

THE  
TWENTY-TWO MUSICAL SRUTIS  
OF THE  
HINDUS:

BY  
RAJAH SIR SOURINDRO MOHUN TAGORE.  
BAHADOOR, Mus. Doc.,

*Knight of the United Kingdom of Great-Britain and  
Ireland ; Companion of the Order of the Indian  
Empire ; Grand Cross, Grand Officer, Com-  
mander, or Knight of divers Orders of  
Chivalry ; Officer of Public Ins-  
truction, France :*

*Nawab Sháhzádá of the Persian Empire,  
Sangitá-Náyaka ; &c., &c.*

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ACADEMY OF MUSIC, PATHURIAGHATA RAJEATI.

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## The Srutis with reference to their position in the Octave.

<i>Names of the Seven Notes.</i>		<i>Names of the Twenty-Srutis.</i>
C—SHARJA (Tonic)	—	Tívrá 1.
	—	Kumudvatí 2.
	—	Mandá 3.
	—	Chhandovatí
D—RISHABHA (Super Tonic)	—	Dayávatí 5.
	—	Ranjaní 6.
	—	Ratiká 7.
E—GANDHÁRA (Mediant)	—	Raudrí 8.
	—	Krodhá 9.
F—MADHYAMA (Sub-Dominant)	—	Bajriká 10.
	—	Prasáriní 11.
	—	Prítí 12.
	—	Márjaní 13
G—PANCHAMA (Dominant)	—	Kshiti 14.
	—	Raktá 15.
	—	Sandípaní 16.
	—	A'lápiní 17.
A—DHAIVATA (Super Dominant)	—	Madantí 18.
	—	Rohiní 19.
	—	Ramyá 20.
B—NISHÁDA (Leading Note)	—	Ugrá 21.
	—	Kshobhiní 22.
C—SHARJA (Tonic) (Higher.)	—	Tívrá. (Higher.)

TO  
His Excellency the Right Hon'ble  
THE EARL OF DUFFERIN,

K. P., G. C. B., G. C. M. G., G. M. S. I.,

&c., &c., &c.,

*Viceroy and Governor-General of India,*

THIS PAMPHLET

IS

MOST RESPECTFULLY DEDICATED

BY

HIS EXCELLENCY'S


MOST OBLIGED AND HUMBLE SERVANT,

S. M. TAGORE.

THE  
TWENTY-TWO MUSICAL SRUTIS  
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**HINDUS.**

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THE classical authorities on Hindu Music thus describe the phenomena of sound :—

When the animal soul wants to speak out, it impresses the mind into its service, and the mind acts on the fire that has its seat in the abdomen. Thus moved, the fire mixes itself with the vital air that pervades the ligament known as *Brakma Granthi* which lies below the  1. The

vital air gets inflated in consequence of contact with the fire, and gradually rises up, causing, in the navel, the *Ati Sukshma Náda* (or the very minute sound,) in the chest, the *Sukshma* (or the minute,) in the throat, the *Pushta* (or, the developed,) in the head, the *Apushta* (the suppressed,) and in the mouth, the *Kitrima* (or the artificial sound). The theory described as above is best illustrated by the meaning of the term *Náda* which is composed of the two consonants *Na* and *da*, the former signifying the vital air, and the latter the fire.

The following description of the production of sound is taken from Nathan's well-known work "*Musurgia Vocalis*"—"An Essay on the History and Theory of Music, and of the qualities, capabilities and management of the human voice:"—

"Sound is produced by the reverberation of air. When any elastic body is caused to vibrate, it acts upon the circumambient fluid of air, and creates in it pulses, waves, or undulations, which again acting or striking upon the *tympanum* or *drum* of the ear, communicates with our



senses and gives to us the idea called *sound*."

