



***Shankha (Conch-Shell) and Murali (Bamboo Flute)***

***Spiritual and Musical Expressions of Vedic Hinduism***

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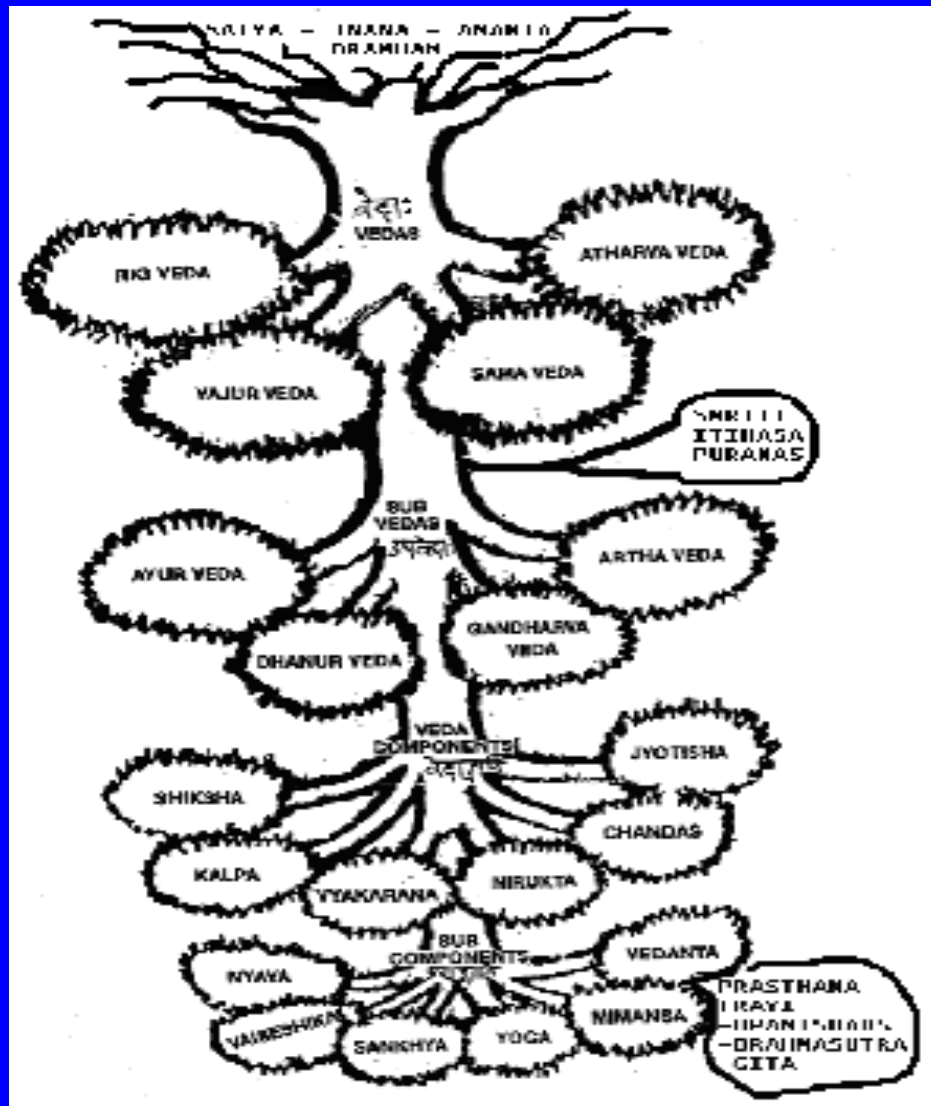
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# Vedic Hinduism

- ❖ *Vedas are the source literature.*
- ❖ *Vedas are infinitely large collection of mantras (chants)*
- ❖ *Vedas and Vedic literature deal with all aspects of life such as religion, philosophy, culture, science, arts, etc.*
- ❖ *Acoustics plays an important role in Vedas and Vedic literature.*

# Vedic Knowledge as an Inverted Tree



*Bramhan* - God  
Non - Dual Reality

4 Vedas

Vedic literature

# Vedic order of natural elements and perception

<b><u>Element</u></b>	<b><u>Sense of perception</u></b>
<b><i>Space</i></b>	<b><i>Sound (hear)</i></b>
<b><i>Air</i></b>	<b><i>Touch and Sound</i></b>
<b><i>Fire</i></b>	<b><i>See, Touch and Sound</i></b>
<b><i>Water</i></b>	<b><i>Taste, See, Touch and Sound</i></b>
<b><i>Earth</i></b>	<b><i>Smell, Taste, See, Touch, Sound</i></b>

- ❖ ***Space is characterized by only sound***
- ❖ ***Sound is the most subtle sense of perception***

