



SACCHIDANANDA SAMARTHA SADGURU SHRI SAINATHA KRIPA

TĀLAPRĀSTĀRA OF

NIḤŚAṆKA ŚĀRṄGADĒVA'S

SĀṄGĪTA RATNĀKĀRA

(A CRITICAL INTERPRETATION)

WITH A FOREWORD BY 'MAHĀMAHŌPĀDHYĀYA'

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**TĀLAPRASTĀRA OF NIḤSAṆKA ŚĀRṄGADĒVA'S
SAṄGĪTA RATNĀKARA**

by Akella Mallikarjuna Sharma

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FOREWORD

I had the privilege of being associated with Vidwan Ākeḷḷa Mallikārjuna Śarma's Senior Fellowship awarded by the Department of Culture, Ministry of Human Resource Development, Government of India, in supervising his work and evaluating his periodical reports of progress. Since he had already done work in the area of Tāḷa-pratyaya and had published two useful books on the Subject, I suggested that he might take up for the fellowship a critical interpretation of the treatment of tāḷa-prastāra in the Saṅgītaratnākara of Śārṅgadēva. This suggestion stemmed from two reasons: the Saṅgītaratnākara was not only the starting point of his investigations but later became the nucleus from which he extended his studies farther afield, but also became the butt of his contentions and criticism. At the end of his Fellowship I felt that his views deserved larger exposure and so advised him to organise his reports in the form of a book. He took the advice and has produced the following book. (I have repeatedly suggested to the HRD Ministry to arrange screening of the end-products of their junior and senior fellowships for publishable material and to provide subsidy for the publishing of worthy books produced by the fellows on the basis of their fellowship work. I hope they will do something about this instead of continuing to allow both their money and the fellowship work going down the drain.)

ŚrīĀkeḷḷa Mallikārjuna Śarma commences the present work with the original text and a free English translation of the verses 312-408 pertaining to tāḷa-pratyaya of the Tāḷādhyāya of Saṅgītaratnākara following a list of abbreviations and explanatory notes. He has divided his thesis into four chapters. This book begins with the extract from the relevant portion from the Tāḷā chapter of the Saṅgītaratnākara and its free translation in English. The second chapter presents simplified methods of the Saṅgītaratnākara for carrying out prastāra. The third chapter deals with the mode of general and partial schemes of permutative tabulations (i.e., prastāra). The fourth chapter elaborates two other pratyayas (determinants of the exact knowledge) of tāḷas viz. Naṣṭa (restoration of the form and structure of a particular permutation from its serial number in the table) and Uddiṣṭa (reverse of Naṣṭa i.e., determination of the serial number of a particular permutation from its form and structure). The value of the discussion is enhanced by a

large number of worked out examples of both pratyayas, lucidly explained step by step according to systematically enunciated rules.

The fifth and final chapter justified the subtitle of the book. It commences with brief notes on the treatment of prastāra in the tāḷa-chapters of some fifteen musical treatises. The main thrust of this chapter is on criticism levelled against the treatment of tāḷa-pratyayas in the Saṅgītaratnākara and Śrī Śarma's proposals for improvement. These may be summarised as i. elaboration of compacted definitions and descriptions ii. the initial empirical constants (the numbers one and two) of the various prastāra tables iii. correct placement of correct numerals in the appropriate houses of the tables iv. correcting the table-formats v. replacing the Pātāḷa-mēru with the easier and more logical (and comprehensive) Mahāpātāḷa-mēru and vi. removing inconsistencies of Druta-mēru and Saṁyōga-mēru.

It may be noted that Śrī Śarma nowhere contends that there are factual errors and inaccuracies in the portion of the Saṅgītaratnākara under consideration. His arguments relate in the main to methodological insufficiencies of the work in points of consistency, clarity and uniformity of treatment of the subject matter. His endeavour lies in attempting to restore these methodological virtues by a re-arrangement or re-ordering the text, removing anomalies by offering uniform criteria and by eliminating textual opacity through elucidation and amplification. He has noticed traces of such attempts (without explanation) in his predecessors (e.g., Taccūr Siṅgarācārya Brothers). In the light of this, Śrī Śarma's efforts are successful and commendable.

However, it would be more productive to view the alleged lapses of the Saṅgītaratnākara in a larger perspective. Why is Śārṅgadēva, invariably methodical and meticulous, inconsistent and unmethodical in his account of the Tāḷa-pratyayas? Is it possible to reconcile the inconsistencies if one adopts a different methodological approach? For example, Khaṇḍa-mēru may be viewed either as a source for derivation (as Śrī Śarma has done) or as the culmination or end-product of a series of precedent, partial prastāras. Again, the positioning of Naṣṭa and Uddiṣṭa after Saṅkhyā (as Śārṅgadēva has done) rather than towards the end (as Śrī Śarma) has suggested may be due to the perception of a conceptual affinity (by the former). Could the anomalies in the tables be traced to faulty textual transmission? This last cannot be a strong possibility because of the wide popularity and fairly settled nature of the text because of the wide distribution and consensus of its collative sources.

More interesting and more important is the question, given the validity of Śrī Mallikārjuna Śarma's criticism and contentions, is, what were the sources of Śārṅgadēva

for tāḷa-prastāra? It is almost certain that the subject-matter and its treatment are not original to him. If this is so, the topic would appear to be abridged or condensed from an unknown earlier source at the cost of clarity and consistency. Pārśvadēva's Saṅgītasamayāsāra deals with the same subject-matter slightly earlier or at about the same time in a very different way. It relates prastāra to the mārga-dēśī classification of tāḷas and derives the dēśī-tāḷas as permutational particulars of marga-tāḷas; taken as archetypes. The six tāḷa-pratyayas, inspired by their metrical analogues, were clearly established at this time. Could they be contributions of the Jaina munis (such as Digambara Sūri)? Even though svara-prastāras (in tānas) were known as early as the Dattilam and the Bṛhaddēśī, it is noteworthy that tāḷa-prastāra is not found in any musical treatise before Saṅgītasamayāsāra and Saṅgītaratnākara (and in the later Saṅgītōpaniṣatsārōddhāra), in which works it appears in a fully developed state. This is relevant to the historiography of Indian music and bears investigation.

Rāga, tāḷa, prabandha and vādyā are foundational and definitive elements of Indian music. The last are also based on the first two. Tāḷa is the base (tāḷa) for gīta, vādyā and nṛtta. Notwithstanding, it has received much less attention and treatment, especially than rāga in both textual and performance traditions. This is clear from the relatively smaller space devoted to tāḷa in treatises on music and dance as well as from the microscopically small number of independent works devoted exclusively to tāḷa, from the earliest times. This is true of the minor role of tāḷa in music curricula in both the gurukula and institutionalized music education as well as in their assessment methods. This has resulted in a mental attitude in the performing musician which employs a greater emphasis on and preoccupation with rāga rather than tāḷa. There are far fewer compositions in Indian music which seek to explore the creative and scholarly aspects of tāḷa and laya.

Fortunately, the living tradition of tāḷa-pratyaya is not quite extinct. Every major writer on the subject from the thirteenth century A.D. onwards has kept it alive with contemporisation and innovation. Examples from the twentieth century include Taccūr Siṅgarācārya Brothers, Uppalapāṭi Aṅkaiahgāru and his father. To this thin but distinguished line belongs ŚrīĀkeḷḷa Mallikārjuna Śarma who carries on the torch.

(Sd)

R. Sathyanārāyaṇa

PREFACE

In the annals of the world music Indian Music has the cultural heritage of 4000 years being the oldest upon the earth and in the annals of Indian Musical literature 'Saṅgīta Ratnākara' written by Niḥśaṅka Śārṅgadēva in 13th century occupies a very high place than all the other works. This consists of 7 chapters and with 7 commentaries among which 5 in Sanskrit itself and one each in Telugu and Hindi are said to have been written by different scholars. Among them two commentaries written in Sanskrit by Catura Kallinātha and Simhabhūpāla in the name of Kaḷānidhi and Sudhākara respectively are very famous and are published along with the text. In the Tāḷādhyāya of this treatise around 400 Ślōkas are furnished. Even in those olden days, becoming aware of the great importance of the Tāḷaprastāra the author of this work had devoted one-fourth of these Ślōkas i.e., around 100 Ślōkas to this Prastāra itself. But, surprisingly enough, only the Prastāra portion of Tāḷādhyāya is missing in the Telugu commentary.

In the Indian Music literature, in respect of Tāḷaprastāra, 'Tāḷadaśapraṅṅapradīpika' (Telugu) written by Pōlūri Gōvinda Kavi in the 17th century is furnished with full of definitions only that too in the form of Telugu poems but without even a single table of figures and 'Gāyakalōcanam' (Telugu) written by Taccūr Siṅgarācārya Brothers, in 1901 is furnished with a number of tables of figures but without even a single definition. So, in the absence of a reasonable work, 'Saṅgīta Ratnākara' becomes the only dependable work in which both the tables of figures and definitions are furnished with more details. But, even though many of the definitions are furnished clearly, the very important and highly interesting and useful secrets are furnished very briefly. At many places the definitions of these secrets furnished by the author or by the commentators or even by the editors are not only confusive and contradictive but also mislead the reader. More over, surprisingly enough, I could not find even a single person in our entire country to guide me properly in this topic except only one person who could teach me barely the alphabets of this topic. At last the ALMIGHTY only guided me and made me write two books, 1. 'Tāḷaprastārasāgaram' in Telugu which was published by the Saṅgīta Academy in 1985 and received the award for the 'Best book written on Fine Arts' from the Telugu University in 1988 and 2. 'Permutative genius in Tāḷa (-prastāra) in Indian Music' in English which was published by the Telugu University in 1992. Later, even after the publication of these two works, in my further research which concluded in 2001 only, many more new interesting and helpful details have come into light and these two books are re-tuned and thoroughly revised now accordingly.

Two years back I had an idea of writing another work specially on 'Saṅgīta Ratnākara' bringing out all the lapses of this work for the benefit of the aspirant and when I proposed the same to the Ministry of Human Resource Development, Govt. of India they were very kind enough to encourage me by granting me the Senior Fellowship for which I am grateful to the authorities concerned. I shall ever remain grateful to Dr. R.Sathyanārāyaṇa, the internationally reputed musicologist and danceologist, for his able, kind, incessant and affectionate guidance althrough my research and also for writing the 'Foreword' with his unfathomable depth of knowledge.