"The varieties of tones in human voices," continues Nathan, "arise partly from the dimensions of the *trachea* or wind-pipe, which, like the flute, the longer and narrower it is, the more acute is the sound it gives, but principally from the head of the *larynx* or knot of the throat, called *pomum adami*, the tone of the voice being more or less grave as the *rima* or clef therein is more or less open. Hence, according to the different qualities of musical sounds, we have a *thin tone*,—a *full tone*,—a *harsh*

*tone,—a rough tone,—a round tone,—a rich tone,—a liquid tone,—a mellow tone, &c."* —

Again :—

“The office of respiration, or breathing, comprehends two processes, namely inspiration, by which the common air of the atmosphere is drawn inwards so as to inflate the lungs; and expiration, by which it is discharged so as to collapse the air-cells, and thereby diminish the capacity of the lungs in proportion as it was increased by the former function. And although these processes are continually going on with great rapidity in the

living system, it is still in our power to repress or protract either of them at pleasure to a considerable extent, and thereby to render them subservient to the rules of music. The *trachea*, or wind-pipe, with its several appendages, is of vast importance in the management of the voice, which is considerably governed by its contraction and elongation ; but more particularly by that of the *larynx*, a cartilaginous body, which may be considered the commencement of the *trachea* and its common reservoir of air. It is composed of five annular cartilages placed

above one another, and united by elastic ligaments, or fibres, by which it is dilated and contracted, so as to be capable of producing all the various tones of voice. It is distinctly seen rising in the production of acute tones, and descending in low ones. For the purpose, therefore, of effecting the greatest possible elevation of this organ, we almost involuntarily throw back the head in great efforts of singing.

“ ‘The *larynx*,’ observes Rennie, ‘is lined internally with a very sensible, vascular and mucous membrane; which is a

continuation of the membrane of the mouth. It is of great importance to keep this in view, as it is owing to its becoming irritated or inflamed and throwing out a quantity of tough phlegm, that hoarseness arises, and other disorders of the voice.'

"At the top of the *larynx*, we have two semi-circular membranes forming a small oblong aperture, the opening of the wind-pipe, which can be dilated or contractéd at pleasure and by its vibratory motions, the tones of the voice are modified; this is termed in anatomy the *glottis*."

To resume the description according to the Sanskrit authorities. The sound produced in the chest is termed *Mandra*, that in the throat is called *Madhya*, and that in the head, is styled *Tára*. On this subject Nathan has the following :—

“The qualities of the human voice are commonly distinguished under three heads, according to the natural organs which appear most particularly concerned in its modulation and tones :—1st, where the sound appears to issue almost entirely from the lungs, it is distinguished as a *chest voice*, called by the Italians, *voce*

*di petto* ; also, *voce naturale*, the natural voice : 2ndly, where the throat appears the organ connected with the production of sound, it is called a *throat voice*, termed in Italian, *falsetto* : 3rdly, where the process of breathing seems more than usually connected with the nostrils, and the sound is accordingly modulated by their influence, it is termed a *head voice*, in Italian, *voce di testa*."

Each of the kind of sound defined as *Mandra*, *Madhya*, and *Tára*, is divided into twenty-two parts, each of which comes under the designation of *Sruti*, so

called because it is perceptible to the organ of hearing.

The classical authorities are divided in their views on the subject of *Srutis*. According to some, *Srutis* are of two kinds—viz, *Svaragata*, or those which are inherent in the seven principal notes, and *Antara*, or those which intervene such notes. Those that support the seven principal notes come under the designation of *Svara-gata*, and those that represent the intervals between the seven principal notes are classed as *Antara*. According to others, *Srutis* are of three classes in



accordance with the three different seats of sound. Some others, again, affirm that *Srutis* are twenty-two in number, and designate them as follow:—

(1) *Tívrá* ; (2) *Kumudvatí* ; (3) *Mandá* ; (4) *Chhandovatí* ; (5) *Dayávatí* ; (6) *Ranjaní* ; (7) *Ratiká* ; (8) *Raudrí* ; (9) *Krodhá* ; (10) *Bajriká* ; (11) *Prasáriní* ; (12) *Príti* ; (13) *Márjaní* ; (14) *Kshiti* ; (15) *Raktá* ; (16) *Sandípaní* ; (17) *Alápiní* ; (18) *Madantí* ; (19) *Rohiní* ; (20) *Ramyá* ; (21) *Ugrá* ; and (22) *Kshobhiní*.

