microtone harmonium, which can play 22 microtones as required in Indian classical music. The fundamental tone (Shadja) and the fifth (Pancham) are fixed, but the other ten notes have two microtones each, one higher and one lower. The higher microtone is selected by pulling out a knob below the key. In this way, the 22-shruti harmonium can be tuned for any particular raga by simply pulling out knobs wherever a higher shruti is required.

Bhishmadev Vedi is said to have been the first to contemplate improving the instrument by augmenting it with a string box-like a harp attached to the top of the instrument. His disciple, Manohar Chimote, later implemented this concept and called the instrument a samvadini—a name now widely accepted. Bhishmadev Vedi is also said to have been among the first to contemplate and design compositions specifically for the harmonium, styled along the lines of "tantarakari"—performance of music on stringed instruments. These compositions tend to have a lot of cut notes and high-speed passages, creating an effect similar to that of a string being plucked.

Wind instruments without reed or holes:

**Shankha:**

Shankha is a conch shell which is of ritual and religious importance in both Hinduism and Buddhism. The conch usually refers to a large sized spiral
shell with an open mouth. Falling under the category of horns, the conch is played by blowing in air from its open mouth. The concept of using everyday objects like the shell to produce sound is age old. The shankha is the shell of a species of large predatory sea snail, Turbinella pyrum, which lives in the Indian Ocean.

In Hinduism, the shankha is a sacred emblem of the Hindu preserver god Vishnu. Simultaneously, it was used as a votive offering and as a charm to keep away the dangers of the sea. It was the earliest known sound-producing agency as manifestation of sound, and the other elements came later, hence it is regarded as the original of the elements. It is still used as a trumpet in Hindu ritual and in the past was used as a war trumpet.

The shankha is displayed in Hindu art in association with Vishnu. As a symbol of water, it is associated with female fertility and serpents (Nāgas). Hindus use it in their worship as well, both as an auspicious sound and as a container of holy water or milk. The shankha is the state emblem of the Indian state of Kerala and was also the national emblems of the Indian princely state of Travancore, and the Kingdom of Kochi.

Like the trumpet, the Shankha was also a martial and heraldic instrument-
to announce the beginning of a battle or the achievement of victory. Shankha is praised in Hindu scriptures as a giver of fame, longevity and prosperity, the cleanser of sin and the abode of Lakshmi, who is the goddess of wealth and consort of Vishnu.

The *shankha* is one of the eight Buddhist auspicious symbols, the Ashtamangala, and in Buddhism it represents the pervasive sound of the Buddhadharma. In Tibetan Buddhism, it is known as "*dung kar*".

A powder made from the shell material is used in Indian Ayurvedic medicine, primarily as a cure for stomach ailments and for increasing beauty and strength.

As a trumpet or wind instrument, a hole is drilled near the tip of the apex of the *shankha*. When air is blown through this hole, it travels through the whorls of the *shankha*, producing a loud, sharp, shrill sound. This sound is the reason the *shankha* was used as a war trumpet, to summon helpers and friends. Shankha continued to be used in battles for a long time. The sound it produced was called *shankanada*.

Though the conch cannot be used to play tunes, its sound is considered to be very auspicious. It plays an important role in Hindu ceremonies and *puja*-s as well. The conch is also used in parts of East Asia and Buddhist temples. It is believed that the conch is sounded loudly in temples and at home in an attempt to initiate the Gods to become a part of the religious ceremonies, rituals and the actual *puja*.

**Kombu:**

Kombu also known as the Kombu Pattu, is a wind instrument (a kind of Natural Horn) usually played along with Panchavadyam, Pandi Melam, Panchari melam etc. This musical instrument is usually seen in Kerala. The

1 ‘Musical instruments’ by B.C. Deva, page no.2.
instrument is like a long horn (Kombu in Malayalam language). It is one of the few instrumental temple art forms in which the melody instruments dominate. The kombuis played at weddings and religious processions, as well as in front of the bier. It is one of the pancha vadya ensemble.¹

There is one other kombu which is S-shaped and much larger in size. This is known by the name ‘Banke’ in Karnataka. The kombu can only produce three notes (sa, pa, and higher sa). The genre is played by a group of kombu players (3, 5, 7, or 9), led by the kombu leader. Within a given tāLa, the leader improvises kombu patterns on the spot to be repeated by the chorus players.