Hyderabad,
Date : 01-06-2001

ĀKEḶḶA MALLIKĀRJUNA ŚARMA
Author

IMPORTANT TECHNICAL-TERMS, ABBREVIATIONS & SIGNS

1. 'D' - '0' - Druta	-	DP	-	Druta-permutation
		DEP	-	Druta-ending-permutation
		DDP	-	Druta-devoid-permutation
		DCP	-	Druta-containing-permutation
		ADEP	-	All-Druta-ending-permutation
2. 'L' - 'l' - Laghu	-	LEP	-	Laghu-ending-permutation
		LDP	-	Laghu-devoid-permutation
		LCP	-	Laghu-containing-permutation
3. 'G' - 'S' - Guru	-	GEP	-	Guru-ending-permutation
		GDP	-	Guru-devoid-permutation
		GCP	-	Guru-containing-permutation
4. 'P' - 'Ś' - Pluta	-	PEP	-	Pluta-ending-permutation
		PDP	-	Pluta-devoid-permutation
		PCP	-	Pluta-containing-permutation
5.		IAEP	-	Identical-aṅga-ending-permutation
6. 'S' - Saṅkhya	-	The total number of permutations obtained in the process of permutation.		
7. 'M' - Mahāpātāḷa	-	The total number of Aṅgas used in the process of permutation.		
8. SM-figure	-	The total of both Saṅkhya and Mahāpātāḷa together.		
9. Prastāra	-	Process of permutation.		
10. Akhaṇḍa-prastāra	-	General-permutation		
11. Khaṇḍa-prastāra	-	Divisional-permutation		
12. Hīna-prastāra	-	Aṅga-devoid-permutation		
13. Yukta-prastāra	-	Aṅga-containing-permutation		

14. General-key-rule : While writing 'Saṅkhyā' of all the tables of Akhaṇḍa-prastāra and for the lowest-lines of all the tables of independent Aṅgas figure '1' should, invariably, be written to the left of the extreme left house.
15. Proxies : In this element of Prastāra some tables consisting of figures are to be written which furnish the details of various innumerable permutations obtained in the process of permutation. But, to avoid the laborious process of permutation, certain easy methods are explained to write these figures basing upon the figures of particularly specified preceding houses (but not of the succeeding houses at all), which classify and represent the Druta-ending-permutations (DEPs), Laghu-ending-permutations (LEPs), Guru-ending-permutations (GEPs) and Pluta-ending-permutations (PEPs) thus classifying the permutations basing upon the Tāḷāṅgas remaining in the extreme right of each permutation the grand total of which forms the 'Saṅkhyā'. The numbers of these specified preceding houses, which here-in-after are called 'PROXIES', play an indispensable role in this element. In Caturaṅga-prastāra, wherein only four Tāḷāṅgas i.e., Druta, Laghu, Guru and Pluta are used in the process of permutation, there are only four 'Proxies' viz., figures of the preceding 1st house, 2nd house, 4th house and 6th house representing the respective Aṅga-ending-permutations of the above four Aṅgas respectively. It should be well remembered that in Caturaṅga-prastāra, except the first proxy '1', all the remaining proxies, 2, 4 & 6 are the multiples of '2' and always the specific mention of the figure '2' indicates the Caturaṅga-prastāra only.
16. Indicative figures of the examples : In this book while furnishing the examples of the various problems of Naṣṭa and Uddiṣṭa, several questions relating to different permutations are furnished along with their respective methods of answering them to make all these problems easy to understand. Application of these figures pertaining to these permutations is given hereunder:

Akhaṇḍa-prastāra	Khaṇḍa-prastāra	Particulars of the indicative numbers
1st	1st	figure '2' indicates the Caturaṅga-prastāra
2nd	2nd	figure indicates the unit-value of the permutation in figures in terms of Drutas
-	3rd	figure indicates the proxy-number of the table concerned which represents the respective Aṅga

-	4th	figure indicates the Aṅga-devoid or containing permutations of the respective Aṅgas
3rd	5th	figure indicates the Saṅkhyā
4th	6th	figure indicates the serial number of the permutation for Naṣṭa. OR the series of the Aṅgas of the permutation for Uddiṣṭa.

Example:- Akhaṇḍa-prastāra – 2-8-60-1 – Among these figures the first figure ‘2’ indicates the Caturaṅga-prastāra, the second figure ‘8’ indicates the ‘8-Druta-permutation’, the third figure ‘60’ indicates the respective Saṅkhyā of the ‘8-Druta-permutation’ and the fourth and last figure ‘1’ indicates the 1st permutation in the question of Naṣṭa and if the fourth is a series of Aṅgas that indicates the question series of Aṅgas of Uddiṣṭa.

Khaṇḍa-prastāra – 2-8-1-0-7-1 – Among these figures, the first figure ‘2’ indicates the Caturaṅga-prastāra as above, the second figure ‘8’ indicates the ‘8-Druta-permutation’ as above, the third figure ‘1’ indicates the 1st proxy of Druta, the fourth figure ‘0’ indicates the Druta-devoid-permutation, the fifth figure ‘7’ indicates the Saṅkhyā of the Druta-devoid-permutations of 8-DP and the sixth and the last figure ‘1’ indicates the 1st permutation in the question of Naṣṭa and if the sixth is a series of Aṅgas that indicates the question series of Aṅgas of Uddiṣṭa.



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Chapter - 1
SANSKRIT TEXT OF TĀḶAPRASTĀRA FROM
SAṄGĪTA RATNĀKARA OF NIḶSAṆKA ŚĀRṄGADĒVA

(Tāḷādhyaḷya : Ślōkas 312 - 408)

Note: Each foot of each Ślōka is divided into two halves and thus the four halves of each Ślōka are named as 'A, B, C & D'.

संगीतरत्नाकरः

- | | | | |
|--|-----|---|------|
| <p>अन्येऽपि सनति भूयांसस्तालास्ते लक्ष्यवर्त्मनि ।
 प्रसिद्धिविधुरत्वेन शास्त्रेऽस्मिन्नप्रदर्शिताः ॥</p> | (1) | <p>द्रुतो लघुः सार्धमात्रो गुरुः सार्धद्विमात्रिकः ।
 प्लुतः सार्धत्रिमात्रश्चेत्येकैकद्रुतवर्धितैः ॥</p> | (10) |
| <p>तद्भेदप्रत्ययार्थं तु लघूपाया भवन्त्यमी ।
 प्रस्तारसंख्ये नष्टं चोद्दिष्टं पातालकास्ततः ॥</p> | (2) | <p>तालभेदाः ऋमादङ्कैः संख्यायन्ते स्थितैरिह ।
 यदङ्कयोगादन्त्योऽङ्को लब्धस्तैरन्ततः क्रमात् ॥</p> | (11) |
| <p>द्रुतमेरुर्लघोर्मेरुर्गुरुमेरुः प्लुतस्य च ।
 मेरुः संयोगमेरुश्च खण्डप्रस्तारकस्ततः ॥</p> | (3) | <p>भेदा द्रुतान्तलध्वन्तगुर्वन्ताश्च प्लुतान्तकाः ।
 संख्यायन्त इति प्रोक्ताः संख्या निःशङ्कसूरिणा ॥</p> | (12) |
| <p>प्राचां चतुर्णां मेरुणां नष्टोद्दिष्टे पृथक्पृथक् ।
 एकोनविंशतिरिति प्रत्ययास्तान् ब्रुवेऽधुना ॥</p> | (4) | <p>अत्रैतावतिथो भेदः किंरूप इति पृच्छति ।
 यत्र तन्नष्टमाख्यातं तस्योत्तरमिहोच्यते ॥</p> | (13) |
| <p>न्यस्याल्पमाद्यान्महतोऽधस्ताच्छेषं यथोपरि ।
 प्राग्ने वामसंस्थांस्तु संभवे महतो लिखेत् ॥</p> | (5) | <p>भेदानां यावतां मध्ये नष्टप्रशनः कृतो भवेत् ।
 तावत्संख्याङ्कपर्यन्तां लिखेत्संख्याङ्कसंततिम् ॥</p> | (14) |
| <p>अल्पानसंभवे तालपूर्त्यौ भूयोऽप्ययं विधिः ।
 सर्वद्रुतावधिः कार्यः प्रस्तारोऽयं लघौ गुरौ ॥</p> | (6) | <p>अन्त्याङ्के तत्र नष्टाङ्कं पातयोदथ शेषतः ।
 पातयोत्पूर्वपूर्वाङ्कतत्र त्वपतितो द्रुतः ॥</p> | (15) |
| <p>प्लुते व्यस्ते समस्ते च न तु व्यस्ते द्रुतेऽस्ति सः ।
 एकद्वयङ्कौ क्रमान्यस्य युञ्जीतान्त्यं पुरातनैः ॥</p> | (7) | <p>पूर्वश्चेत्पतितो न स्याल्लघुस्तु पतितान्द्रवेत् ।
 उत्तरेणाकृतार्थेन सहितान्तदसंभवे ॥</p> | (16) |
| <p>द्वितीयतुर्यषष्ठाङ्कैरभावे तुर्यषष्ठयोः ।
 तृतीयपञ्चमाङ्काभ्यां क्रमात्तं योगमग्रतः ॥</p> | (8) | <p>अकृतार्थेन पूर्वेण सान्तरे पतिते पृथक् ।
 लघुर्निरन्तरे त्वस्मिल्लङ्घुरेव गुरुर्भवेत् ॥</p> | (17) |
| <p>लिखेद्दक्षिणसंस्थैवमङ्कश्रेणी विधीयते ।
 सा चाङ्कैरिष्टतालस्थद्रुतसंख्यैः समाप्यते ॥</p> | (9) | <p>गुरुहेतोस्तृतीये तु पतिते गः प्लृती भवेत् ।
 अङ्काभावे द्रुता ग्रह्यास्तालपूरणहेतवः ॥</p> | (18) |