Those who fix the number of *Srutis* at sixty-six, (at the rate of twenty-two to each of the

three seats of sound,) name them as under:—

**I.—For the Seven Notes in the  
*Mandra octave.***

(1) Mandrá ; (2) Atimandrá ;  
(3) Ghorá ; (4) Atighorá ; (5)  
Mandalá ; (6) Saumyá ; (7) Suma-  
ná ; (8) Pushkará ; (9) S'ankhi-  
ní ; (10) Nílá ; (11) Utpalá ; (12)  
Anunásiká ; (13) Ghoshavatí ;  
(14) Nílanádá ; (15) A'vartaní ;  
(16) Raṇadá ; (17) Ekagam-  
bhírá ; (18) Dirghatārá ; (19)  
Nádiní ; (20) Mandrajá ; (21)  
Suprasanná ; and (22) Ninadá.

## II.—For the Seven Notes in the *Madhya* octave.

(1) Nádántá; (2) Nishkalá; (3) Gurhá; (4) Sakalá; (5) Madhurá; (6) Galí; (7) Ekákshará; (8) Bhriṅgajāti; (9) Rasagíti; (10) Suranjiká; (11) Púrṇá; (12) Alankárinī; (13) Bāñsíká; (14) Bainiká; (15) Trisstháná; (16) Susvará; (17) Saumyá; (18) Bháshāṅgí; (19) Várttiká; (20) Sampúrṇá; (21) Prasanná; and (22) Sarva-byápiniká.

## III.—For the Seven Notes in the *Tára* octave.

(1) I's'varí; (2) Kaumárí; (3) Savarálí; (4) Bhogavíryyá;

(5) Manoramá; (6) Susnigdhá;  
 (7) Divyāṅgá; (8) Sulalitá; (9)  
 Vidrumá; (10) Mahárká; (11)  
 Saṅginí; (12) Ráká; (13) Lajjá;  
 (14) Kálí; (15) Suskmatísuksh-  
 má; (16) Pushtá; (17) Supush-  
 tiká; (18) Vispashtá; (19) Ro-  
 karí; (20) Karálí; (21) Vispho-  
 tántá; and (22) Mēdiní.

We do not agree with those who, as we have shown above, fix the number of the *Srutis* at sixty-six. As the fact of there being three places in the human body (from which proceed the sounds representing the three octaves) does not make the number

of the principal notes twenty-one instead of seven, it does not stand to reason that the *Srutis* which form the intervals of the octaves would have to be multiplied by three to represent the three octaves. In fact the *Srutis* have lower or higher values according as they represent the intervals of the lower or higher octaves, precisely as the notes in the octaves have, according to the positions of the octaves.\*

\* Perhaps, the object which the authorities had in assigning a name to each interval in the three octaves is to afford one facilities to trace the position of a particular *Sruti* by the bare mention of its designation.

It would, perhaps, be more reasonable to accept the theory of those who declare the number of *Srutis* to be countless; for there is an authoritative text to the effect that “even *Brahmā* found himself unable to enumerate the *Srutis* intervening the musical notes.” We, however, are decidedly of opinion that the number of *Srutis* is twenty-two, and proceed to delineate them accordingly.

For the purpose of causing an idea of the nature of the *Sruti* to be formed, the scholars of old have said “this much” only :—  
Above the chest lies the tubular

vessel called *Sushumnā-nāṛī*,\* round which are arranged in a crooked way twenty-two very minute arteries. The vital air, referred to in the preceding pages, comes into contact with these, in the course of its motion upwards, and produces each of the twenty-two *Srutis*. These *Srutis* rise in value—each higher than the preceding one. Thinking it hard to impress upon one the idea of the *Sruti* by means of the voice, the classical scholars have laid down the following

\* One of the three canals, which, according to the anatomy of the Schools of Indian philosophy and medicine, are the chief passages of breath and air.

directions with the object of illustrating their views on the subject :—

Mount a *Vinā* (a stringed instrument) with twenty-two strings. Tune the first string so low that if it is tuned lower the sound would be perfectly inaudible. Tune the second, a *little* higher than the first, but so as not to admit of the production of any perceptible sound between the first and the second; and so on, as regards the other strings. The sound produced by each of the strings thus tuned will represent a *Sruti*, and the consecutive sounds will represent the



sounds emanating from the twenty-two *Srutis*.