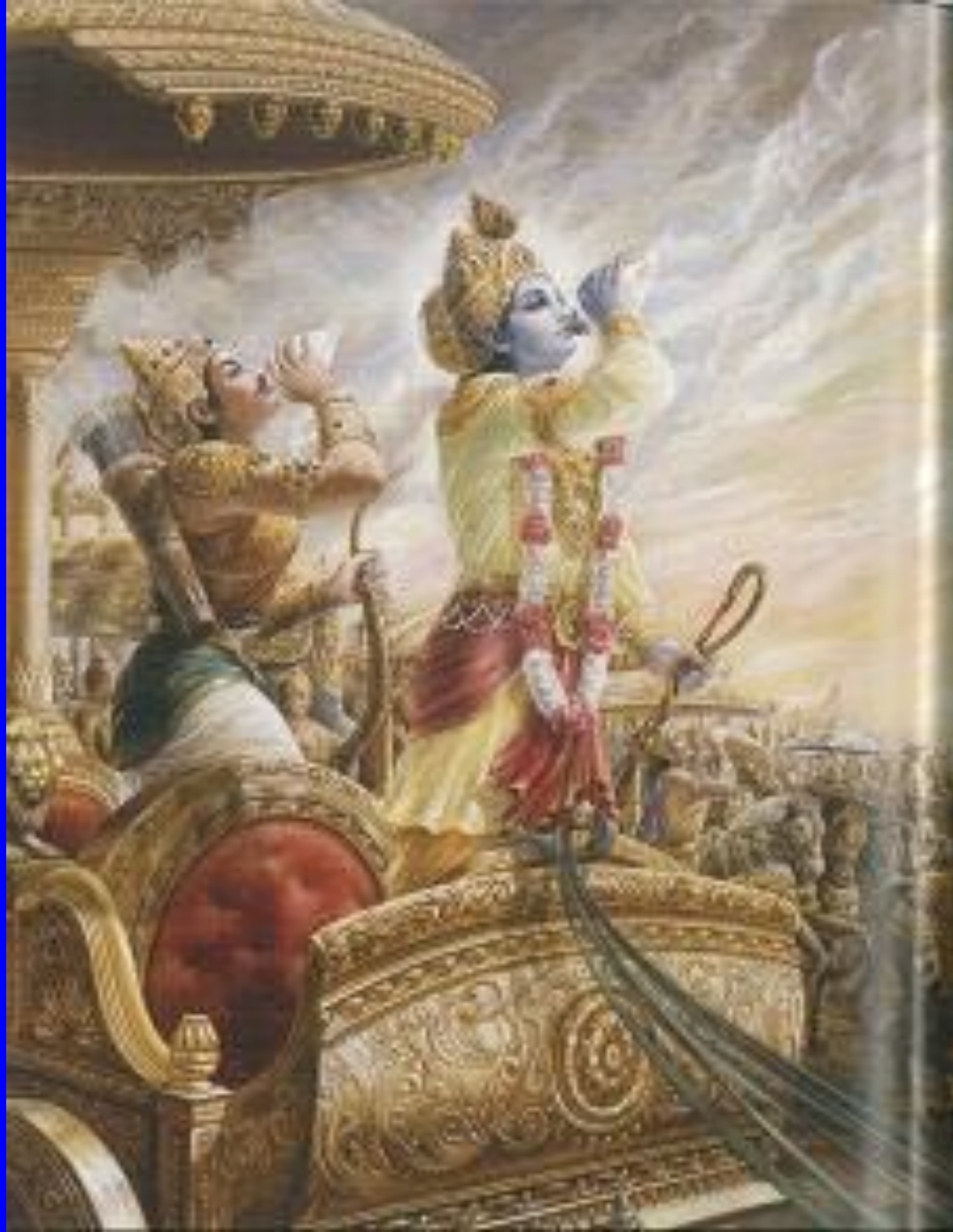
# Music and Vedic Hinduism

- Sounds especially from nature, chants and music provide joy and spiritual experiences for humans.
- Music (in Sanskrit) called Sangeeta includes Vocal music, Instrumental music and Dance.
- The notes of music are derived from nature (for ex: from sounds of animals and birds).
- Music and Dance are part of religious offering in a Hindu worship.
- *“Music should become the bridge that takes the listeners from sensual level to the spiritual level of Atman”*– Yogi-seer Sriranga Sadguru

## Sapta Svaras (seven tones) from nature

- Sa: Peacock (C)
- Ri: Cow (D)
- Ga: Goat (E)
- Ma: Krouncha bird (F)
- Pa: Nightingale (G)
- Dha: Horse (A)
- Ni: Elephant (B)

A Raga is a pleasing combination of these notes. Raga also provides spiritual experience. Raga also depicts moods and sentiments. There are hundreds of ragas.