- इति नष्टस्य विज्ञेयमुत्तरं रूपनिर्णयात् ।
ईदृग्रूपोऽत्र कतिधा भेदः प्रश्न इतीदृशः ॥ (19)
- उद्दिष्टं तत्र संख्याङ्कसंततिं नष्टवल्लिखेत ।
यैरङ्कैः पतितैर्नष्टे लभ्यन्ते ये प्लुतादयः ॥ (20)
- तानेवाङ्काल्लभन्ते ते भेदमुद्दिष्ट माश्रिताः ।
यद्वा षट्प्लुतहेत्वङ्कमध्ये ऽन्त्यात्प्राचि सप्तमे ॥ (21)
- तदभावे तु षष्ठाङ्केपातितेऽन्त्याङ्कमध्यतः ।
यः शेषः स प्लुताल्लभ्यो लब्धहीनान्त्यशेषतः ॥ (22)
- ज्ञानं पूरणसंख्याया उद्दिष्टोत्तर मिष्यते ।
आदौ रूपमथैकैकमङ्कसंख्याङ्कसंततेः ॥ (23)
- क्रमादधोऽधो विन्यस्येदन्त्यादींश्चतुरस्तथा ।
स्वपङ्क्तिस्थाँ लिलिखेदङ्कानग्रसंख्याङ्कवद्युतान् ॥ (24)
- किंतु प्रतिनिधिर्नात्र विद्यते तुर्यषष्ठयोः ।
इष्टतालद्रुतमितेष्वङ्केषु लिखितेष्विति ॥ (25)
- क्रमादन्त्योपान्त्यतुर्यषष्ठैर्यत्र द्रुतादयः ।
मीयन्ते सर्वभेदस्थाः पातालः सोऽभिधीयते ॥ (26)
- पङ्क्ति कृत्वेष्वतालस्थद्रुतसंमितकोष्ठिकाम् ।
तिरश्चीं तत्परामूनां कोष्ठेनाथ ततः पराः ॥ (27)
- द्विद्विकोष्ठोनिताः स्वस्वपूर्वतोऽथाङ्कयोजना ।
द्वौ द्वौ तासामाद्यकोष्ठौ स्यातामेकाङ्कसंयुतौ ॥ (28)
- अधस्तन्त्यास्तृतीयादौ विषमे कोष्ठके लिखेत् ।
अन्त्याद्यङ्कचतुष्कस्य योगं संख्याङ्कसंघवत् ॥ (29)
- समे त्वन्त्यं विनैतेषां योगं न्यस्याथ पङ्क्तिषु ।
परासु शेषकोष्ठेषु चतुर्योगोऽयमिष्यते ॥ (30)
- नास्ति प्रतिनिधिस्त्वासामङ्कयोस्तुर्यषष्ठयोः ।
तासु स्वभावतो यास्तु निष्पन्ना ऊर्ध्वपङ्क्तयः ॥ (31)
- तन्मध्ये तु समा कोष्ठेऽन्त्यस्थानेऽन्त्यादधस्तनः ।
अङ्कः कार्योऽथ तैरङ्कैर्भेदसंख्याभिधीयते ॥ (32)
- विषमायामूर्ध्वपङ्क्तौ स्थितैरङ्कैरधः क्रमात् ।
एकद्रुताद्या विषमत्र्यादिसंख्या द्रुता भिदाः ॥ (33)
- सर्वद्रुतान्ता मीयन्ते समपङ्क्तिस्थितैः पुनः ।
द्रुतहीनादयो द्व्यादिसमसंख्या द्रुता भिदाः ॥ (34)
- सर्वद्रुतान्ता ज्ञायन्ते द्रुतमेरुरयं मत ।
ऊर्ध्वपङ्क्तिस्थसर्वाङ्कयोगात्संख्यापि गम्यते ॥ (35)
- लघुमेरौ कोष्ठपङ्क्तीः प्राग्वन्त्यस्येत्तदादिमः ।
एकैककोष्ठ एकाङ्कयुक्तोऽधः पङ्क्तिषु तु ॥ (36)
- शेषकोष्ठेष्वन्त्यतुर्यषष्ठयोगं निवेशयेत् ।
परासां शेषकोष्ठेषूपान्त्याधस्तनसंयुतम् ॥ (37)
- त्रियोग मेवमादध्यादत्र च द्रुतमेरुवत् ।
सदसत्त्वे प्रतिनिधेः कोष्ठाङ्कैरूर्ध्वपङ्क्तिगैः ॥ (38)
- लघुहीनादुपक्रम्यै काद्येकोत्तर वृद्धलाः ।
सर्वलान्ताः क्रमाज्ञेयाः संख्या सर्वाङ्कसंगतेः ॥ (39)
- गुरुमेरावधःपङ्क्तेः परा कोष्ठत्रयोनिता ।
चतुश्चतुष्कोष्ठहीनाः स्वस्वपूर्वावलेः पराः ॥ (40)
- एकाङ्कवन्त आद्याद्यकोष्ठाः प्रथमपङ्क्तिगः ।
द्वितीयो द्व्यङ्कवानन्त्योपान्त्यषष्ठाङ्कयोगिनः ॥ (41)
- शेषकोष्ठाः परासां तु द्वितीयादिषु लिख्यते ।
योगोऽन्त्योपान्त्यषष्ठानामधस्तुर्याङ्कसंयुतः ॥ (42)

- लघुस्थाने गुरुर्ज्ञेयः शेषं तु लघुमेरुवत् ।
प्लुतमेरावधः पङ्क्तेः पञ्चकोष्ठोनिता परा ॥ (43)
- तत्पराः स्वस्वपूर्वातः षट्षट्कोष्ठोनिता मताः ।
अधः पङ्क्तौ तु षष्ठाङ्कस्थाने तुर्यं नियोजयेत् ॥ (44)
- त्रियोगोऽयमधः षष्ठयुक्तः स्यात्परपङ्क्तिषु ।
प्लुतो ज्ञेयो गुरुस्थाने शेषं तु गुरुमेरुवत् ॥ (45)
- संयोगमेरावूर्ध्वाः स्युश्चतस्रः कोष्ठपङ्क्तयः ।
इष्टतालद्रुतमितैः कोष्ठैर्युक्तास्ततः परे ॥ (46)
- द्वे पङ्क्ती स्वस्वपूर्वातो द्विद्विकोष्ठोनिते ततः ।
द्वे षष्ठ्या एककोष्ठोने ततस्तिम्रोऽष्टमावलेः ॥ (47)
- एककोष्ठोनिताः पश्चाद् द्विद्विकोष्ठोनिते परे ।
पङ्क्तिभ्यां स्वस्वपूर्वाभ्यां तथैकैकोनिते परे ॥ (48)
- आद्यासु चतसृष्वसां क्रमेण सकलद्रुताः ।
समस्तलघवः सर्वगुरवः सकलप्लुताः ॥ (49)
- एकाङ्कयुक्तनिःशेषकोष्ठाद्या स्यात्परा पुनः ।
खयुक्तैर्विषमैः कोष्ठैः समैस्त्वेकाङ्कसंयुतैः ॥ (50)
- कर्तव्या गुरुपङ्क्तेस्तु त्रयः कोष्ठा नभोन्विताः ।
तुर्यं एकाङ्कवानेवं चतुष्कोष्ठाः परा अपि ॥ (51)
- प्लुतपङ्क्तौ सशून्या स्युः पञ्च षष्ठस्तु रूपवान् ।
षट्कोष्ठास्तद्वदन्ये स्युः षट्सु पङ्क्तिष्वनन्तरम् ॥ (52)
- द्वियोगजाः क्रमाद्धेदा दलघू दगुरू दपौ ।
लगौ लपौ गपौ चेति तदङ्गप्रक्रिया त्वियम् ॥ (53)
- अत्रोपरिष्ठादारभ्य स्यादधोऽधोऽङ्गलेखनम् ।
अन्त्यपूर्वद्वितीयाङ्कतुर्यषष्ठास्तथा क्रमात् ॥ (54)
- योज्या दलगापेषु स्युस्तेषु तद्योगजा भिदाः ।
पङ्क्तौ तदङ्कयोगाङ्कं तत्कोष्ठे संभवाँल्लिखेत् ॥ (55)
- लेख्यपङ्क्त्युपरिश्रेणीया तिरश्ची तदाश्रिताः ।
अङ्गा दलगपानां स्युराद्यपङ्क्तिचतुष्टये ॥ (56)
- तेषु प्रस्तुत भेदस्थद्रुतादिव्यक्ति संश्रितान् ।
अङ्गान्गृहणीत तेऽप्यन्त्यद्वितीयाद्या द्रुतादिषु ॥ (57)
- प्रस्तुतेषु विपर्यस्ताः स्युरङ्गासंभवे तु खम् ।
त्रियोगजाश्च ये भेदाश्चतुर्योगभवश्च यः ॥ (58)
- तत्पङ्क्तीनामपि ज्ञयमेवमेवाङ्कपूरणम् ।
किंतु त्रियोगजे भेदे ये त्रयः स्युर्द्वियोगजाः ॥ (59)
- तेषां संनिहिताद्यानां प्रागुक्तोऽङ्कविपर्ययः ।
चदुर्योगे तु चत्वारो ये स्युर्भेदास्त्रियोगजाः ॥ (60)
- तदङ्गेष्वेव पूर्वोक्तं स्याद्विपर्यासयोजनम् ।
ये चत्वारस्त्रियोगोत्थश्चतुर्योगोत्थपञ्चमाः ॥ (61)
- भेदास्ते पङ्क्तिषु ज्ञेयाः क्रमादन्त्यासु पङ्क्तिषु ।
दलगा दलपाश्चैव दगपा लगपाः क्रमात् ॥ (62)
- त्रियोगजाश्चतुर्योगोद्भवा दलगपा इति ।
एष संयोगमेरुः स्यादतो ज्ञेयमथोच्यते ॥ (63)
- तिर्यक्पङ्क्तिस्थकोष्ठाङ्कैस्तैस्तैः सर्वद्रुतादयः ।
उर्ध्वपङ्क्तिगता मेयास्तदभावस्तु शून्यतः ॥ (64)
- तावद् द्रुतोऽत्र तालः स्यात्पङ्क्तिर्यावतिथी तिरः ।
उपरिष्ठात्समारभ्य संख्या पङ्क्त्यङ्कसंगतेः ॥ (65)
- द्रुतहीनादयो भेदोद्भवा ये मेरुबोधिताः ।
सर्वप्रस्तारवत्तेषां प्रस्तारः किं तु तेषु यः ॥ (66)

द्रुतादिनियमः सोऽत्र न भङ्गव्यः प्रयत्नतः ।
संख्येषा मेरुकोष्ठाङ्गाद्यस्मात्पूर्वोक्तरीतितः ॥ (67)

लभ्यते तत्र नष्टाङ्गं पातयेदथ शेषतः ।
तृतीयपञ्चमोपान्त्यावपाते लभ्यते लघुः ॥ (68)

परो यद्यकृतार्थः स्यात्सह तेनाथ चेदुभौ ।
अकृतार्थो ततस्ताभ्यां स्वं विनैवैष लभ्यते ॥ (69)

परे कृतार्थे ग्राह्यः स्यादकृतार्थः पुरातनः ।
पतिताद् गुरुलाभः स्यात्सह प्राचा तदा परा ॥ (70)

चतुरङ्गी निर्वर्तेत पतिते पञ्चमेऽप्यथ ।
गुरुः प्लुती भवेत्प्राचा सह चैषा निर्वर्तते ॥ (71)

रूपाप्तौ प्रापकाङ्केभ्यः शेषेष्वेष पुनर्विधिः ।
गुरुलाभे त्वपातार्हः पञ्चमः शेषतां ब्रजेत् ॥ (72)

अङ्गाभावे तु गृह्यन्ते लघवस्ताल पूर्तये ।
उद्दिष्टे तु गुरोर्लभ्यस्तृतीयोऽन्त्यात्पुरातनः ॥ (73)

प्राग्वच्चतुर्निवृत्तिः स्यात्तृतीयः पञ्चमस्तथा ।
प्लुताल्लभ्यो निवृत्तिस्तु षण्णामथ पुनर्विधिः ॥ (74)

लघोरङ्को न लभ्येत निवृत्तिस्त्वङ्गयोर्द्वयोः ।
लब्धाङ्गयोगहीनेऽन्त्ये शेषादुद्दिष्टबोधनम् ॥ (75)

समस्तनष्टवन्नष्टं विषमे कोष्ठके भवेत् ।
द्रुते लब्धे ततः पूर्वैरङ्गैः स्यात्समकोष्ठवत् ॥ (76)

समस्तोद्दिष्टवत्प्रोक्तमुद्दिष्टमिह सूरिभिः ।
द्रुताङ्गानन्तरं कार्यं विधानं समकोष्ठवत् ॥ (77)

कोष्ठे समोर्ध्वपङ्क्तिस्थे परासामधिको भवेत् ।
द्वितीयाधस्तनः पात्यस्तत्र त्वपतिताद् द्रुतः ॥ (78)

पतिताल्लः पात्यपातानन्तर्येऽल्पो महान्भवेत् ।
रूपपूर्तो निवर्तन्ते पूर्ववत्स्वीयपङ्क्तिगाः ॥ (79)

अधः समवदन्यत्स्यान्निवृत्तौ तु पुनर्विधिः ।
यस्मात्स यस्यामूर्ध्वायां पङ्क्तौ सा विषमा यदि ॥ (80)

विधिर्विषमकेष्ठोक्तः समा चेत्तर्ह्ययं मतः ।
विषमोर्ध्वश्रेणिसंस्थे कोष्ठेऽधोविषमोदितः ॥ (81)

यैरङ्गैः पतितैर्नष्टैर्लभ्यन्ते ये प्लुतादयः ।
तेभ्य उद्दिष्टसंस्थेभ्यस्तदङ्गावाप्तिरिष्यते ॥ (82)