We, however, have hit upon another method to ascertain the nature and the position of the *Srutis*. The method is as follows :—

Take a *Setár* or a *Víná*; measure the distance between the *Sharja* (C) of the *Madhya* (middle) octave and the *Sharja* of the next higher octave, *i. e.*, the C of the *Tára* octave. Divide the space between these two C's by putting a dot or a line in the middle. Put a dot or line on either extremity. Place the note F over the dot or line in the middle, the note C on

the other extremity of the first-half portion of the divided space, and the note higher C on that of the second-half portion. Subdivide the first-half portion into nine equal and the second-half into thirteen equal parts, and put a dot or line to mark off each subdivision. • Including the dots or lines already put in (which respectively represent C and F), and excluding the one which represents the higher C, there will be in all twenty-two dots or lines. Now, each of these dots or lines will represent a *Sruti* and the total number of *Srutis* will necessarily be twenty-two; the names of

which have already been given in consecutive order. Of these twenty-two *Srutis* are born the seven principal notes,—*Sharja* (C); *Rishabha* (D); *Gándhára* (E); *Madhyama* (F); *Panchama* (G); *Dhaivata* (A); and *Nisháda* (B).

The place indicated by the position of the first *Sruti* (*Tivrá*) represents *Sharja* (C).

The place indicated by the position of the fifth *Sruti* (*Dayávatí*) represents *Rishabha* (D).

The place indicated by the position of the eighth *Sruti* (*Raudrī*) represents *Gándhára* (E).

The place indicated by the position of the tenth *Sruti* (*Bajriká*) represents *Madhyama* (F).

The place indicated by the position of the fourteenth *Sruti* (*Kshiti*) represents *Panchama* (G).

The place indicated by the position of the eighteenth *Sruti* (*Madantí*) represents *Dhaivata* (A).

The place indicated by the position of the twenty-first *Sruti* (*Ugrá*) represents *Nisháda* (B).

The annexed Table explains the position of the *Srutis* with reference to the Diapason.

Great difference of opinion

exists as to the relation of the *Srutis* to the notes. Some think that they being both perceivable by the ear are one and the same in nature. But this opinion does not appear to be a sound one, for the *Sruti* is the foundation or supporter of the note, and consequently the supported cannot be the same as the supporter. Others hold that the note is reflected on the *Sruti* just as the human face is reflected on the looking-glass. This view, too, does not seem to be above refutation, for, unlike that of the note with reference to the *Sruti*, the perception of the reflected

object is of an illusive nature. It is the conclusion of another class of thinkers that the *Sruti* is the cause of the note, in the same sense that a lump of clay is the cause of an earthen-pot. But this kind of reasoning is faulty too, inasmuch as the clay may be distinguished in the presence of the earthen-pot, whereas the *Sruti* cannot be perceived in the presence of the note. Some other thinkers make out that the *Sruti* is transformed into a note in the manner in which milk is transformed into curd. There seems to be some force in this simile.

From the Table given, it would appear that there are four *Srutis* respectively in *Sharja* (C), *Madhyama* (F), and *Panchama* (G); three, in *Rishabha* (D) and *Dhaivata* (A) respectively; and two in *Gándhára* (E) and *Nisháda* (B) respectively. According to modern use, in conformity with which the Table has been drawn up, there are three *Srutis* between *Sharja* and *Rishabha*. Hence, if *Rishabha* is lowered by one *Sruti*, it is called \**Sámánya*

\*It would, perhaps, be necessary to explain the Sanskrit adjectives by which the notes raised or lowered in value are distinguished. *Komala* means *Flat*; *Tivra*=*sharp*; *Sámánya*=*slightly*; *Madhya*=*medium*; *Ati*=*very*. Thus: *Sámánya Komala Rishabha* would

*Komala* ; if it is lowered by two *Srutis*, it is called *Madhya Komala* ; and if by three, it is called *Ati Komala Rishabha*.