# Conch shell, Bells and Gongs in temples

## The Hindu Temple and Cultural Society, Bridgewater, N.J





# Measurement Data for Conch Shell

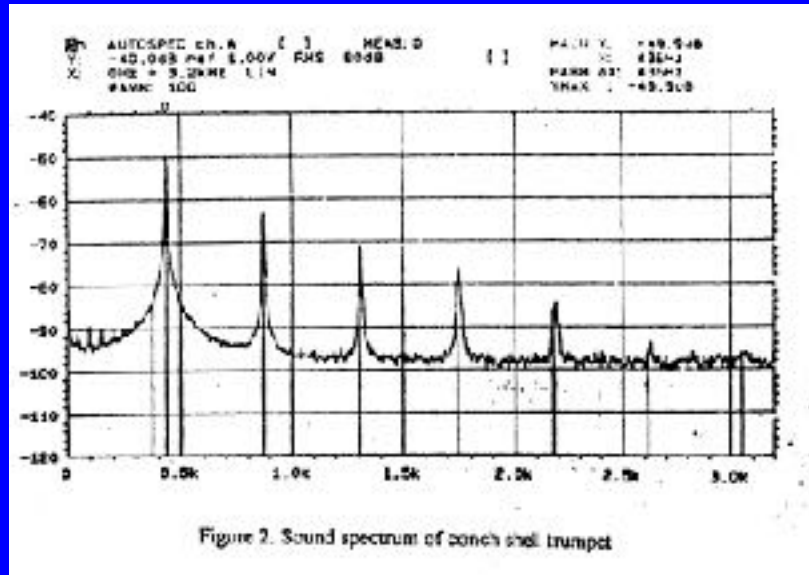