द्रुतहीनद्यकोष्ठासु पङ्क्तिषूर्ध्वासु यो लघुः ।
तस्मादुद्दिष्ट रूपस्थान्नाङ्गः कश्चिदवाप्यते ॥ (83)

लब्धाङ्गन्यूनितान्त्याङ्गशेषादुद्दिष्ट वेदनम् ।
लघुमेरावधःपङ्क्तेर्नष्टाङ्केनान्त्यशेषतः ॥ (84)

पूर्वेषां पात्यमानानामपाते पूर्ववद् द्रुतः ।
पतितात्सह पूर्वाभ्यां परेण च गुरुर्भवेत् ॥ (85)

पतिते वृत्तगुर्वङ्गानन्तरे गः प्लुती भवेत् ।
एवं नष्टस्य बोधः स्यादित्युक्तं सूरिशार्ङ्गिणा ॥ (86)

नष्टे तु परपङ्क्तीनां पातयेत्प्रातिलोम्यतः ।
द्वितीयं च तृतीयाधस्तनमङ्गं च पञ्चमम् ॥ (87)

परेषु च निवृत्तेषु शेषेष्वेष पुनर्विधिः ।
समस्तनष्टवच्चात्र द्रुतादेः प्राप्तिरिष्यते ॥ (88)

किंतु लब्धे लघौ शेषेष्वद्याधस्तनतः क्रिया ।
सोऽधस्तनः स्वपङ्क्तिस्थविधिमेवं प्रवर्तयेत् ॥ (89)

शेषेऽङ्गाश्रितपङ्क्त्यङ्गाभावे तु लघवो मताः ।
अधस्तनश्रेणिसंख्या नष्टस्यैष विधिः स्मृतः ॥ (90)

गुरु मेरोरधः पङ्क्तौ नष्टं सकलनष्टवत् । प्लुतलाभस्तु गुरु वत् परपङ्क्तिष्वथोच्यते ॥ (91)	अधो गच्छेत् प्लुते पूर्णो गुरुमेरौ गुराविव । द्रुतो लघुर्गुरुर्वान्त्यैरङ्गैर्लब्धः प्लुती भवेत् ॥ (95)
तृतीयाधस्तनस्थाने तृतीयोऽङ्कोऽत्र पात्यते । स्थाने तु पञ्चमस्याधः पञ्जमो लघुवद्गुरौ ॥ (92)	तदङ्गाधस्तनैः सार्धमङ्गषट्कमतीत्य च । अधः पङ्क्तौ स्थितैरङ्कैः शेषैरेष पुनर्विधिः ॥ (96)
लब्धेऽधोव्रजनं शेषाल्लघुवद्गुरुलम्भनम् । लघुमेरुवदन्यत्तु नष्टे स्यात्परपङ्क्तिषु ॥ (93)	पङ्क्तौ तु प्लुतहीनायां नान्तिमः प्लुततां व्रजेत् । सर्वोद्दिष्टवदुद्दिष्टं लघुमेर्वादिषु त्रिषु ॥ (97)
समस्तनष्टवन्नष्टं प्लुतमेरावुदाहृतम् । विशेषः कथ्यते त्वेष द्वितीयादिषु पङ्क्तिषु ॥ (94)	

FREE TRANSLATION

1 – 4 : In practical music there are many other tālas. As they are not in vogue they have not been described in this Śāstra. These are the easy methods to know their varieties of those Tālas. They are nineteen: Prastāra, Saṅkhyā, Naṣṭa, Uddiṣṭa, Pātāla, Druta-mēru, Laghu-mēru, Guru-mēru, Pluta-mēru, Saṁyōga-mēru, Khaṇḍa-prastāra, Naṣṭa and Uddiṣṭa of the four mērus. I shall, now, define them.

PRASTĀRA

5 – 7B : Place the lower (aṅga) below the higher (aṅga). Write the remaining in the same way. If the Tāla-units are lesser than the previous and if the lower Aṅgas are suitable, write them to the left. If not, to fill-in the Tāla, write lower Aṅgas. This should be done till all become Drutas. This is the permutation in regard to Laghu, Guru and Pluta and their mutual combinations but not for Druta.

SAṅKHYA

7C – 12 : Write figures 1 & 2 consecutively. Add the previous, previous second, fourth and sixth. If the fourth and sixth are absent add the 3rd and 5th (pratinidhi) instead. Write the total figures continuously to the right. This (series) ends with the (number of) Drutas (equivalent in total duration) of the required Tāla. The series should proceed by gradually increasing by one Druta: eg., Druta, Laghu, Mātra and a half, Guru, two Mātras and a half, Pluta, three

Mātras and a half. The varieties of Tāḷas are enumerated by these figures of Saṅkhya. Among the figures which add upto the total figure of Tāḷa varieties (Saṅkhya), those figures reckoned serially from the right give the number of Tāḷas ending in Druta (DEP), Laghu (LEP), Guru (GEP) and Pluta (PEP) respectively.

NAṢṬA

- 13 – 19B : If it is asked: 'what form does a Tāḷa bearing a particular number (in the prastāra scheme) consist?' The answer is given by Naṣṭa : (this is determined) by writing the series of figures of Saṅkhya, upto the number of Drutas which are equivalent to the quantity of the Tāḷa. The Naṣṭa-number is subtracted from the final figure; from the remainder, subtract the preceding figures. If not subtractable, write Druta; if the figure is not thus subtractable but subtracted either along with the un-deducted figure on the right or on the left, write Laghu. If subtracted alternatively or discontinuously write Laghus separately. If subtracted consecutively, this Laghu becomes Guru. If the third from the figure giving out Guru is also subtracted, this Guru becomes Pluta. In the absence of subtractable number fill-in the deficit of the Tāḷa amount by writing the appropriate number of Drutas. Thus the form of the desired Tāḷa is known.

UDDIṢṬA

- 19C – 23B : Whatever the Pluta (-ending Tāḷas) etc., are obtained by subtracting whatever figures, the self-same figures give the Uddiṣṭa (forms) also. For example, the serial number of the Uddiṣṭa (desired) Tāḷa is as the remainder obtained when from the final figure the penultimate, the seventh or in its absence the sixth figure are deducted.

PĀTĀLA

- 23C – 26: First write '1' in the first house, below Saṅkhya and other figures one after the other in the later houses. Write the upper figure of the previous figure including the last four figures beginning with the last in the present line. The difference (from Uddiṣṭa) is, in this case the pratidinhis 3rd & 5th, should not be taken if the 4th & 6th figures are absent. Like this the figures should be written upto the total number of Drutas equal to the quantity of the Tāḷa and in this process the total of the ultimate, penultimate, fourth and sixth is written; it is called Pātāḷa.

DRUTA-MĒRU

- 27 – 35 : Write houses horizontally upto the number of Drutas equal in quantity to the required Tāḷa. Above it write another horizontal line with one house less. Then write further upper lines each with two houses lesser than its predecessor. In the houses prepared in the above manner, write figures as mentioned below. In the first two houses of all these lines write the figure '1'. In the odd-numbered houses of the lowest-line write the total of the four figures viz., ultimate etc., as in the Saṅkhyā and in the even-numbered houses write the total omitting the ultimate. In the remaining houses of the upper-lines the total of the four should be written. For the even-numbered houses of the upper-lines, instead of the ultimate, the lower figure of the ultimate should be written. From the figures of the upper-lines, the number of varieties of the permutations could be furnished. In the odd vertical lines, serially, from bottom, varieties consisting of odd-numbers of Drutas, like one-Druta, along with Sarva-Drutānta (ADEPs) in the end, are written and in the even-lines, varieties consisting of zero-Drutas and even-number of Drutas, like 2-Drutas, along with Sarva-Drutānta, in the end, are written. This is the method of Druta-mēru. Also by totalling of all these figures of these vertical lines, the Saṅkhyā could be obtained.

LAGHU-MĒRU

- 36 – 39 : Keep the lines of houses of Laghu-mēru as in Druta-mēru and write '1' in the first houses. Write the total of the ultimate, fourth and sixth houses in the remaining houses of the lowest line. Add the lower figure of the penultimate to the triplet of the remaining houses of the upper-lines. Here also the 'pratinidhi' effects are as in the Druta-mēru. The figures of the vertical lines should be understood serially starting from the varieties of zero-Laghu, 1-Laghu varieties in gradually increasing order of Laghus upto Sarva-Laghvantas (ALEPs). The total of all the figures form Saṅkhyā.

GURU-MĒRU

- 40 – 43B : In Guru-mēru write the second line with three houses lesser than the lowest-line and its upper-lines, four houses lesser than the precedent ones. Write '1' in the first houses. Second house of the first line should consist of '2' and the remaining, the total of the ultimate, penultimate and sixth. From the second upper-line add the lower of the fourth to this total of the

ultimate, penultimate and sixth. In place of Laghu keep Guru. The rest is as in Laghu-mēru.

43C – 45 : In Pluta-mēru write the second line with five houses lesser than the lowest line and its upper-lines six houses lesser than their previous ones. In the lowest line, in place of 6th take the 4th. The upper-lines include the lower of the sixth with the triplet. In place of Guru keep Pluta. The rest is as in Guru-mēru.

SAMYŌGA-MĒRU

46 – 65 : In Saṁyōga-mēru, the four vertical lines consist of the houses upto the requirement of Drutas. Next two lines are of two houses lesser than their predecessors. Next two lines have one house lesser than the sixth. Next three lines have one lesser than the eighth. Next two lines have two houses less. Next two lines have one house lesser than their predecessors. Among them, the first four lines are of the varieties of Sarva-drutāntas (ADEPs), Sarva-laghvantas (ALEPs), Sarva-gurvantas (AGEPs) and Sarva-plutāntas (APEPs) respectively. First line has the number '1' in all the houses, next line is of '0' in odd-houses and '1' in the even-houses. In Guru-line, the first three houses have '0' and the 4th has '1' and in the same manner in each group of four houses later. In Pluta-line the first five houses have '0' and the 6th has '1' and in the same manner in each group of six houses later. The next six lines are of the duplets of DL, DG, DP, LG, LP and GP. This is the way of writing figures. Here figures are written starting from top to bottom. In respect of D, L, G and Ps ultimate, penultimate, 4th and 6th are taken respectively. The total of the figures of the respective combinations are to be written. The figures of the respective D, L, G and Ps of the first four of the upper horizontal lines should be taken into account. In respect of ultimate, penultimate etc., of Druta etc., the above figures are in reverse order. Write '0' if no figures are existing. The figures for the lines of triplets derived out of the quadruplets are also written in the same manner. For the three duplets derived out of the triplets and which begin from the nearest figure, the above reverse order is followed. Only for the figure of the four triplets derived out of the quadruplets the above reverse order is to be followed. In the last five lines the four triplets and the fifth quadruplet are DLG, DLP, DGP, LGP and DLGP. This is called Saṁyōga-mēru and later the thing to be known

is mentioned. By the figures of the horizontal lines pertaining to the vertical lines of Sarva-drutāntas (ADEPs), Sarva-laghvantas (ALEPs) etc., the varieties should be known and by '0' their absence. In this table the serial number of the horizontal line is the value of Druta of that Tāḷa. Starting from the above the total of the numbers of all the lines is Saṅkhyā.