**KahaLe:**

KahaLe is an important instrument known to us for some centuries and heard now everywhere, though the name is more popular in Orissa and Karnataka. It was made of gold, silver and copper of about half a metre in length.² A wind instrument like kombu, kahale is a kind of natural horn. Centuries ago, this was also used as a war trumpet, to announce war. This instrument cannot be used to play notes. It is played by blowing from the narrow mouth of the instrument.

¹‘Musical instruments’- by B.C.Dev, page no.57.
²‘Musical instruments’ by B.C. Deva page no. 58.
Flutes:

Flute has a special place in our country as it has a divine origin. Lord Krishna is depicted as KoLalu Krishna (KoLalu, meaning flute) and Muralidhara (murali-meaning flute again). It is also known by words- vēNu (Sanskrit), Kuzhal (Tamil), pillan-kuzhal (Tamil), Kolavi (Kannada), Pilangovi (Telugu) and so on.1 Besides the voice, flutes are the earliest known musical instruments. A number of flutes dating to about 43,000 to 35,000 years ago have been found in the Swabian Alb region of Germany. These flutes demonstrate that a developed musical tradition existed from the earliest period of modern human presence in Europe.

Unlike woodwind instruments with reeds, a flute is an aerophone or reedless wind instrument that produces its sound from the flow of air across an opening. Generally flutes are made of bamboo or wood and the Indian musician prefers these due to the tonal and musical attributes of these materials. However, there are references of flutes made of red sandalwood, black wood, cane, ivory, bronze, silver and gold also. Single or double flutes with only one hollow tube with finger holes for

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1 ‘Musical instruments’ by B.C.Deva page no. 63.
controlling the pitch of the note are very common in many parts of the country. Long horizontal flutes with a larger diameter are used to play slow passages such as Alapan of the lower registers. Smaller and shorter flutes, sometimes held vertically, are used for Taanas, the faster passages, and also for producing higher pitches of sound. The double flutes are mostly played by musicians of the tribal and rural areas and are rarely found on the concert platform. They resemble beak flutes which have a narrow aperture at one end. One finds references to these types of instruments in the sculptures of the first century in the Sanchi Stupa which shows a musician playing on a double flute. A musician who plays the flute can be referred to as a flute player or a flautist.¹

**History:**

The first known use of the word flute was in the 14th century.² According to the Oxford English Dictionary, this was in Geoffrey Chaucer's The Hous of Fame, ca. 1384.³

The oldest flute discovered may be a fragment of the femur (thigh bone) of a cave bear, a species of bear that lived in Europe and later became extinct about 27,500 years ago.

The horizontal flute is the best known and most popular throughout the country. Karnataka music at its refined excellence is rich in fine pitch differences like the *shruti* and ornamentations like the gamaka. These are best obtained by the complicated fingering techniques, adjustments of the pressure of blowing and slight changes in the angles of the flute on the lip.

Flutes may be open at one or both ends. The ocarina, xun, pan pipes, police

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whistle, and bosun's whistle are closed-ended. Open-ended flutes such as the concert flute and the recorder have more harmonics and thus more flexibility for the player, and brighter timbres.

**Construction:**

The flute is made in the form of an open cylindrical air column about 66 cm long. Its fundamental pitch is middle C (C4) and it has a range of about three octaves to C7. Sound is produced from a flute by blowing onto a sharp edge causing air enclosed in a tube to vibrate. As with other edgetone instruments, the tone production is made more efficient by the coupling of the slit formed by the player’s lips, the edge, and the air column. The flute has a series of 16 openings in the tube wall, eleven of which can be closed directly by seven fingers and one by the left thumb. The four additional openings can be opened or closed by means of suitably arranged keys. The external structures on the flute which aid the players to access all the holes total about 150 springs, rollers, levers, etc.

**Indian flute:**

The bamboo flute is an important instrument in Indian classical music, and developed independently of the Western flute. The Hindu God Lord Krishna is traditionally considered a master of the bamboo flute. The Indian flutes are very simple compared to the Western counterparts; they are made of bamboo and are keyless. Two main varieties of Indian flutes are currently used. The first, the Bansuri, has six finger holes and one embouchure hole, and is used predominantly in the Hindustani music of Northern India. The second, the Venu or Pullanguzhal, has eight finger holes, and is played predominantly in the Karnataka music of Southern India. Presently, the eight-holed flute with cross-fingering technique is common among many Karnataka flutists. Prior to this, the South Indian

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flute had only seven finger holes, with the fingering standard developed by Sharaba Shastri, of the Palladam school, at the beginning of the 20th century. Dr. C.A. Shreedhara, Professor, Fine Arts College, Mysore has invented and designed a special type of bamboo flute with a metal lining inside, which he has named as ‘Lohavamshi’.