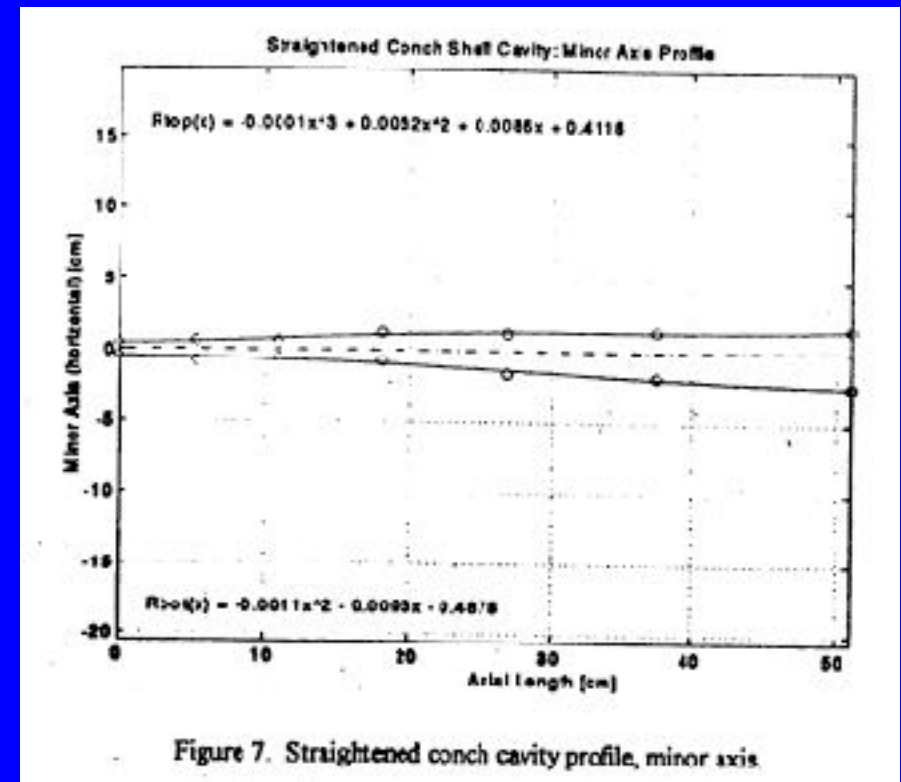
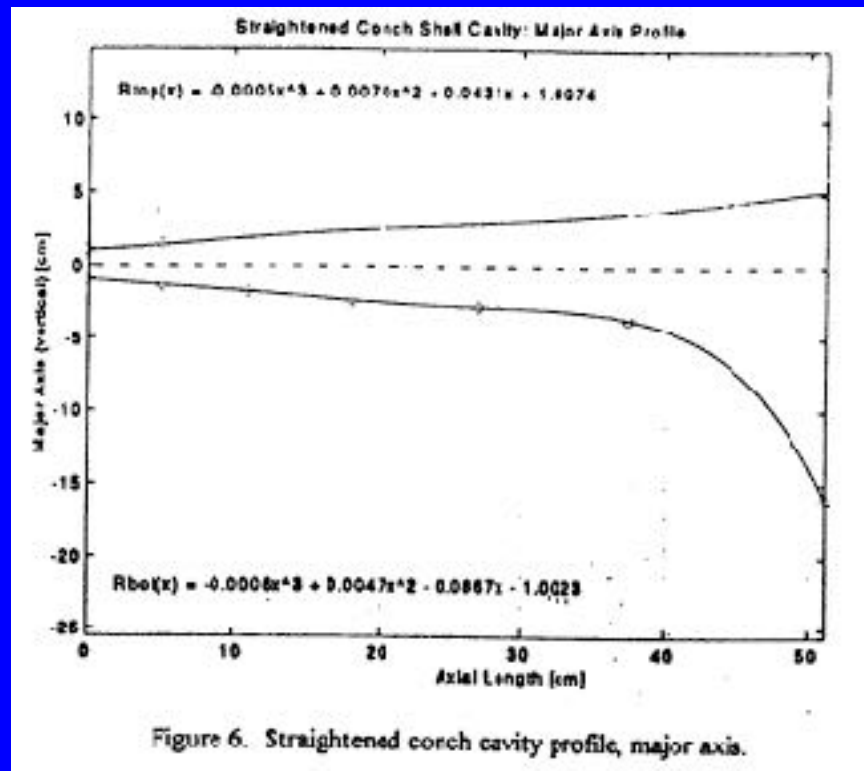
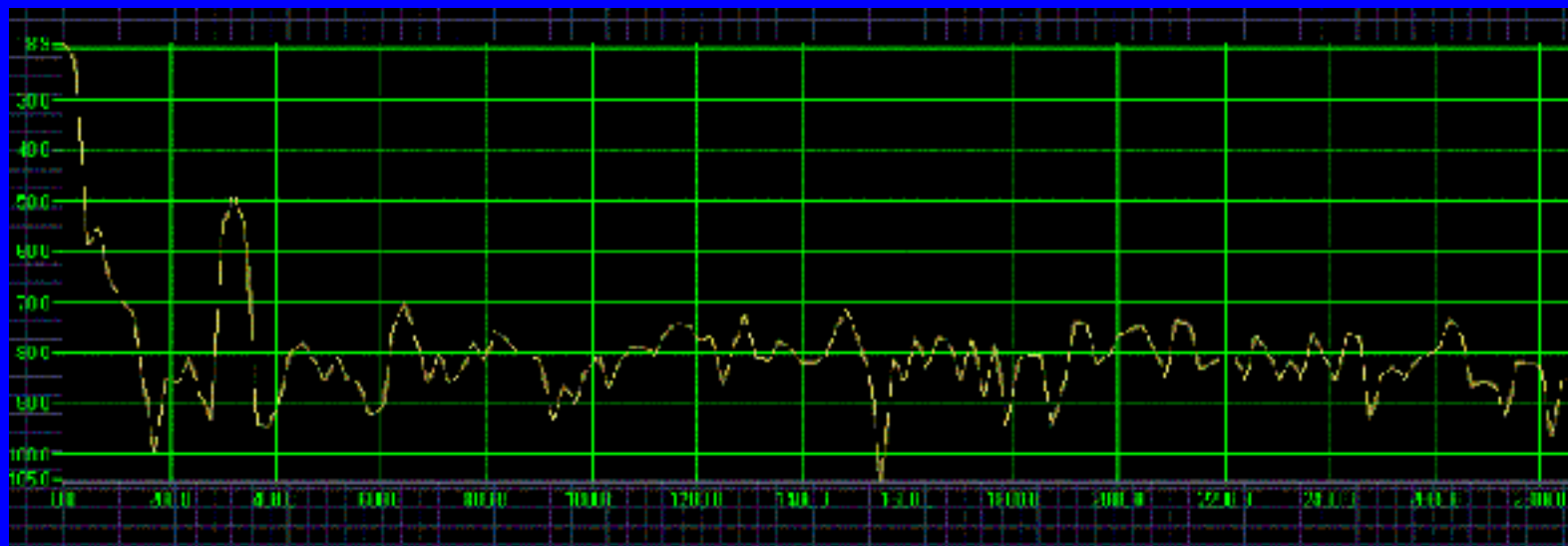
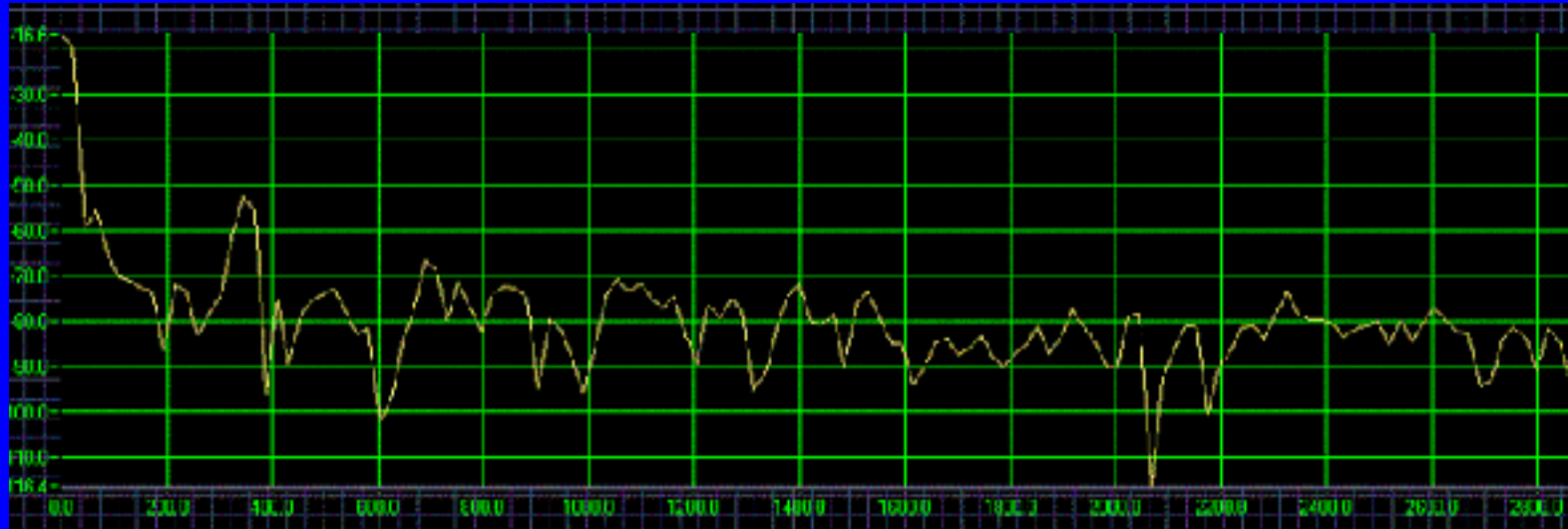