There are two *Srutis* between *Rishabha* and *Gándhára*. Hence *Gándhára* is called *Madhya Komala* if it is lowered by one *Sruti* ; and *Ati Komala*, if it is lowered by two.

There is only one *Sruti* between *Gándhára* and *Madhyama*. But, according to usâge, the latter is never lowered. It is raised, i. e., it is made sharp.

Mean *Rishabha* rendered slightly flat. *Ati Komala Rishabha*,—*Rishabha* rendered very flat ; *Madhya Komala Rishabha*—*Rishabha* rendered neither slightly flat nor very flat.



The number of *Srutis* between *Madhyama* and *Panchama* is three. Hence, if *Madhyama* is raised by one *Sruti*, it becomes *Sámánya Tíva*; if it is raised by two *Srutis*, it becomes *Madhya Tíva*, and, if by three, it becomes *Ati Tíva*.

According to the Theory of Hindu Music, *Panchama* cannot be rendered either flat or sharp. But that makes no difference as to the pitch of the note sought to be produced; for *Madhyama* sharp amounts to the same thing as *Panchamā* flat. There are three *Srutis* between *Panchama* and *Dhaivata*. If the latter is

lowered by one *Sruti*, it becomes *Sámánya Komala*, if it is lowered by two *Srutis*, it becomes *Madhya Komala*, and if by three, it becomes *Ati Komala*.

Two *Srutis* lie between *Dhái-vata* and *Nisháda*. Hence, if the latter is lowered by one *Sruti*, it becomes *Madhya Komala*, and if by two *Srutis*, it becomes *Ati Komala*.

The tonic (*Sharja*) C, according to Indian Music, admits of no change in its value. Its position is a fixed one.

Now, comes the question as to the values of the *Srutis*. As would appear from the Table

given, the nine intervals between C and F are equal to one another, and the thirteen between F and C (*Higher*) are also equal to one another. But the intervals in the latter group are not the same as those in the former, but are rather closer to one other; for there are nine intervals in the first-half of the division, and thirteen in the second-half of it. Hence the value of the *Sruti* immediately succeeding the note F is comparatively higher than that of the one immediately preceding the same note. The intervals in the two groups are *almost* equal to one another, so far as each

group is concerned—we say *almost*, because the notes arranged according to the intervals laid down do not, in some cases, form *very* accurate representations of the Diapason. But the difference is so minute as to defy detection by the ordinary ear.

To represent, as correctly as possible, the sound of the twenty-two *Srutis*, we have devised a musical instrument called *Sruti-Vīṇā*, which is a *Setār* arranged with frets representing each interval of the middle octave, and mounted with strings. This instrument might give the curious some idea of the arrange-

ment of the *Srutis* in the Diapason, and of the variety of sounds an Indian octave is credited with producing.

We have also had constructed to our order tuning forks forming a series of twenty-three (including the Tonic of the next higher octave), which, it is hoped, will give the uninitiated some idea of the *Sruti* which seems to be as much puzzle to lovers and cultivators of European Music as it is a peculiar characteristic of our own.

The *Srutis* are, as it were, the life and soul of Hindu Music. It is they that form the foundation

of the natural and the chromatic intervals and the fountain-head of the various *Rágas* and *Ráginis* which owe their origin to the different permutations of the intervals. Attempts at harmonising Hindu Music should be made with an eye to the positions of these minute intervals. This subject has been dealt with in detail in the work,\* "The Musical Scales of the Hindus," to which the attention of the interested reader is humbly invited.

\* By the Author.