The quality of the flute's sound depends somewhat on the specific bamboo used to make it, and it is generally agreed that the best bamboo grows in the Nagercoil area in South India.

**Well-known flautists of Karnataka music:**

T.R. Mahalingam (popularly known as Mali), N. Ramani, Sikkil Sisters-Neela and Kunjumani, Mala Chandrashekhar, K.S. Gopalakrishnan, T.S. Shankaran, V. Raman, Dr. C.A. Shridhara, Master Shashank, Mysore. A. Chandan Kumar (great grandson of T. Chowdaiah) and Vamshidhar, grandson of V. Deshikachar of Mysore.

**Mukhaveene:**

Mukhaveene is a woodwind instrument with a conical tube-body and provided with a mouthpiece. Mukhaveene is a special kind of instrument used in folk art, which emanates a single note with the synchronisation of three different
components. While playing the three different components, one has to hold breath tightly. Anjanappa, the only exponent of this instrument now, says that even a little negligence can spell danger to the life of the artiste.

Naranappa of Srirangapatna was the only known exponent of this instrument in Karnataka classical music.

Membranophones or Avanaddha Vadyas:

The concepts of rhythmical harmony and tāLa exposition are distinct contributions of India to world musical thought. In an Indian concert, the performer in addition to giving time-beats, provides a cross-rhythmical accompaniment continuously.

In the Avanaddha Vadya category of instruments, sound is produced by striking the animal skin which has been stretched across an earthen or metal pot or a wooden barrel or frame. The earliest references to such instruments have been found in the Vedas where there is mention of Bhūmi Dundhubhi; this was a hollow pit dug in the ground and covered with the hide of a buffalo or ox which was stretched across the pit. The tail of the animal was used for striking the animal hide and thus sound was produced.

Membranophones are called Avanaddha vadyain musical literature in India. Avanaddha means "to be covered”; therefore, an instrument wherein a vessel or a frame is covered with leather is an avanaddha vadya. Traditionally, there is another, pushkara, which seems to have also meant drums in general. Bharata in his Nātya Shāstra tells a tale of how these pushkaras came into being. According to the story, Swati, a great saint, went to a pond (pushkara) in his hermitage for a wash. When he was there Indra, the god, sent a downpour of heavy rain and the drops made sweet and rhythmic sound as they fell on the lotus (pushkara) leaves. The sage listened to the sound as they fell on the lotus (pushkara) leaves. The sage
listened to the sound enthralled and came back to his hut with the music still ringing in his ears. He then has the various pushkara-s such as the paNavaand the darduramade with the assistance of the heavenly craftsman, Visvakarma.

**Mrdangam:**

The mrdangam is the classical double sided drum of South India and is used as an accompaniment for vocal, instrumental and dance performances. The term mrdangam is derived from the Sanskrit words "Mrid Ang" which literally means "Clay-Body," indicating that it was originally made of clay.

The process of making the mrdangamis an intricate art. The fixing of the black paste on the right head of the mrdangam to the requisite quantity has enabled the instrument to produce a beautiful tone.

The present day mrdangam is made of a single block of wood. It is made either of Jackwood or Redwood. Jackwood has more fibrous structure than the other types of wood. The packing of the fibres is also very high. The pores present in jack wood is less when compared to others. The pore size and distribution of the material can be inversely proportional to the modulus of the wood. The density of jackwood is also less when compared to other woods.

**Construction:**

The Mrdangam is a barrel-shaped double-headed drum, the right head being smaller than the left. The two heads are made of layers of skin. The heads are stretched by leather straps which run along the sides of the body.
The pitch is adjusted by moving small wooden cylindrical pieces of wood between the wooden shell and the leather straps.

The right head is made of three concentric layers of skin. The innermost layer is not visible. The outer ring is called the Meetu thol and the inner ring is called the Chapu thol. The inner ring is made of sheepskin and the outer skin is made of calf-hide. At the centre of the right head is a permanent spot of black paste. This spot, called the Soru, is a mixture of boiled rice, manganese and iron filings. This black spot is responsible for the special tone of the mridangam allowing emission of harmonics. Different harmonics of the head are produced by various finger combinations.