KHAṆḌA-PRASTĀRA

66 – 67B : Even for the varieties lacking Druta mentioned in Druta-mēru etc., the prastāra is same, but prastāra should be made without violating the restrictions of Druta etc.

DRUTA-MĒRU-NAṢṬĪDDIṢṬA

67C – 84B: Lowest-line-even-number-naṣṭa : The question number is subtracted from the Saṅkhyā which is formed from particular mēru figures. Then, from the remainder, the 3rd, 5th and the penultimate should be subtracted. If it is not subtractable Laghu is obtained. If the next figure is not subtractable, or including it, if the next two figures are not subtracted, even without them, Laghu is obtained. If the next figure is subtracted, the un-deducted ultimate should be taken into account. Guru is obtained from the subtracted figure. Then, including the ultimate, the next four figures should be left off. If the fifth is also subtracted the Guru becomes Pluta. This figure, including the ultimate, should be omitted. If Aṅgas like Laghu are obtained from the figures, the same method should be repeated in respect of the remaining figures. If Guru is obtained the un-deductible fifth becomes the remainder. In the absence of the figures Laghus should be written to fill-in the deficit of Tāḷa.

Lowest-line-even-number-uddiṣṭa: In Uddiṣṭa, from Guru, the 3rd figure of the ultimate is obtained and four figures should be omitted as above. From Pluta, the 3rd and 5th figures are obtained and six figures should be omitted. Follow as above in respect of the remaining figures. From Laghu, no figure is obtained but two figures should be omitted. By subtracting the total of the obtained figures from the remainder, the Uddiṣṭa should be answered.

Lowest-line-odd-number-naṣṭa: For odd-houses the Naṣṭa is as above. Druta is obtained from the ultimate figure as in Naṣṭa of even-houses.

Lowest-line-odd-number-uddiṣṭa: For Uddiṣṭa, proceed as above. After obtaining the figure from Druta proceed as in Uddiṣṭa of even-houses.

Upper-lines-naṣṭa: For the even-houses of the upper-lines the lower of the 2nd should also be subtracted in addition. Druta is obtained from the un-deducted figure and Laghu from the deducted. If figures are subtracted discontinuously the lower ones become higher ones. After obtaining Laghu etc., the figures of the same line should be omitted as above. The rest is as for the even-houses of the lowest-line. After leaving the figures the procedure should be started again as prescribed for the odd-houses or the even houses. For the odd-houses of the upper-lines follow as for the odd-houses of the lowest-line.

Upper-lines-uddiṣṭa : Pluta etc., are obtained in Uddiṣṭa from the very same figures by subtracting which Pluta etc., are obtained in Naṣṭa. Where there is Laghu in the vertical lines, in which zero-Drutas are in the first house, from that Laghu no figure could be obtained. By subtracting the total of the obtained figures from the remainder, the Uddiṣṭa should be derived.

LAGHU-MĒRU-NAṢṬA

84C – 90 : For the lowest-line of Laghu-mēru, Druta is obtained from the remainder as above from the un-deductible preceding figures, after deducting the question number from the final figure. By the subtraction of two previous figures and one upper figure Guru is obtained. If the alternative figure of the figure giving out Guru is also subtracted the Guru becomes Pluta. In this manner the Naṣṭa should be understood as told by Śārṅgadēva. For the Naṣṭa of the upper-lines the 2nd, the lower of the 3rd and 5th should be subtracted in the reverse order. After the upper figures are disposed off the previous method should be followed in respect of the remaining figures. Here, as in general - Naṣṭa, Drutas etc., are obtained. But, while Laghu is obtained, in respect of other Aṅgas, it should be followed starting from the lower figure of the first. That lower figure should be followed as preferred for self-line. In the absence of the figures of the line, the Laghus, equal with the number of the lower-lines should be taken. This is for Naṣṭa.

GURU-MĒRU-NAṢṬA

- 91 – 93 : The Naṣṭa for the lowest-line of Guru-mēru is as in general - Naṣṭa. Pluta is obtained like Guru. The procedure in respect of the upper-lines will now be described. Here, in place of the lower of the 3rd, the 3rd should be subtracted and in place of the 5th, the lower of the 5th should be subtracted. Like Laghu, if Guru is obtained, same procedure should be adopted as in the lowest-line. Guru is obtained like Laghu. In Naṣṭa of the upper-lines the rest is as in Laghu-mēru.

PLUTA-MĒRU-NAṢṬA

- 94 – 97B : Pluta-mēru is as in general - Naṣṭa. For the 2nd and further upper-lines a difference should be noted. As it is done after obtaining Guru for Guru, in this table, after obtaining Pluta, the same procedure should be followed as in the lowest-line. Either Druta, Laghu or Guru, obtained from the last figure, becomes Pluta. The process should be repeated with the figures of the lowest-line after omitting six figures of the lowest-line of the ultimate figure. No ultimate figure of the lowest Pluta-devoid-line becomes Pluta.

UDDIṢṬA OF OTHER MĒRUS

- 97C & D : The general-Uddiṣṭa should be followed for the Uddiṣṭa of the three tables (mērus) of Laghu etc.



Chapter – 2 EASY METHODS OF PRASTĀRA

Note : In the present work, the definitions of the 19 methods offered by Śārṅgadēva are made clearer and his order of these methods is followed at first. In subsequent chapters, his order is changed to a more systematic one offering critical and constructive interpretations and crucial examples for better and clearer understanding.

Nineteen easy methods are furnished by Śārṅgadēva in his Ślōkas from 1 to 4 to know all the varieties of Tālas. They are : 1. Prastāra, 2. Saṅkhyā, 3. Naṣṭa, 4. Uddiṣṭa, 5. Pātāla, 6. Druta-mēru, 7. Laghu-mēru, 8. Guru-mēru, 9. Pluta-mēru. 10. Saṁyōga-mēru, 11. Khaṇḍa-prastāra, 12. Druta-mēru-naṣṭa, 13. Druta-mēru-uddiṣṭa, 14. Laghu-mēru-naṣṭa, 15. Laghu-mēru-uddiṣṭa, 16. Guru-mēru-naṣṭa, 17. Guru-mēru-uddiṣṭa, 18. Pluta-mēru-naṣṭa and 19. Pluta-mēru-uddiṣṭa.

They are defined as follows: -

1. Prastāra : The mode of permuting Tālāṅgas in all possible varieties which are called prastāras or permutations.
2. Saṅkhyā : The total number of permutations obtained in the process of permutation of Tālāṅgas.
3. Naṣṭa : The easy method of obtaining the series of Tālāṅgas of a particular permutation in question absolutely avoiding the laborious process of permutation.
4. Uddiṣṭa : The easy method of obtaining the serial number of a permutation consisting of a particular series of Tālāṅgas absolutely avoiding the laborious process of permutation.
5. Pātāla : The total number of the least Aṅga occurred in the process of permutation.
6. Druta-mēru : The table of Druta in which the full details of Druta such as the total number of permutations devoid of Druta and the permutations containing one or more number of Drutas are furnished.
7. Laghu-mēru: The table of Laghu in which the full details of Laghu such as the total number of permutations devoid of Laghu and the permutations containing one or more number of Laghus are furnished.

8. Guru-mēru : The table of Guru in which the full details of Guru such as the total number of permutations devoid of Guru and the permutations containing one or more number of Gurus are furnished.
9. Pluta-mēru : The table of Pluta in which the full details of Pluta such as the total number of permutations devoid of Pluta and the permutations containing one or more number of Plutas are furnished.
10. Saṁyōga-mēru : The table of combinative Aṅgas in which the full details of all kinds of combinations of Aṅgas along with the independent Aṅgas are furnished.
11. Khaṇḍa-prastāra : The mode of permuting the divisional permutations like devoid of a particular Aṅga or containing a particular number of particular Aṅga.
12. Druta-mēru-naṣṭa : The mode of applying Naṣṭa to Druta-mēru.
13. Druta-mēru-uddiṣṭa : The mode of applying Uddiṣṭa to Druta-mēru.
14. Laghu-mēru-naṣṭa : The mode of applying Naṣṭa to Laghu-mēru.
15. Laghu-mēru-uddiṣṭa : The mode of applying Uddiṣṭa to Laghu-mēru.
16. Guru-mēru-naṣṭa : The mode of applying Naṣṭa to Guru-mēru.
17. Guru-mēru-uddiṣṭa : The mode of applying Uddiṣṭa to Guru-mēru.
18. Pluta-mēru-naṣṭa : The mode of applying Naṣṭa to Pluta-mēru.
19. Pluta-mēru-uddiṣṭa : The mode of applying Uddiṣṭa to Pluta-mēru.

Correlating the available material of the topic of this treatise and basing upon the order of preference, the following sequential order of division is prescribed hereunder.

Prastāra consists of two main divisions and they are:

1. Akhaṇḍa-prastāra (name coined by the author to keep it identical with the other name Khaṇḍa-prastāra) or general permutation and
2. Khaṇḍa-prastāra or divisional permutation.

Among them, Khaṇḍa-prastāra has two sub-divisions namely,

1. Hīna-prastāra or devoid-permutation and
2. Yukta-prastāra or containing permutation.

Basing upon these two sub-divisions of Khaṇḍa-prastāra all the tables of Aṅgas i.e., Druta, Laghu, Guru and Pluta and the table of combinative Aṅgas or Saṁyōga-mēru are originated to systematically categorise all the various permutations derived in the process of permutation.

Even without adopting the laborious process of permutation there are very interesting and important easy methods to obtain the Saṅkhya and Pātāḷa and also to obtain the 'series of Tālāṅgas of a particular serial number of prastāra in question consisting of a particular series of Tālāṅgas' and 'the serial number of a prastāra in question consisting of a particular series of Tālāṅgas' which are named as 'Naṣṭa' and 'Uddiṣṭa' respectively. As these two easy methods 'Naṣṭa' and 'Uddiṣṭa' are only answering methods of two different types of questions they could be applied to the Saṅkhya of all the tables of Akhaṇḍa and Khaṇḍa-prastāras alike (except the table of combinative Aṅgas as it consists of Saṅkhya of the combinations of all the different Aṅgas also) but they cannot be treated as divisions of this element, Prastāra, at all.



Chapter - 3 APPLICATION OF PRASTĀRA

The treatment of Akhaṇḍa-prastāra by Śārṅgadēva in his Ślōkas from 5 to 7B is quite terse. I shall now elucidate it in some detail.

3.1. AKHAṆḌA-PRASTĀRA

Mode of permutation: -

1. Write one or more Tāḷaṅgas to be permuted equal to the desired value of the units and if two or more Tāḷaṅgas are to be written to the desired value of the units they should be written anti-clockwise from right to left in the descending order of value.
2. If there is more than one Aṅga in the permutation the permutable Aṅga at the left extreme should be permuted at first.
3. If the Aṅgas at the extreme left are so minute that they cannot further be permuted the immediate next permutable Aṅga to their right should only be permuted.
4. To permute an Aṅga write down the immediate lower Aṅga, in value, than the upper Aṅga in the same column.
5. After writing down the lower Aṅga than of the upper Aṅga, for the remainder, a suitable independent Aṅga should be written to the left of the Aṅga already written. For this remainder, if two or more Aṅgas are to be written they should be written anti-clockwise only, in descending order of value to the left of the Aṅga already written.
6. After writing down the lower Aṅga than of the upper Aṅga, if there are some more Aṅgas to the left of the upper Aṅga, the remainder value of the permuted Aṅga should be added to the total value of all the left-side Aṅgas and a suitable Aṅga to that total value should be written to the left of the Aṅga already written and if two or more Aṅgas are to be written for this total value they should be written anti-clockwise in descending order of value to the left of the Aṅga already written.
7. The Aṅgas, if any, which are to the right of the Aṅga being permuted should always be brought down and written as they are in their respective columns without any modification.