## CONCLUDING REMARKS.

THE "*Sruti*" is known among the modern musicians of India by the name of "*Sorut*." But I doubt whether all of them understand what is meant by that term. In the course of the general change which followed the transfer of Hindusthan from the hands of the Hindus to those of the Mahomedans, the *S'ástras* of the Hindus, including that of Music, sank into oblivion. The Mahomedan rulers encouraged the practice of Hindu Music and converted it into an instrument of sensual enjoyment. They did not at all care for the essential principles of Music which, to them, appeared uninviting and inaccessible. The consequence was that the musical *S'ástras* well nigh fell into disuse. One or two Sanskrit

works on Music were translated, for the first time into Persian, by Amir Khusroo during the reign of the Pathan king Gias-uddin Balban, who ascended the throne in 1256 after Christ. Mirza Khan of Persia wrote also in Persian a musical treatise which goes by the name of "*Toftel Hind.*" The book does not show when or in whose reign it was got up. A few other Persian translations of Sanskrit works on Music are noticed, but in none of them has the subject of *Sruti* been clearly dealt with, in its theoretical or practical aspect. The Mahomedan musicians, when questioned on this subject, are generally able to say this much only that there is such a thing as *Sorut*, the nature of which, they add, it is difficult to determine. A few musical works have lately been translated into Hindi under the patronage of some of



the Hindu Chiefs of the present day, but these works, too, do not give any authoritative exposition of the subject. I have known of the existence of a few Guzerati works on Hindu Music in the Presidency of Bombay, but as, unfortunately, I have not had the opportunity of making myself acquainted with their contents, I am not in a position to say whether or how they have treated the question of the *Sruti*. From the conversation I have had with a few of the musicians of Guzerat, it did not appear to me clear that they could throw any light on the subject. The Southern portion of India did not suffer so much from the influences of the Mahomedan conquests as the Northern one, and, for this reason, several Sanskrit works on Music are still extant in the Southern Presidency. The Tamil works written on the basis of the *S'ástras* deal

with *Srutis* in a comparatively comprehensive manner, but it is doubtful whether the subject has been successfully treated in its *practical* view. The principles of melody, measure and of the Drama, as followed up to this day in the Southern Presidency, are exactly the same as those laid down in the classical authorities. From the work which is being published by Lieutenant C. R. Day, of the Madras Army, on the subject of Hindu Music as described in the Sanskrit works, extant in the Southern Presidency, it would appear how very different now is the Music of India to what it was before. I have had the pleasure of cultivating the acquaintance of several musicians of note hailing from the South, and can well testify to the excellence of the manner in which they have practically explained the principles of the *Rāgas* in

accordance with the *dicta* of the *S'āstras*. The Music of Bengal and the North-West has partaken largely of the Mahomedan element. About 50 years ago, a Bengali gentleman of the name of Babu Radha Mohun Sen of Calcutta wrote in Bengali a treatise on Music which appears to have had the "*Toftel Hind*" for its model. This is believed to be the first work on Music written in the Bengali language. The work does not speak of *Srutis* according to the views of the *S'āstras*. The author simply says that the *Srutis* are the wives of the notes; and he illustrates the metaphor by remarking that, like the wives gifted with the bashfulness natural to their sex, the *Srutis* seek protection in the persons of their husbands. This, no doubt, is poetical sentiment, which throws little light on the views of the musical *S'āstras*. About seventeen years ago,

my revered teacher the late Professor Kshetra Mohun Gosvami succinctly stated the principles of the *Sruti* as enunciated in the ancient works, in the course of his musical work designated "*Sangita-Sāra*." The opinions expressed on the subject by eminent Europeans versed in Hindu Music such as Sir William Jones, Capt. Willard, and others (notably among whom is Paterson who has written a lengthy dissertation on the topic), will be found collected in my publication called "*Hindu Music from various Authors*."

It is known to all musicians of Europe that the practice of dividing the notes into minute intervals is not confined to the Music of India. That the ancient Greeks had it will appear clear from the following passage under the heading of "*Enharmonic Scale*" in Nathan's work "*Musurgia Vocalis*" :—

“ Enharmonic, extremely musical, so called from its superior excellence. Aristoxenus ascribes the invention of this genus to Olympus. The diastema\* of the Enharmonic, according to Euclid, are two dieses and the ditonus. Brosard says, it is a species of Music, the modulation whereof proceeds by intervals less than quarter-tones. This genus was in great use among the Greeks, especially in their dramatic performances; but in what its excellences consisted we have never been able to find out. It was allowed by all to be so difficult that few could ever practise it; one of the Enharmonic scales in the time of Aristoxenus, consisted of quarter-tones and major thirds: they had originally another kind of enharmonic, which was considered much easier of execution, but is now lost.”