The left head, known as the 'Toppi' is made of only two layers; the inner one is made of sheepskin and the outer one is made of buffalo hide. Before playing the mrdangam, a thick paste made of semolina and water is applied to the centre of this head. This is done to lower the pitch and produce a bass sound on the left head. This paste is scraped off after the performance. The right head is tuned to the Tonic. On the rims of the two heads there are spaces for the leather braces to pass through. A small, smooth stone and a small stick (wooden) are used to vary the pitch of the heads by upward or downward strokes on the rims. The pitch of the mridangam varies according to its size. The larger the mrdangam, the lower the pitch and vice versa. The walls of the instrument are 2/3 centimetres thick and give it stability in the low frequencies.
Posture:

The mrdangam is played resting it parallel to the floor. A right-handed mrdangam artist plays the smaller membrane with his or her right hand and the larger membrane with the left hand. This can be described in words as follows: The mrdangam rests upon the right foot and ankle, the right leg being slightly extended, while the left leg is bent and rests against the hull of the drum and against the torso of the artist.

Players:

Over the years and especially during the early 20th century, great maestros of mrdangam arose, inevitably defining "schools" of mrdangam with distinct playing styles. Examples include the Puddukottai School and the Thanjavur School. The virtuosos Palani Subramaniam Pillai, Palghat Mani Iyer, C.S. Murugabhupathy and Late Sri Mahadevu Radha Krishna Raju contributed so much to the art that they are often referred to as the Mrdangam Trinity.

Past players:


Current players:

Khanjira:

The Khanjira is a South Indian frame drum, is an instrument of the tambourine family. It is used primarily in concerts of Karnataka musicas a supporting instrument for the mrdangam. Khanjiras have been used since 1880's, and was added to classical concerts during the 1930s.

Construction:

Khanjira consists of a circular frame made of the wood of the jackfruit tree, between 7 and 9 inches in width and 2 to 4 inches in depth. It is covered on one side with a drumhead made of iguana, monitor lizard skin, while the other side is left open. Since the leather is fixed tightly to the frame even while making the instrument, and there is no provision for tuning, these are not amenable to finer tuning. The frame has a single slit which contain three to four small metal discs—often old coins—that jingle when the kanjira is played.

Method of playing:

The khanjirais a relatively difficult Indian drum to play, especially in South Indian Karnataka music, for reasons including the complexity of the percussion patterns used in Indian music. It is normally played with the palm and fingers of the right hand, while the left hand supports the drum. The fingertips of the left hand can be used to bend the pitch by applying pressure near the outer rim. It is not tuned to any particular pitch, unlike the mridangam or the ghatam.

Normally, it has a very high pitched sound. To get a good bass sound, the performer reduces the tension of the drumhead by sprinkling water on the

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1Musical instruments’ by B.C. Deva, page no.33.
inside of the instrument. This process may have to be repeated during a concert to maintain a good sound. However, if the instrument is too moist, it will have a dead tone, requiring 5–10 minutes to dry. Tone is also affected by external temperature and moisture conditions. Performers typically carry a couple of kanjiras so that they can keep at least one in perfectly tuned condition at any given time.

**Past Exponents of the Instrument:**


**Present Exponents:**


**Avanaddha Vadyas:**

**Those played with a stick**

**Dolu or Thavil:**

The Thavil or Tavil is a barrel shaped drum from South India. It is used in Karnataka music, often accompanying the Nagaswaram. It is also used in temples and in folk music. The thavil and the nagaswaram are essential
components of traditional festivals and ceremonies in South India. In folk music contexts, a pair of wider, slimmer sticks is sometimes used. Thanjavur is famous for thavil, so called Thanjavur Thavil. In Kollywood Filmi songs thavils are mostly used.

Physical components:

The tavil consists of a cylindrical shell hollowed out of a solid block of jackfruit wood. Layers of animal skin (that of water buffalo on the right, goat on the left) are stretched across the two sides of the shell using hemp hoops attached to the shell. The right face of the instrument has a larger diameter than the left side, and the right drum head is stretched very tightly, while the left drum head is kept loose to allow pitch bending. The larger face is higher in pitch than the smaller face.

Methods of use & Posture:

The instrument is either played while sitting, or hung by a cloth strap from the shoulder of the player. The right head is played with the right hand, wrist and fingers. The player usually wears thumb caps on all the fingers of the right hand, made of hardened glue from maida flour. The left head is played with a short, thick stick made from the wood of the portia tree. It is not uncommon for left-handed players to use the opposite hands, and some nagaswaram groups feature both a right- and a left-handed thavil player.