8. Carefully observing the relevant rules and restrictions, if any, this process of permutation should be continued until all the Aᅅgas become so minute that none of them could further be permuted.
9. In all the permutations, the total value of all the Aᅅgas of each permutation should always be the same.

Note:- Druta could never be permuted further as it is the least Aᅅga in this Caturaᅅga-prastāra in which the four Aᅅgas, Druta, Laghu, Guru and Pluta only are used in the process of permutation.

To easily understand and follow the process of permutation the Aᅅgas should always be written from right towards the left observing the columns of units, tens, hundreds, thousands, ten thousands, lakhs, ten lakhs, crores and ten crores respectively like in writing the figure '987654321' in general mathematics and in the examples furnished below.

2-6-19

				ᅅ	1
			1	S	2
		0	0	S	3
			S	1	4
		1	1	1	5
	0	0	1	1	6
	0	1	0	1	7
	1	0	0	1	8
0	0	0	0	1	9
		0	S	0	10
	0	1	1	0	11
	1	0	1	0	12
0	0	0	1	0	13
		S	0	0	14
	1	1	0	0	15
0	0	1	0	0	16
0	1	0	0	0	17
1	0	0	0	0	18
0	0	0	0	0	19

In all there are 19 permutations in Akhaᅅᅅa-prastāra of 6-DP.

2-8-60

						1 0 S 0	30
		1	Ś	1		0 0 0 S 0	31
		0 0	Ś	2		0 S 1 0	32
			S S	3		0 1 1 1 0	33
		1 1	S	4		1 0 1 1 0	34
		0 0	1 S	5		0 0 0 1 1 0	35
		0 1 0	S	6		S 0 1 0	36
		1 0 0	S	7		1 1 0 1 0	37
	0 0 0 0	S	8		0 0 1 0 1 0	38	
		Ś	1	9		0 1 0 0 1 0	39
		1 S	1	10		1 0 0 0 1 0	40
	0 0	S	1	11		0 0 0 0 0 1 0	41
		S	1 1	12		Ś 0 0	42
		1 1 1 1	13			1 S 0 0	43
	0 0	1 1 1	14			0 0 S 0 0	44
	0 1 0	1 1	15			S 1 0 0	45
	1 0 0	1 1	16			1 1 1 0 0	46
	0 0 0 0	1 1	17			0 0 1 1 0 0	47
		0 S 0 1	18			0 1 0 1 0 0	48
	0 1 1 0	1	19			1 0 0 1 0 0	49
	1 0 1 0	1	20			0 0 0 0 1 0 0	50
	0 0 0	1 0 1	21			0 S 0 0 0	51
		S 0 0 1	22			0 1 1 0 0 0	52
	1 1 0 0	1	23			1 0 1 0 0 0	53
	0 0 1 0 0	1	24			0 0 0 1 0 0 0	54
	0 1 0 0 0	1	25			S 0 0 0 0	55
	1 0 0 0 0	1	26			1 1 0 0 0 0	56
	0 0 0 0 0 0	1	27			0 0 1 0 0 0 0	57
		0 Ś 0	28			0 1 0 0 0 0 0	58
	0 1 S	0	29			1 0 0 0 0 0 0	59
	1 0 S	0	30			0 0 0 0 0 0 0	60

In all there are 60 permutations in Akhaṇḍa-prastāra of 8-DP.

3.1.1. SAÑKHYA
TABLE OF GENERAL-PERMUTATIONS
(with Sañkhya only)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	2	3	6	10	19	33	60	106	191	340	610	1089

Sañkhya denotes the total number of permutations obtained in the process of permutation of Tā|āṅgas.

In the above table of Sañkhya two lines of houses are written horizontally. In the upper line of houses, from left to right the figures starting from '1' are written in gradually increasing order of value which represent the value of permutation in terms of Drutas i.e., 1-Druta-permutation (1-DP), 2-DP, 3-DP, 4-DP, 5-DP etc. The lower line of the house consists of the respective figures of Sañkhya i.e., the total number of permutations obtained in the process of permutation of the above mentioned value of Aṅgas.

Absolutely avoiding the laborious process of permutation there is an easy method to write this line of figures of Sañkhya.

Niḥsañka Śārṅgadēva, while furnishing the easy method of writing the figures of Sañkhya in his Ślōkas from 7C to 12, prescribed to write figures '1 & 2' in the 1st and 2nd houses without giving any explanation. And while taking the figures of the preceding 1st, 2nd, 4th and 6th houses into account to get the total of Sañkhya he also prescribed to take the figure of the 3rd house in the absence of the figure of the 4th house and the figure of the 5th house in the absence of the figure of the 6th house and named such figure taken into account in the absence of other figure as 'Pratinidhi'. As this system of 'Pratinidhi' leads to inconsistency and effects the uniformity, the facile procedure of the easy method is furnished hereunder :

Key-rule No. 1 :-

Write figure '1' in the left of the extreme left house outside the table of Sañkhya. This figure should also be taken into account while arriving at the total of the figures of the respective preceding houses.

Key-rule No. 2 :-

The figure of Sañkhya should always be written basing upon the existing figures of the preceding houses only but not of the succeeding houses at all. Thus, in this Caturaṅga-prastāra, the first figure of the 1st preceding house (antya or ultimate) representing the

first Aṅga, Druta, the second figure of the 2nd preceding house (upāntya or penultimate) representing the second consecutive Aṅga, Laghu, the third figure of the 4th preceding house (turya or tūrīya) representing the third consecutive Aṅga, Guru and the fourth figure of the 6th preceding house representing the fourth consecutive Aṅga, Pluta which are hereinafter called “PROXIES” i.e., 1st, 2nd, 4th and 6th proxies, play a very important role in this element, Prastāra and the total of the available proxies of them form the figure of Saṅkhya, the total number of permutations obtained in the process of permutation.

Note:- While enumerating the serial numbers of the preceding houses the house in which the Saṅkhya has to be written should always be excluded and never be taken into account.

Example :-

No. of the house	Preceding 1st	+	Preceding 2nd	+	Preceding 4th	+	Preceding 6th	=	Total
1	1		-		-		-		1
2	1		1		-		-		2
3	2		1		-		-		3
4	3		2		1		-		6
5	6		3		1		-		10
6	10		6		2		1		19
7	19		10		3		1		33
8	33		19		6		2		60
9	60		33		10		3		106

For example if the Saṅkhya ‘60’ of 8-DP is analysed one can find that among these figures of the four proxies the 1st proxy ‘33’ represents the Druta-ending-permutations (DEPs---permutations ending with Druta in the right extreme of each permutation), the 2nd proxy ‘19’ represents the Laghu-ending-permutations (LEPs---permutations ending with Laghu in the right extreme of each permutation), the 4th proxy ‘6’ represents the Guru-ending-permutations (GEPs---permutations ending with Guru in the right extreme of each permutation) and the 6th proxy ‘2’ represents the Pluta-ending-permutations (PEPs---permutations ending with Pluta in the right extreme of each permutation) forms the total of the Saṅkhya ‘60’.

3.1.2. PĀTĀĻA
TABLE OF GENERAL-PERMUTATIONS
(with Saṅkhya & Pātāḷa)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	2	3	6	10	19	33	60	106	191	340	610	1089
	1	2	5	10	22	44	91	180	358	698	1360	2622	5041

Pātāḷa denotes the total number of the least Aṅgas only occurred in the process of permutation. For example as per the figures of the lowest-line of the above table, in the process of permutation from 1-DP to 13-DP, we get 1, 2, 5, 10, 22, 44, 91, 180 and 358 numbers of Drutas respectively.

Like the easy method of writing the figures of Saṅkhya there is another easy method of writing the figures of 'Pātāḷa' too by absolutely avoiding the laborious process of permutation and Śārṅgadēva, while furnishing the easy method to write this 'Pātāḷa' in his Ślōkas from 23C to 26 prescribed to write the line of Pātāḷa figures beneath the Saṅkhya line of figures. While writing the figures of Pātāḷa, he also prescribed to write figure '1' in the first house and later write the total of the available figures of the preceding 1st, upper of the preceding 1st, preceding 2nd, 4th and 6th houses as furnished hereunder. He also prescribed not to follow the 'Pratinidhi' system for writing the figures of Pātāḷa.

Example :-

No. of the house	Preceding 1st +	Upper of the preceding 1st	Preceding + 2nd	Preceding + 4th	Preceding + 6th	= Total
1	1	-	-	-	-	1
2	1	1	-	-	-	2
3	2	2	1	-	-	5
4	5	3	2	-	-	10
5	10	6	5	1	-	22
6	22	10	10	2	-	44
7	44	19	22	5	1	91
8	91	33	44	10	2	180
9	180	60	91	22	5	358

In fact, there is much easier and more useful another system called 'Mahāpātāḷa' to obtain not only the details of least Aṅgas but the details of all the other Aṅgas of all the denominations also microscopically which, unlike Pātāḷa, is far more easier to apply not only to the table of Akhaṇḍa-prastāra but also to all the other tables of Khaṇḍa-prastāra too (refer the 'Permutative genius in Tāḷa (-prastāra) in Indian Music' of the same author for full details). So, keeping its multipotency in view, writing the figures of Mahāpātāḷa of Akhaṇḍa-prastāra is also explained hereunder entirely eliminating the less useful Pātāḷa.

TABLE OF GENERAL-PERMUTATIONS
(with Saṅkhyā & Mahāpātāḷa)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	2	3	6	10	19	33	60	106	191	340	610	1089
	1	3	7	16	34	72	147	298	592	1169	2282	4431	8541

To write Mahāpātāḷa write the total of both Saṅkhyā and Mahāpātāḷa together of the same 1st, 2nd, 4th and 6th proxies which are taken into account while writing Saṅkhyā. While doing so, the figure '1' written as per key-rule No. 1 should also be taken into account even in the absence if its Mahāpātāḷa.