\* Diastema, an interval, or space.

Dr. Burney says:—"From several passages in ancient authors who have written upon Music, it appears that there were two kinds of *enharmonic* melodies in use among the Greeks ; in the most ancient of which we do not find that the *Diesis* or *quarter-tone* ever had admission. This I shall distinguish, in the course of the following essay, by the title of *Old Enharmonic*. The other, in which the semi-tone was divided, and which seems to have been a refinement upon this, I shall call *New Enharmonic*."

The practice still obtains among the Arabs, as would appear from the following remarks taken from Nathan :—

"Aristotle speaks of *enharmonic* melodies being formerly preferred to all others for their ease and simplicity. The *enharmonic* was in its decline in the time of Aristoxenus and the chromatic daily

increasing in public favor. Dr. Burney tells us, that Dr. Russell procured him from Aleppo the Arabian 'scale of Music, the octave of which consisted of twenty-four quarter-tones, all of which had their particular denominations."

In his work entitled "An Introduction to the Study of National Music," Carl Engel reproduces a song of the natives of Nukahiva, (the principal Island of the Marquesas Archipelago) which illustrates the use of the quarter-tones, and remarks that it is also discernable in the vocal performances of some other barbarous nations. The New Zealanders, or Maories are reported "to be gifted with a remarkably fine ear for distinguishing quarter-tones." "Mr. Davies," adds Carl Engel, "has written a small essay, the purport of which is to prove that the succession of intervals employed by the Maories bears

a close resemblance to the *enharmonic genus* of the ancient Greeks, which consisted of a succession of a quarter-tone, another quarter-tone and a major third."

The preceding pages represent a brief *resumé* of the views of classical authorities, such as Bharata, Nārada, Sārangdeva, &c., on the subject of the *Srutis*, and are written on the basis of those authorities. As would appear from the context, attempts have been made to illustrate the subject, firstly, with the help of a *Setār* in which the frets have been arranged with reference to the positions of the *Srutis* in a Diapason, and secondly, with the help of a set of tuning forks representing the intervals of the Diapason. For the idea of the latter I am indebted to Mr. A. J. Ellis, the eminent authority on Mathematical Music, at whose instance the Government of India has done me the



honor of asking whether I could undertake to carry out the suggestion. The immediate object of the publication of this hurried and necessarily imperfect pamphlet will be found in the correspondence published in the Appendix. If by the construction of the tuning forks, supplemented by this brochure, I am found, even to the slightest extent, to have succeeded in carrying out the orders of the Government of India and in giving the visitors of the "Indo-Colonial Exhibition," and the European public generally, an idea of the nature and uses of the *Sruti*, my labors in this connection will have been amply recompensed. In conclusion, I think it but just to state, that my eldest son, Kumar Pramod Kumar Tagore, has considerably lessened my labors by himself undertaking to transcribe the *Sruti* on the tuning forks. My acknowledge-

ments are also due to Mr. S. Harraden of this city, for the favor he has done me by obtaining for me such a large number of tuning forks.

CALCUTTA,  
March 1886. }

S. M. TAGORE.

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## APPENDIX.

No.  $\frac{3573}{1225}$  Ex.

FROM

C. S. BAYLEY, Esq., c. s.,  
*Under-Secretary to the Government of India.*

TO

RAJAH SIR SOURINDRO MOHUN TAGORE,  
Kt., c. l. e.,

*Calcutta, the 29th December 1885.*

Revenue and Agri-  
cultural Department.  
(Exhibition).

SIR,

I AM desired to forward for your information  
the enclosed papers on the  
subject of the preparation  
of a set of tuning forks  
representing the division  
of the Indian octave for  
the forthcoming Colonial  
and Indian Exhibition.