Some master thavil players:

**Chande:**

The Chande is a drum used in the traditional and classical music of South India and particularly in Karnataka. It provides rhythmic accompaniment in several dance dramas of South India such as Yakshagana. It follows the Yakshagana TāLa system. The rhythms are based on pre-classical music forms, folk groves and some rhythms are similar to Karnataka Sangeeta. There are different varieties in this instrument. Two major varieties are the Badagu Thittu Chande (Northern School) and the Thenku Thittu Chande (Southern School). The latter is also spelt as Chenda and is used exclusively in the art forms of southern coastal Karnataka and Kerala. The Chande used in Badagu Thittu is structurally and acoustically different from Chenda used in Kerala.

**History:**

In ancient Hindu sculpture, painting, and mythology, the Chande is often depicted as the instrument used to declare war (raNa chande - war drum). This instrument can produce complicated rhythms that can be heard from more than 3 km. However Chande is the relatively recent addition to Yakshagana orchestra. It is believed it came to be used since 150 or so years ago.

**Construction:**

The body of the Chande is constructed from wood of the jackfruit tree. The body is called 'goodu' in Kannada. Chande players follow the Yakshagana system of tāLās.

The circular drum head is made of processed cow skin. Usually there are 12 hinges that hold the drum head to the wooden trunk using thick ropes. Typical drum head size is about 32 cms and about 23 cms inner diameter. Playing area of drum head is about 20 cms in diameter. Wedges inserted inside the ropes are twisted to tighten or loosen the drum head while tuning. A tubular wooden wedge is tied to edge of the drum head to roll
using dominant hand. Traditionally the Chande must be tuned to an octave above singers tonic (Higher Shadja).

Chande sticks are drum sticks called *chande kolu* in Kannada. These are specially made for chande. The shape and thickness varies along the stick. Left hand and right hand sticks are differently shaped. Their typical length is 28 cms. Actual length varies based on drum head diameter.

**Playing:**

The drummer suspends the chende from his neck such that it hangs more or less vertically and he strikes the upper parchment with a pair of sticks. There are similarities to the Karnataka Sangeetha tāLās. The rhythm system itself has pre-classical origins.

The sticks are flexible and are usually made from a type of bamboo. The head of the stick used for the dominant hand is thicker and the body tapers and the end where the hand grips the stick is of normal size. The other stick is slightly thicker and less tapered. The dominant stick usually rests on the wedge of the drum head and the stick is rolled to produce the fluttering sound. It is this feature that gives Chande an advantage of producing multiple fillers in between the beats that hands or fingers usually will not be able to produce on drums. It is played in a forceful manner. The Chande groves form what is called the Yakshagana Tala.

**Types:**

There are many kinds. The Uruttu chenda (for playing variations), the Veekku chenda (one which beats the basic rhythm), Acchan chenda. A
similar instrument in sculptures as old as those of Sanchi can also be seen.

**Maddale:**

Yakshagana Maddale. The Maddale (Kannada) is a percussion instrument from Karnataka. It is the primary rhythmic accompaniment in a Yakshagana ensemble along with Chande. Maddale used in Yakshagana looks similar to mrdangam but is markedly different in structure, acoustics, playing techniques and the rhythm system. Unlike Mrdangam or Tabla, Maddale produces tonic (*shruti swara*) when played either on rim or on ink. The traditional variety of Maddale was 30 cm long, had 8 inch drum head and produced loud sound. Maddale is available in more than three different variations.

**History:**

Maddale belongs to mrdangam family of drums and hence shares the history of similar drums. Its drum head is similar to tabla and the drum itself is similar to pakhavaj. Thus it is likely that maddale is a variation of pakhavaj and mrudangam. Over the years, the Maddale evolved to be made of different kinds of wood and for higher octave, and today, its body is constructed from wood of the jackfruit tree among other woods like kakke, baine, hunaalu. Its use has evolved with the development of Yakshagana and Yakshaganic fingering and hand techniques have been developed. Use of palm produces a sound that is somewhat a mixture of pakhawaj and mrdangam.

**Physical components:**

The body of a maddale is usually made using a hollowed piece of jackfruit wood about half an inch thick. This body is called Goodu. The two open ends of the drum are covered with goat skin leather and laced to each other
with leather straps around the circumference of drum. These straps stretched to tightly hold the drum heads on either side of the drum body, allowing them to resonate when struck. Drum head on the left is slightly larger (bass side). One side produces bass another treble. The drum head is known as muchchige.