Example :-

No. of the house	Upper of the Preceding		Upper of the Preceding		Upper of the Preceding		Upper of the Preceding		Total
	1st	1st	2nd	2nd	4th	4th	6th	6th	
1	1	-	-	-	-	-	-	-	1
2	1	1	1	-	-	-	-	-	3
3	2	3	1	-	-	-	-	-	7
4	3	7	2	3	1	-	-	-	16
5	6	16	3	7	1	1	-	-	34
6	10	34	6	16	2	3	-	-	72
7	19	72	10	34	3	7	1	1	147
8	33	147	19	72	6	16	2	3	298
9	60	298	33	147	10	34	3	7	592

For example if the above Mahāpātāḷa of Saṅkhyā of 60 permutations of 8-DP is analysed we find the following :

- a) As per the first-1st proxy '33' of DEPs (Druta-ending-permutations) and its corresponding lower figure '147' of Mahāpātāḷa it should be understood that apart from these '33' Drutas which are in the right extreme end of these permutations, there are '147' other Aṅgas also, thus totalling to $(33 + 147 =)$ '180' Aṅgas in these '33' DEPs. Here it is also interesting to know that there are only '180' Drutas in all these '60' permutations. It may also be noted that in these '33' DEPs there are - '2' Plutas according to the total $(1 + 1 =)$ '2' of the 6th PEP proxy '1' and its corresponding lower figure '1' of Mahāpātāḷa, '10' Gurus according to the total $(3 + 7 = 10)$ of the 4th GEP proxy '3' and its corresponding lower figure '7' of Mahāpātāḷa, '44' Laghus, according to the total $(10 + 34 =)$ '44' of the 2nd LEP proxy '10' and its corresponding lower figure '34' of Mahāpātāḷa and '91' Drutas according to the total $(19 + 72 =)$ '91' of the 1st DEP proxy '19' and its corresponding lower figure '72' of Mahāpātāḷa thus striking the total $(33D + 2P + 10G + 44L + 91D)$ to '180' Aṅgas.
- b) As per the 2nd LEP proxy '19' and its corresponding lower figure '72' of Mahāpātāḷa, it should be understood that apart from the '19' Laghus which are in the right extreme end of these permutations, there are '72' other Aṅgas also thus totalling to $(19 + 72 =)$ '91' Aṅgas in these '19' LEPs. Here it is also interesting to know that there are only '91' Laghus in all these '61' permutations. It may also be noted that in these '19' LEPs there are - '1' Pluta according to the 6th PEP proxy '1', '5' Gurus according to the total $(2 + 3 =)$ '5' of the 4th GEP proxy '2' and its corresponding lower figure '3' of Mahāpātāḷa, '22' Laghus according to the total $(6 + 6 =)$ '22' of the 2nd LEP proxy '6' and its corresponding lower figure '16' of Mahāpātāḷa and '44' Drutas according to the total $(10 + 34 =)$ '44' of the 1st DEP proxy '10' and its corresponding lower figure '34' of Mahāpātāḷa thus striking the total $(19L + 1P + 5G + 22L + 44D)$ to '91' Aṅgas.
- c) As per the 4th GEP proxy '6' and its corresponding lower figure '16' of Mahāpātāḷa it should be understood that apart from the '6' Gurus which are in the right extreme end of these permutations there are '16' other Aṅgas also thus totalling to $(6 + 16 =)$ '22' Aṅgas in these '6' GEPs. Here it is also interesting to know that there are '22' Gurus only in all these '61' permutations. It may also be noted that in these '6' GEPs there are - '1' Guru according to the 4th GEP proxy '1', '5' Laghus according to the total $(2 + 3 =)$ '5' of the 2nd LEP proxy '2' and its

corresponding lower figure '3' of Mahāpātāḷa and '10' Drutas according to the total (3 + 7 =) '10' of the 1st DEP proxy '3' and its corresponding lower figure '7' of Mahāpātāḷa thus striking the total (6G + 1G + 5L + 10D) to '22' Aṅgas.

- d) As per the 6th PEP proxy '2' and its corresponding lower figure '3' of Mahāpātāḷa, it should be understood that apart from the '2' Plutas which are in the right extreme end of these permutations, there are '3' other Aṅgas also thus totalling to (2+3=) '5' Aṅgas in these '2' PEPs. Here it is also interesting to note that there are only '5' Plutas in all the '61' permutations. It may also be noted that in these '2' PEPs there are - '1' Laghu according to the 2nd LEP proxy '1' and '2' Plutas according to the total (1+1=) '2' of the 1st DEP proxy '1' and its corresponding lower figure '1' of Mahāpātāḷa thus striking the total to (2P + 1L + 2D) '5' Aṅgas.

By the above analysis it is evident that : -

1. any proxy indicates the total number of permutations ending with the Aṅga concerned in the right extreme of each permutation,
2. the total of the proxy and its corresponding lower figure of Mahāpātāḷa indicates the total number of all the different Aṅgas occurring in all the permutations ending with the Aṅga concerned in the right extreme and
3. the total of the proxy and its corresponding lower figure of Mahāpātāḷa also indicates the number of times that particular Aṅga occurred totally in all the permutations of Sāṅkhya.

3.2. KHAṆḌA - PRASTĀRA

In the Khaṇḍa-prastāra also the same process of Akhaṇḍa-prastāra should be followed but with some restrictions like devoid-permutations without a particular Aṅga i.e., devoid of Druta, devoid of Laghu, etc., or containing-permutations containing a particular Aṅga of a particular number i.e., 4-Drutas-containing-permutation (4-DCP), 3-Laghus-containing-permutation (3-LCP), 2-Gurus-containing-permutation (2-GCP), 1-Pluta-containing-permutation (1-DCP) etc. Thus, this Khaṇḍa-prastāra or the divisional-permutation consists of two categories and they are 1. Hīna-prastāra or devoid-permutation and 2. Yukta-prastāra or containing-permutation and the process of them should be made carefully observing the relevant restrictions of which some examples are furnished hereunder.

All the different tables of either independent Aṅgas such as the table of Druta or Laghu etc., or the table of combinative-Aṅgas (Saṁyōga-mēru) derive from this Khaṇḍa-prastāra only. Therefore, this has been made the second main division. But, Śārṅgadēva has defined Khaṇḍa-prastāra very tersely in his Ślōkas from 66 to 67B. This is made clearer and more facile as follows :

If the processes of permutation furnished below are carefully observed one can easily understand that, even though the process has to be made like in Akhaṇḍa-prastāra or general-permutation, the restriction of keeping each and every permutation devoid of Drutas in the first example and restriction of keeping each and every permutation containing 2-Drutas in the next example, are followed scrupulously.

In the same manner the entire Khaṇḍa-prastāra should be understood and followed.

Examples :

Table of Druta

DDPs of 8-DP (2-8-1-0-7):-

Form of the permutation	Akhaṇḍa -saṅkhyā	Khaṇḍa -saṅkhyā
1 Ś	1	1
S S	3	2
1 1 S	4	3
Ś 1	9	4
1 S 1	10	5
S 1 1	12	6
1 1 1 1	13	7

2-DCPs of 8-DP (2-8-1-2-25)

					Akhaṇḍa -saṅkhya	Khaṇḍa -saṅkhya
Form of the permutation						
		0	0	Ś	2	1
		0	0	1 S	5	2
		0	1	0 S	6	3
		1	0	0 S	7	4
		0	0	S 1	11	5
0		0	1	1 1	14	6
0		1	0	1 1	15	7
1		0	0	1 1	16	8
		0	S	0 1	18	9
0		1	1	0 1	19	10
1		0	1	0 1	20	11
		S	0	0 1	22	12
1		1	0	0 1	23	13
			0	Ś 0	28	14
		0	1	S 0	29	15
		1	0	S 0	30	16
		0	S	1 0	32	17
0		1	1	1 0	33	18
1		0	1	1 0	34	19
		S	0	1 0	36	20
1		1	0	1 0	37	21
			Ś	0 0	42	22
		1	S	0 0	43	23
		S	1	0 0	44	24
1		1	1	0 0	45	25

3.2.1. DRUTA - MĒRU (Table of Druta)

All the tables of the independent Aṅgas i.e. , tables of Druta, Laghu, Guru and Pluta should always be drawn and the figures written basing upon certain uniform norms as it facilitates to understand the system very easily without any ambiguity.

As per the general norms the lowest line of any table of independent Aṅga always consists of Saṅkhya in which the Aṅga of that particular table is absent and among the upper-lines the 1st upper-line consists of the Saṅkhya in which that particular Aṅga of that table occurs or appears only once in each of the permutations, the 2nd upper-line consists of the Saṅkhya in which that particular Aṅga of that table occurs only twice in each of the permutations, the 3rd upper-line is of 3-Aṅgas-containing-permutations and so on. Thus, this table of Druta consists of the Saṅkhya of the Druta-devoid-permutations (DDPs) in the lowest-line as per the zero written in the right extreme, 1-Druta-containing-permutations (1-DCPs) in the 1st upper-line as per the figure '1' indicated in the right extreme, 2-DCPs in the 2nd upper-line as per the figure '2' indicated in the right extreme, 3-DCPs in the 3rd-upper-line as per the figure '3' indicated in the right extreme and so on.

													A		
1	2	3	4	5	6	7	8	9	10	11	12	13			
													1		13
											1	0			12
										1	0	12			11
									1	0	11	0			10
								1	0	10	0	65			9
							1	0	9	0	54	0			8
						1	0	8	0	44	0	200			7
					1	0	7	0	35	0	147	0			6
				1	0	6	0	27	0	104	0	357			5
			1	0	5	0	20	0	70	0	220	0			4
		1	0	4	0	14	0	44	0	125	0	336			3
	1	0	3	0	9	0	25	0	63	0	153	0			2
1	0	2	0	5	0	12	0	26	0	56	0	118			1
1	0	1	0	2	0	4	0	7	0	13	0	24	0		0

As per the general norms, write houses horizontally in the lowest-line of Druta-devoid-permutations (DDPs) to the required value in terms of Drutas like in the table of Saṅkhya of Akhaṇḍa-prastāra. Later, the first house in the left extreme of the 1st upper horizontal line i.e., the 2nd horizontal line starts from the 1st vertical line itself and the 2nd upper horizontal line from the 2nd vertical line, the 3rd upper horizontal line from the 3rd vertical line and so on serially according to the proxy '1' of Druta and its multiples. Thus, for example, for the Saṅkhya upto 13-DP write horizontally :

13 houses in the		lowest-line	
13	- do -	1st	upper-line
12	- do -	2nd	- do -
11	- do -	3rd	- do -
10	- do -	4th	- do -
9	- do -	5th	- do -
8	- do -	6th	- do -
7	- do -	7th	- do -
6	- do -	8th	- do -
5	- do -	9th	- do -
4	- do -	10th	- do -
3	- do -	11th	- do -
2	- do -	12th	- do -
1	- do -	13th	- do -

From bottom to top the figures from '0' to '13' in the increasing order of value in the right extreme indicate the line of Saṅkhya figures pertaining to DDPs, 1-DCPs, 2-DCPs, 3-DCPs, 4-DCPs and so on respectively. Vertically as per the figures furnished at the top from left to right the lines consist of Saṅkhya pertaining to the value of the permutations in terms of figures of Drutas in the increasing order of value i.e., Saṅkhya line of 1-DPs, 2-DPs, 3-DPs and so on.

To write the figures of the table, as per the key-rule No.1 write figure '1' to the left of the extreme left house of the lowest line like in the Saṅkhya of Akhaṇḍa-prastāra. While writing other figures of this table of Druta, the first of the four Aṅgas, avoid the first - 1st proxy for the lowest-line as this line consists of the Saṅkhya figures of Druta-devoid-permutations (DDPs) only and write the total of the remaining available second - 2nd, third - 4th and fourth - 6th proxies. For all the upper-lines write the total of the available first - 1st proxy of the immediate lower line and the second - 2nd, third - 4th and fourth - 6th proxies of the same line. Thus, among the four proxies of the first - 1st, second - 2nd, third - 4th and fourth - 6th proxies the first - 1st proxy pertaining to the

Along the table, Druta should be avoided for the lowest-line of the table of Druta and for all the upper-lines the same first – 1st proxy should be taken from the immediate lower line.