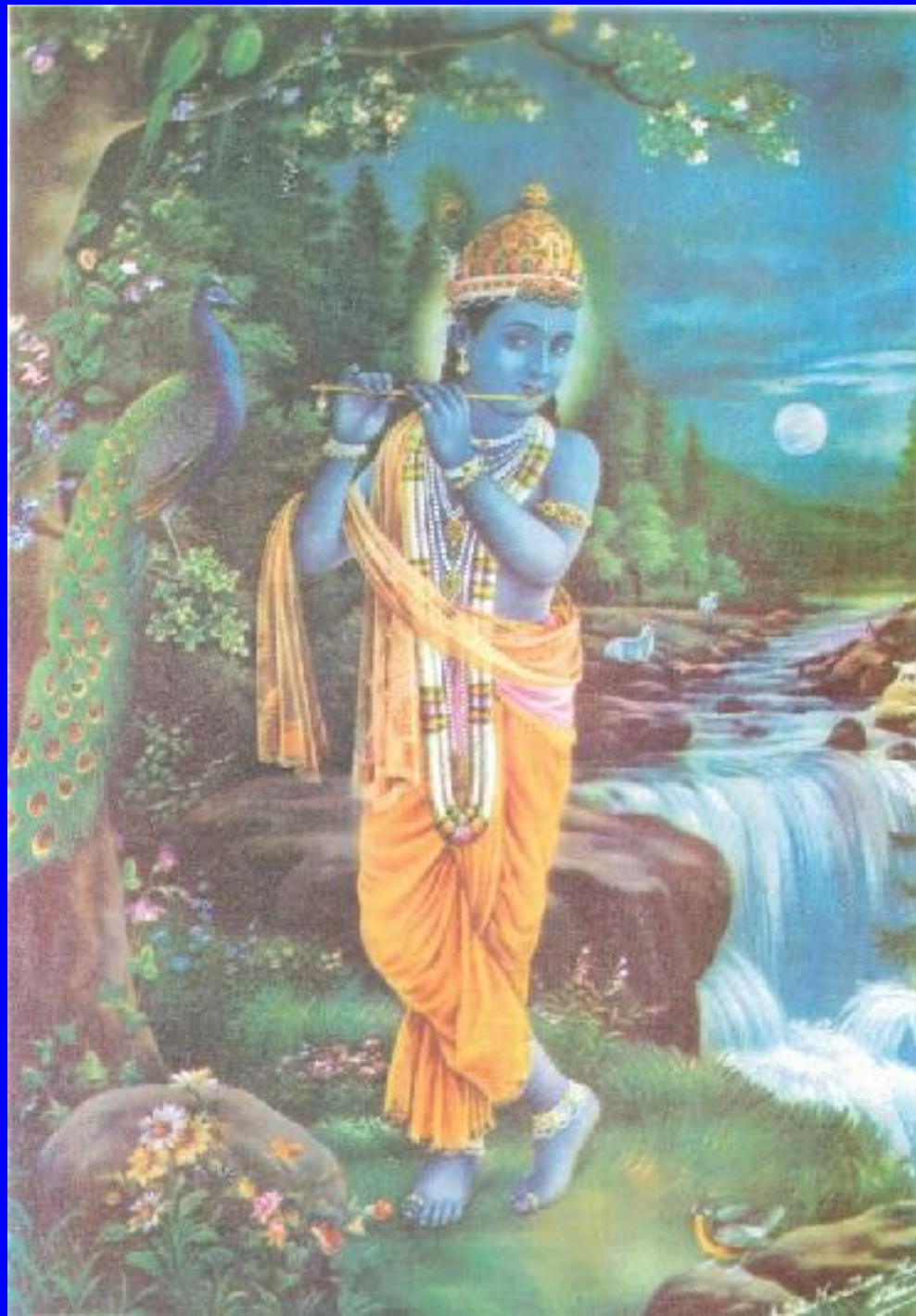
Figure 3. X-ray tomography picture of conch longitudinal section.