The bass drum head is known as the \textit{eda muchchige} and the drum head is known as the bala \textit{muchchige}. The right drum head is similar to \textit{tabla} drum head but differs slightly creating a major tonal difference. Maddale unlike Mrudangam or Tabla produces tonic when playing on rim and on ink. The left drum head produces lower pitched bass sounds. The right drum head has a circular disk in the center called \textit{karNe} causing the drum to produce harmonic tones. The left drum is smeared with a tuning paste made from ash and rice called \textit{bona}, before performance to dampen the tone and to produce bass sound.

\textbf{Methods of use:}

Maddale is tuned to the tonic of the Yakshagana singer before performance. A wooden peg is sometimes used to tighten the leather straps. To major strokes are called Gumpu and Chapu. Playing on the rim is called Chapu this is used for tuning. Playing on the ink to produce a more resonating sound is called Gumpu.

\textbf{Panchamukhi:}

As the name suggests, this is a five-faced avanaddha vadya. This is seen only in temples. This is played along with shuddha maddale. Some descendents of Tambiah, disciple of Sri Muttuswami Deekshitar play this instrument in Tiruvarur even today. This instrument is played in a solemn manner. This is an evoluted form of the instrument Kodamola. Kodamola is made of clay, while \textit{panchamukhi} is made of brass. Arunagirinathar has described \textit{panchamukhi} in ‘Bhutavetalapankaja’. This instrument is also seen
at the Nataraja temple at Chidambarm. This is a cylindrical shaped instrument with five small cylinders towards the top which are covered with skin. The central cylinder is bigger than the other four. The instrument is played by covering and beating the top of the five cylinders alternately. Still the five faces have the names of gods: the central is the ‘Sadyodaya’, the other four being Eeshana, Tatpurusha, Aghora and Vamadeva. Because of the size of the instrument, it is shifted from place to place only by carts or huge vehicles. It is said that the swaras played by this instrument are shuddha swaras.\textsuperscript{1}

\textbf{Ghanavadya:}

Ghana vadyas were invented very early by man. Once constructed, this category of instruments does not need special tuning prior to playing. In early times these instruments were the extension of the human body such as sticks, clappers, rods, etc. and were also closely related to objects of utility in daily life such as pots and pans, jhanj, etc. They are principally rhythmic in function and are best suited as accompaniment to folk and tribal music and dance.

Ghana \textit{vadyas} are those made of metals like Brass, bronze, copper and iron and even clay. These instruments can be classified as:

\textsuperscript{1}‘Vadyalapa’, Bharateeya vadyagala hinnele, swaroopa, vaishishtyaby Sadananda Kanavalli, page no.114.
1. Whole instruments- for example, Ghatam- which is made of clay and played with fingers.

2. Those which have two separate parts. For example- Morching, Jagate, Gejje and Tala.

Ghatam:

The Ghatam is a percussion instrument used in Karnataka music. Its variant is played in Punjab and is known as gharha as is a part of Punjabi folk traditions. Its analogue in Rajasthan is known as the madga and pani mataqa ("water jug").

The ghatam is one of the most ancient percussion instruments of South India. It is a clay pot with narrow mouth. From the mouth, it slants outwards to form a ridge. Made mainly of clay backed with brass or copper filings with a small amount of iron filings, the size of the ghatam varies according to its pitch. The pitch can be slightly altered by the application of plasticize clay or water.

Although the Ghatam has the same shape as an ordinary Indian domestic clay pot, it is made specifically to be played as an instrument. The tone of the pot must be good and the walls should be of even thickness to produce an even tone.

Ghatams are mostly manufactured in Manamadurai, a place near Madurai in Tamil Nadu. Though this instrument is manufactured in other places like Chennai and Bangalore, too, Manamadurai ghatams have special tonal quality. It is believed that the mud is of special quality. The Manamadurai ghatam is a heavy, thick pot with tiny shards of brass mixed into the clay. This type of ghatam is harder to play but produces a sharp metallic ringing sound which is favoured by some players.
Playing:

The instrument is usually placed on the lap of the performer, with the mouth facing the belly. The performer uses the fingers, thumbs, palms, and heels of the hands to strike its outer surface to produce different sounds. Different tones can be produced by hitting areas of the pot with different parts of the hands. Sometimes the ghatam is turned around so that the mouth faces the audience and the performer plays on the neck of the instrument. The ghatam can be moved to other positions while being played. Occasionally, the performer tosses the instrument up in the air and catches it. The ghatam is ideal for playing rhythmic patterns in very fast tempo. The ghatam usually accompanies a mrdangam.