Copy of letter, dated  
10th November 1885,  
from Mr. Ellis to the  
Royal Commissioners  
for the Colonial and In-  
dian Exhibition. Ex-  
tract paragraphs 3, 4  
and 5 of letter dated  
23rd November 1885  
from Mr. Ellis.

2. The Government of India is itself unable  
to provide this exhibit, but aware of the interest

taken by you in the subject of Indian Music and of your intention to send a selection of native musical instruments to the Exhibition, has directed me to forward the communications received from Mr. Ellis and to enquire whether you would wish to carry out his suggestion.

I have the honor to be

Sir,

Your most obdt. Servant,

(Sd.) CHAS. S. BAYLEY,

*Under-Secretary to the Government of India.*

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25, ARGYLE ROAD,  
KENSINGTON, LONDON, W.

23rd November, 1885.

To

E. C. BUCK, Esq.,

*Secretary to the Government of India,*

*Revenue and Agricultural Department.*

SIR,

3. THE music of India is very remarkable and its musical Scale has never been satisfactorily solved. It consists of a division of the octave

into 22 *Srutis*, presumed to be unequal, but no representation of these *Srutis* by *fixed tones* has ever been made.

4. My suggestion is that 23 tuning forks be procured and exhibited, giving the 22 notes of the Scale and the octave of the lowest note and hence the 22 *Srutis*' intervals. On such forks being exhibited, I undertake gratuitously to determine the exact pitch of each, as I am the only person, I believe, in England who possesses the necessary means.

5. The proper person to determine whether such forks are correctly tuned and to superintend their construction is *Rajah Comm. Sourindro Mohun Tagore*, Musical Doctor, Companion of the Order of the Indian Empire, Founder and President of the Bengal Academy of Music, Author of "The Musical Scales of the Hindus," Pathuriaghata Rajbati, Calcutta. My suggestion is therefore that you should request him to procure such a set of forks for exhibition. He is fully aware of their value and importance to Indian music, and that they alone (to use his own words addressed to me on 22nd September, 1885) "are

calculated to bring the vexed question to a definite head."

Respectfully yours,

(Sd.) A. J. ELLIS.

(True Extract.)

(Sd.) G. A. ANDREWS,

*Registrar, Revenue and Agricultural  
Department.*

*Copy of a letter from Alexander J. Ellis, Esq.,  
F. R. S., F. S. A. Member of the Music Com-  
mittee of the Inventions, Exhibitions, &c., &c., to  
Sir Philip Cunliffe-Owen, K. C. M. G.,  
London, 10th November, 1885.*

DEAR SIR,

ASSUMING that it is intended to illustrate fully the remarkable Music of India at the Indian and Colonial Exhibition 1886, I beg respectfully to suggest through you to the Royal Commission, that any exhibit will be incomplete, unless means are taken to determine the complete Indian division of the octave into *Srutis*, presumed to be unequal, and that the only certain means of doing so

is to cause 23 forks to be tuned to the Indian middle *Saptaka* or septime, the intermediate tones and the octave of the lowest note.

Also I would suggest that the only person in India fit to superintend such a set of forks and pronounce that they are correct, is Rajah Sourindro Mohun Tagore, Musical Doctor, Companion of the Order of the Indian Empire, Founder and President of the Bengal Academy of Music, Calcutta, Author of the "Musical Scales of the Hindus," 1884. I therefore respectfully suggest that the Rajah be requested to furnish such a set of forks for the Exhibition.

If such forks arrive in England, I will gratuitously examine them, and furnish the number of vibrations of each fork, as I am perhaps the only man in England who possesses the necessary instruments. By this means the Indian Musical Scale which has long been a vexed question will be known accurately for the very first time.

I, therefore, finally suggest that this is an opportunity not to be neglected.

Be kind enough to bring this letter to the notice of the Royal Commission.

Forwarded to the Secretary to the Government of India, Revenue and Agricultural Department, for his consideration. Mr. Ellis has also been recommended to apply to India direct on the subject of his letters.

(Sd.) J. R. ROYLE.