# Straightened Conch Cavity



# SPECTRA OF CONCH SHELL OPEN AND CLOSED







**Flute Concert by Mr. Raman Kalyan on flute with Dr.  
C.G.Balachandran on Mridangam, Mr.K.V.S. Vinay on Violin and  
Mr. Murali Balachandran on Ghatam**

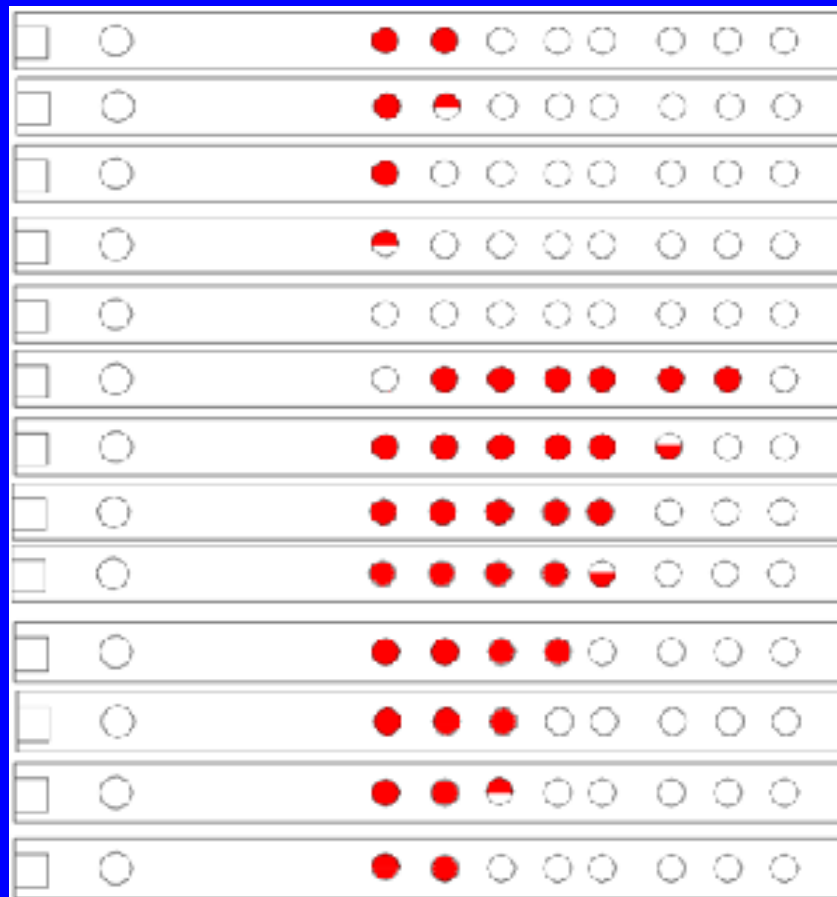
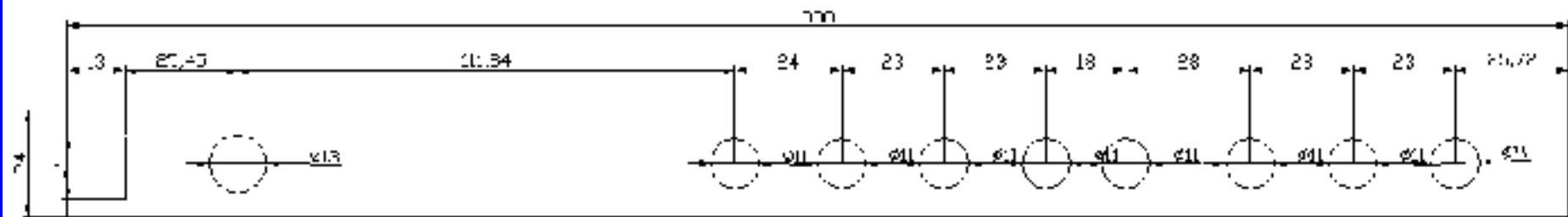