Players:


Morching:

A morsing (also spelt as mourching and morching) is a wind percussion instrument, mainly used in Rajasthan, in the Karnataka classical music of South India and in Sindh (Pakistan). It can be categorized under lamellophones, which is in the category of plucked idiophones. It consists of a metal ring in the shape of a horseshoe with two parallel forks which form the frame, and a metal tongue in the middle, between the forks, fixed to the ring at one end and frees to vibrate at the other. The metal tongue is
bent at the free end in a plane perpendicular to the circular ring so that it can be struck and is made to vibrate. This bent part is called the trigger.

Its origin in India is not very clear though many myths and stories prevail. In India it is found mainly in South India, Rajasthan and also in some parts of Assam. In South India, it features in Karnatic concerts and percussion ensembles. In Rajasthan it is called morchang and is used as percussion instrument in folk music.

Playing technique:

The morsing is placed between the teeth and held firmly in the hand and is struck using the other hand to produce sound. Movement of the player's tongue, variations of the throat and blowing and sucking of air through the instrument produces different sounds or overtones.

The morsing is firmly held in the hand, the frame or the ring between the palm and the fingers usually in the left hand. Care should be taken to see that the middle part or the metal tongue is not being touched when held idle. Then the upper of the two parallel forks is gently pressed against the front upper teeth; the lower fork, against the front lower teeth, so that the metal tongue will not contact the teeth when it moves. The trigger is plucked with the tip of the index finger. Sound is produced due to the vibration of the metal tongue of the morsing in the mouth and the throat cavity. Movement of the player's tongue with constant plucking can produce very fast patterns of sound. By constricting the space in the mouth and throat many variations of sound can be produced.
Tuning:

The basic pitch of the instrument can be varied very little. Significantly, the pitch of the instrument can only be reduced and not increased. To reduce the pitch a little, bee-wax can be applied on the plucking end. To increase the pitch, it can be filed, although this may damage the instrument.

The art of accompaniment:

As the morsing is played most of the time along with the mrdangam, it is necessary to know the syllables or aural interpretation of what is played on mrdangam. It is important to know the art of ‘Konnakol’ (the aural representation of the ferns (pattern of syllables played on percussion instruments) played on mrdangam as it is being silently recited while playing the morsing. It is essential to follow the mrdangam and play the same ferns as far as possible, though it is difficult owing to the limitations of the instrument.

Glimpses of uniqueness and versatility of the morsing can be shown when accompanying singly for the song or during neraval or swara prastara. The morsing is played as a shadow of the mrdangam throughout the concert and the instrument's capabilities should be exhibited when playing or accompanying alone or during Thani (percussion round in a concert) or talavadyas (percussion ensembles)

Morsingists:

Pudukottai S. Mahadevan, Delhi R Krishnan, A.S. Krishnan, Srirangam Kannan, Bangalore Rajashekar, R. Raman, Pramath Kiran, Bejjanki V Ravi Kiran (Delhi), Kumbakonam Venkateshan) and V.S. Ramesh.

Gejje:

Gejjes are small metallic bells stung together. These are used in devotional music and also in Bharatanatyam by dancers. It is also known by the name
Ghungru by the northerners.

Ghungroos serve to accentuate the rhythmic aspects of the dance and allow complex footwork to be heard by the audience. They are worn immediately above the ankle, resting on the lateral malleolus and medial malleolus.

A string of ghungroos can range from 50 to greater than 200 bells knotted together. A novice child dancer may start with 50 and slowly add more as he or she grows older and advances in his or her technical ability. Ghungroos or Salangais are worn in traditional performances of the classical Indian dance forms: Bharatnatyam, Kathak, Kuchipudi, Odissi and many such dance forms.

Ghunghroo Vadan was evolved by V. Anuradha Singh, a renowned Indian classical kathak exponent. She developed bell as a main musical instrument and performed in many pure music festivals where dance was not allowed. It is the only foot percussive art and it takes great dexterity, superb control, stamina, classical knowledge and physical strength.

Gejjes are also used as accompaniment in light music and folk music.

**Tala: (Cymbals)**

Manjira is known by many names. It is also called jhanj, tala, mondira, (small size) kafi (large size), or a host of other names. It is basically a set of small cymbals. It is a ubiquitous component of dance music and bhajans. It is used in Bharatanatyam, Kuchipudi, Mohiniattam, Manipuri and Kathakkali. It also plays a major role as an
accompanying instrument to Nagaswaram and can therefore be called a temple instrument. It is a very ancient instrument; examples may be seen on temple walls going back to the earliest of times. They are usually made of brass.

**Jallari:**

Jallari is a lute, a string instrument like Veena sans frets. This instrument is two-three feet long, and it’s an accompanying instrument in which only “thalam” (rhythm) can be played. It can be played by striking two bamboo sticks on the strings, with which the rhythm is generated and the “yaazhi” is inverted unlike veena, and rests on the ground.

This instrument has one more special reference in Sri Muthuswamy Dikshithar’s krithi ‘Akhilandeswari’ as “Jallari”. Jallari/Geth is now being taught only by Dr. H. Subramaniamin Chennai. This instrument is an indigenous instrument of Tamil Nadu and a divine one which is nearly extinct. In Aavudayarkoil, the female deity has no instrument for her “aradhanai” (worship), but this one. Such a once-upon-a-time-famous instrument is now one among the neglected ones in Tamil Nadu.

**Kartal:**

Made of wood, kartals have a fairly long handle. Holding both in the right hand, it is brought down on the left palm and the sound is produced. There
is another type where payals (gejje) are inserted into the instrument. Narada is always remembered with Kartal.

**Ghante:**

This instrument is mainly used in temples. It is hung in all temples and the devotees visiting temples ring the bell. It is usually made of brass and is hung in temples. It is played at the time of ‘Mahamangalarati’ in temples everyday.

**Jal Tarang:**

The Jaltarang, Jalyantra, Jalatarangam is an Indian melodic percussion instrument. Jal means water, Tarang means Vibration. The ceramic bowls are tuned with water and played with teak wood stick. The bowls are played by striking the edge with beaters, one in each hand.

Earliest mention of Jaltarang is found in Vātsyāyana's Kamasutra as playing on musical glasses filled with water. It is one of the 64 Arts and Science to be studied by a maiden.

It is rarely seen or heard, even though the gentle tinkle of its unique sound is quite pleasing. Literally, Jaltarang means "waves in water" but indicates motion of sound created or modified with the aid of water. In the wave-instruments, it is the most prominent and ancient instrument. This traditional instrument is used in Indian classical music.

The Jaltarang developed on the pattern of gongs of gamelan orchestras played in Java, Bali, and Burma (now Myanmar). Gongs of gamelan are made up of copper and other metal alloys and are moulded in different shapes to create various musical notes. Holding bamboo sticks in both hands with cotton on the striking end of sticks, the gongs are gently struck
to create the desired sound. Some scholars opine that in the ancient period these were in routine use around the eastern border of India.

Jaltarang finds its first mention in ‘Sangeeta Parijaata’. This medieval musical treatise categorizes this instrument under Ghan-Vadya. ‘Sangeeta Saara’ considered one with 22 cups to be complete Jaltarang and one with 15 cups to be of mediocre status. Cups, of varying sizes were made of either bronze or porcelain. Today only china bowls are preferred by artistes, numbering around sixteen in normal use. Cups for Mandra Swaras (notes of lower octave) are large while those for Taara Swaras (notes of higher octaves) are smaller in size. Water is poured into the cups and the pitch is changed by adjusting the volume of water in the cup. The number of cups depends on the melody being played. The bowls mostly are arranged in a half-circle in front of the player who can reach them all easily. The player softly hits the cups with a wooden stick on the border to get the sound. It's not easy to tune the instrument and needs some skill. During playing fine nuances can be reached if the performer is accomplished. ‘Sangeeta Saara’ mentions that if the player can rotate the water through a quick little touch of the stick, nuances and finer variations of the note can be achieved.

Jaltarang was also called Jalyantra in the medieval times. Poets of Krishna cult (also called Ashta-chhap poets) have mentioned this instrument, but there is no mention in literature prior to this. Some contemporary Jaltarang players of Karnataka music do attempt to produce Gamaka often in the face
of sounds going awry lacking required control.

**Jaltarang Players:**

Pt. Shankarrao Kanhere, Milind Tulankar, Milind Tulankar, Seetha Doraiswamy, Ragini Trivedi, Manish Sharma, Gaekwad Brothers in Vadodara, Ranjana Pradhan and Anayampatti S Ganesan.

To sum up, it was instrumental music that helped man to get a clear grasp of the subtleties of the tone system and the graces and nuances used in ragas. And it cannot be denied that instrumental music has universal appreciation. Without instrumental accompaniment no concert can shine.

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