# Flute Concert by the same artists showing the change of flute

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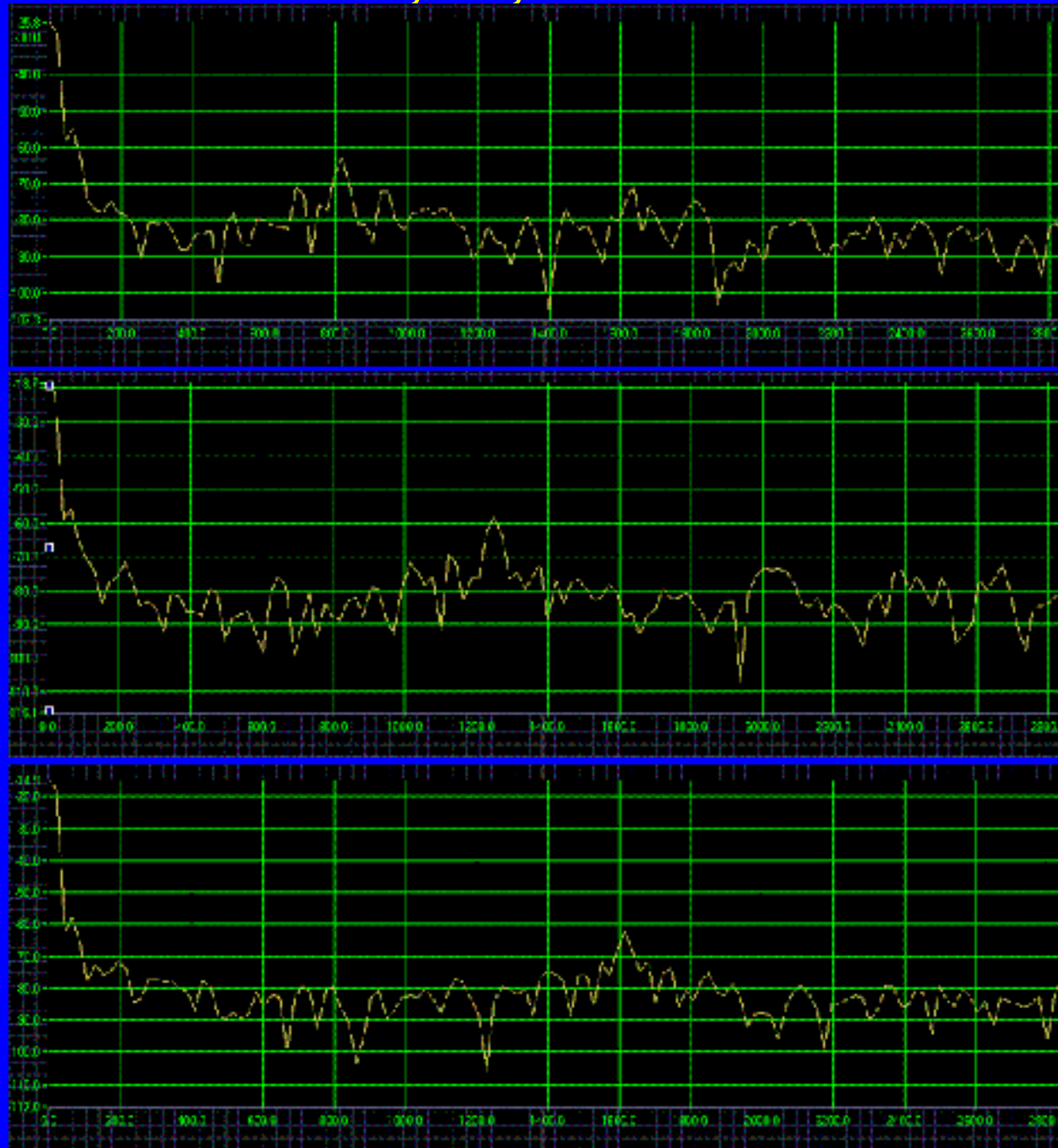
## MEASUREMENTS OF TONES FROM A BAMBOO FLUTE [A5]



Note	Hz	Expt.	Theory
SA	837	1.00	1.00
RH	910	1.09	1.07
RF	952	1.14	1.13
GH	1030	1.23	1.20
GF	1000	1.29	1.25
MF	1127	1.35	1.33
MH	1227	1.47	1.41
PA	1262	1.51	1.50
DH	1352	1.62	1.60
DF	1300	1.65	1.69
NF	1492	1.78	1.80
NH	1575	1.88	1.88
SA	1660	1.98	2.00



# SPECTRA OF SA, PA, SA HIGH ON FLUTE A5

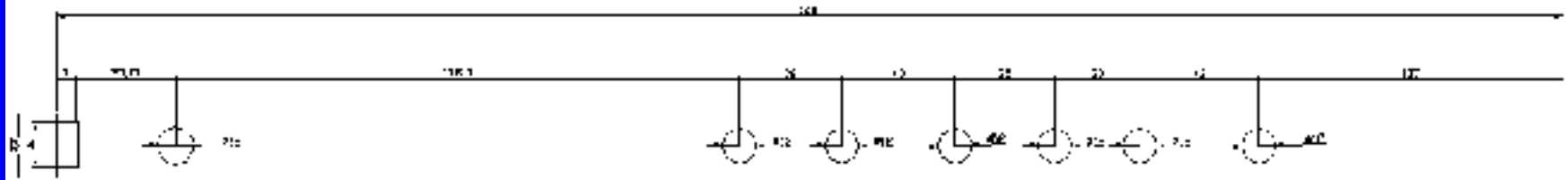


# COMPARISON OF SCALES

## FLUTE A5

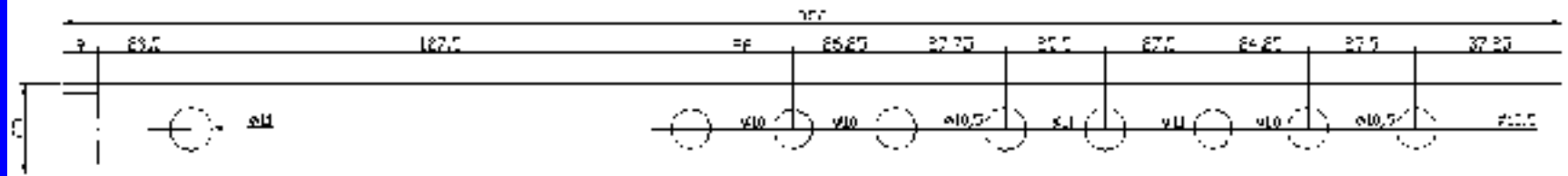
NOTE	RATIO [EXPT]	NOTE	RATIO [PYTHOGOREAN]
SA	1.00	C	1.00
RF	1.14	D	1.13
GF	1.29	E	1.25
MF	1.35	F	1.33
PA	1.51	G	1.50
DF	1.65	A	1.66
NH	1.88	B	1.88
SA	2.00	C	2.00

## MEASUREMENTS OF TONES FROM A BAMBOO FLUTE [A6]




Note	Hz	Expt.	Theory
SA	505	1.00	1.00
RH	545	1.08	1.07
RF	570	1.13	1.13
GH	625	1.24	1.20
GF	645	1.28	1.25
MF	685	1.36	1.33
MH	735	1.46	1.41
PA	755	1.50	1.50
DH	815	1.61	1.60
DF	840	1.66	1.69
NF	910	1.80	1.80
NH	975	1.93	1.88
SA	1005	1.99	2.00

# MEASUREMENTS OF TONES FROM A BAMBOO FLUTE [A4 $1/2$ ]

[illegible]

Note	Hz	Expl.	Theory
SA	725	1.00	1.00
RH	765	1.06	1.07
RF	810	1.12	1.13
GH	900	1.24	1.20
GF	955	1.32	1.25
NF	965	1.33	1.33
MH	1070	1.48	1.41
PA	1115	1.54	1.50
DH	1190	1.64	1.60
DF	1210	1.67	1.69
NF	1310	1.81	1.80
NH	1405	1.94	1.88
SA	1465	2.02	2.00

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