No. of the house	1st	+	2nd	+	4th	+	6th	= Total
Lowest-line:								
1	-		0		0		0	0
2	-		1		0		0	1
3	-		0		0		0	0
4	-		1		1		0	2
5	-		0		0		0	0
6	-		2		1		1	4
7	-		0		0		0	0
8	-		4		2		1	7
9	-		0		0		0	0
10	-		7		4		2	13
11	-		0		0		0	0
12	-		13		7		4	24
13	-		0		0		0	0
1 st upper-line: Immediate lower of the 1st								
1	1		0		0		0	1
2	0		0		0		0	0
3	1		1		0		0	2
4	0		0		0		0	0
5	2		2		1		0	5
6	0		0		0		0	0
7	4		5		2		1	12
8	0		0		0		0	0
9	7		12		5		2	26
10	0		0		0		0	0
11	13		26		12		5	56
12	0		0		0		0	0
13	24		56		26		12	118

3.2.2. LAGHU - MĒRU (Table of Laghu)

According to Śārṅgadēva (in Ślōkas 36 to 39), the houses of the table of Laghu should be drawn in the same way as in the table of Druta. This is not correct. This is made clearer in the following.

As per the general norms, write the houses horizontally in the lowest-line to the required value in terms of Drutas like in the table of Akhaṇḍa-prastāra. Later, the first house in the left extreme of the 1st upper horizontal line starts from the 2nd vertical line and the other upper horizontal lines from the 4th , 6th , 8th , 10th , 12th vertical lines and so on serially according to the proxy '2' of Laghu and its multiples. From bottom to top the figures '0' to '3' in the right extreme indicate the line of Laghu-devoid-permutations (LDPs), line of 1-Laghu-containing-permutations (1-LCPs), line of 2-LCPs, line of 3-LCPs and so on.

While writing the figures of this table of Laghu, the second of the four Aṅgas, avoid the second - 2nd proxy and write the total of the remaining available first - 1st , third - 4th and fourth - 6th proxies in the lowest-line as this line consists of the Saṅkhya figures of Laghu-devoid-permutations (LDPs) only and for all the upper-lines write the total of the available first - 1st , third - 4th and fourth - 6th proxies of the same line and the second - 2nd proxy of the immediate lower-line. Thus, among the four proxies, the first - 1st, second - 2nd , third - 4th and fourth - 6th proxies, the second - 2nd proxy pertaining to Laghu should be avoided for the lowest-line of the table of the second Aṅga, Laghu and for all the upper-lines the same second - 2nd proxy should be taken from the immediate lower-line.

1	2	3	4	5	6	7	8	9	10	11	12	13		
											1	7	6	
									1	6	21	56	5	
							1	5	15	35	75	156	4	
					1	4	10	20	39	76	148	280	3	
			1	3	6	10	18	33	61	108	186	313	2	
		1	2	3	4	7	12	21	34	54	84	133	210	1
1	1	1	1	2	3	5	7	10	14	21	31	46	67	0

No. of the house	1st	+	2nd	+	4th	+	6th	= Total
Lowest-line:								
1	1		-		0		0	1
2	1		-		0		0	1
3	1		-		0		0	1
4	1		-		1		0	2
5	2		-		1		0	3
6	3		-		1		1	5
7	5		-		1		1	7
8	7		-		2		1	10
9	10		-		3		1	14
10	14		-		5		2	21
11	21		-		7		3	31
12	31		-		10		5	46
13	46		-		14		7	67
1st upper-line:								
			Immediate lower of the 2nd					
1	-		1		-		-	1
2	1		1		-		-	2
3	2		1		-		-	3
4	3		1		-		-	4
5	4		2		1		-	7
6	7		3		2		-	12
7	12		5		3		1	21
8	21		7		4		2	34
9	34		10		7		3	54
10	54		14		12		4	84
11th	84		21		21		7	133
12th	133		31		34		12	210

3.2.3. GURU - MĒRU (Table of Guru)

Sārṅgadēva's description of Guru-mēru (in Ślōkas 40 to 43 B) is too terse. This is made clearer in the following.

As per the general norms, write the houses horizontally in the lowest-line to the required value in terms of Drutas like in the table of Akhaṇḍa-prastāra. Later, the first house in the left extreme of the 1st upper horizontal line starts from the 4th vertical line and the other upper-lines from the 8th, 12th, 16th vertical lines and so on serially according to the proxy '4' of Guru and its multiples. From bottom to top the figures '0' to '2' in the right extreme indicate the line of Guru-devoid-permutations (GDPs), line of 1-Guru-containing-permutations (1-GCPs), line of 2-GCPs and so on.

As per the key-rule No. 1 write figure '1' to the left of the extreme left house of the lowest-line like in Saṅkhyā of Akhaṇḍa-prastāra.

While writing the figures of the table of Guru, the 3rd of the four Aṅgas, avoid the third-4th proxy and write the total of the remaining available first - 1st, second - 2nd and fourth - 6th proxies in the houses of the lowest-line as this line consists of Saṅkhyā figures of Guru-devoid- permutations (GDPs) and for the houses of all the upper-lines write the total of the available first - 1st, second - 2nd and fourth - 6th proxies of the same line and the third - 4th proxy of the immediate lower-line. Thus, among the four proxies of the first - 1st, second - 2nd, third - 4th and fourth - 6th proxies, the third - 4th proxy pertaining to Guru should be avoided for the lowest-line of the table of the 3rd Aṅga, Guru and for all the upper-lines the same third - 4th proxy should be taken from the immediate lower-line. The figures of all the upper-lines should be written in the same manner.

	1	2	3	4	5	6	7	8	9	10	11	12	13	
												1	4	3
								1	3	9	22	51	111	2
				1	2	5	10	20	38	73	136	253	464	1
1	1	2	3	5	8	14	23	39	65	109	182	305	510	0

No. of the house	1st	+	2nd	+	4th	+	6th	= Total
Lowest-line:								
1	1		-		-		-	1
2	1		1		-		-	2
3	2		1		-		-	3
4	3		2		-		-	5
5	5		3		-		-	8
6	8		5		-		1	14
7	14		8		-		1	23
8	23		14		-		2	39
9	39		23		-		3	65
10	65		39		-		5	109
11	109		65		-		8	182
12	182		109		-		14	305
13	305		182		-		23	510
1st upper-line:								
					Immediate lower of the 4th			
1	-		-		1		-	1
2	1		-		1		-	2
3	2		1		2		-	5
4	5		2		3		-	10
5	10		5		5		-	20
6	20		10		8		-	38
7	38		20		14		1	73
8	73		38		23		2	136
9	136		73		39		5	253
10	253		136		65		10	464

3.2.4. PLUTA - MĒRU (Table of Pluta)

In his brief account of Pluta-mēru (in Ślōkas 43c to 45) Śārṅgadēva describes that the 4th place should be taken instead of the 6th house. This is incorrect. This is explained in the following.

As per the general norms, write the houses horizontally in the lowest line to the required value in terms of Drutas like in the table of Akhaṇḍa prastāra. Later, the first house in the left extreme of the 1st upper horizontal line starts from the 6th vertical line and the other horizontal lines from the 12th, 18th, 24th vertical lines and so on serially according to the proxy '6' of Pluta and its multiples. From bottom to top, the figures '0' and '1' in the extreme right indicate the line of Pluta-devoid permutations (PDPs) and 1-PCPs and so on.

As per the key rule No. 1 write figure '1' to the left of the extreme left house of the lowest line like in Saṅkhya of Akhaṇḍa-prastāra.

While writing the figures of the table of Pluta which is the 4th of the four Aṅgas, avoid the fourth – 6th proxy and write the total of the remaining available first – 1st, second – 2nd and third – 4th proxies in the lowest-line as this line contains the Saṅkhya figures of Pluta-devoid-permutations (PDPs) and for all the upper lines write the total of the available first – 1st, second – 2nd and third – 4th proxies of the same line and the fourth – 6th proxy of the immediate lower line. Thus, among the four proxies of the first – 1st, second – 2nd, third – 4th and fourth – 6th proxies, the fourth – 6th proxy pertaining to Pluta should be avoided for the lowest line of the table of the fourth Aṅga, Pluta and for all the upper lines the same fourth – 6th proxy should be taken from the immediate lower-line. The figures of all the other upper-lines should be written in the same manner.

1	2	3	4	5	6	7	8	9	10	11	12	13			
													1	3	2
					1	2	5	10	22	44	89	174			1
1	1	2	3	6	10	18	31	55	96	169	296	520	912		0

No. of the house	1st	+	2nd	+	4th	+	6th	= Total
Lowest-line:								
1	1		-		-		-	1
2	1		1		-		-	2
3	2		1		-		-	3
4	3		2		1		-	6
5	6		3		1		-	10
6	10		6		2		-	18
7	18		10		3		-	31
8	31		18		6		-	55
9	55		31		10		-	96
10	96		55		18		-	169
11	169		96		31		-	296
12	296		169		55		-	520
13	520		296		96		-	912
1st upper-line:								
							Immediate lower of the 6th	
1	-		-		-		1	1
2	1		-		-		1	2
3	2		1		-		2	5
4	5		2		-		3	10
5	10		5		1		6	22
6	22		10		2		10	44
7	44		22		5		18	89
8	89		44		10		31	174

B

0															
1	1												1		
1	1	0											2		
1	0	2	S										3		
1	1	3	1	0S									4		
1	0	7	0	2	IS	Ś							5		
1	1	11	0	3	2	1	0IS	0Ś					6		
1	0	20	0	4	0	0	6	2	IS					7	
1	1	32	1	5	3	0	12	3	2	0IS				8	
1	0	54	0	9	0	0	32	4	0	6	SS				9
1	1	87	0	13	7	0	60	5	3	12	2	0SS			10
1	0	143	0	18	0	0	134	6	0	32	0	6	IS	Ś	11
1	1	231	1	24	11	1	251	7	4	60	0	12	6	0ISS	12
1	0	376	0	35	0	0	500	11	0	122	0	20	0	24	13

To have the correct version of Saṁyōga-mēru as given above draw the table and write the respective figures as prescribed hereunder.

Write the first vertical line consisting of 13 houses, the next four vertical lines reducing one house each from the top than its precedent, 6th & 7th vertical lines reducing one more house than their precedent, 8th & 9th vertical lines reducing one more house than their precedent and from the 10th to 15th vertical lines reducing one more house each than its precedent. Now, the figures of this table should be written basing upon the following rules.

Rule No. A : For the vertical lines of IAEPs (Identical-aṅga-ending-permutations) of individual Aṅgas write the figure '1' in each of the houses pertaining to the respective proxy and its multiples of the Aṅga concerned.

Rule No. B : For the vertical lines consisting the combinations of two Aṅgas or more the total of the existing upper proxies representing the respective Aṅgas of the same vertical line besides the corresponding serial figures of the vertical lines pertaining to the respective interbred combinations like IAEPs

of double-Aṅga-combinations, duplets of triple-Aṅga-combinations, triplets of quadruple-Aṅga-combinations and quadruplets of quintuple-Aṅga-combinations should be written.

1st (D) vertical line :- The Saṅkhya of ADEPs (All-druta-ending-permutations) is furnished in this line and as per rule No. A write figure '1' in each house of this line consecutively since the proxy of Druta is '1'.

2nd (L) vertical line :- The Saṅkhya of ALEPs (All-laghu-ending-permutations) is furnished in this line and as per rule No. A write figure '1' in each 2nd house of this line since the proxy of Laghu is '2'.

3rd (DL) vertical line :- The Saṅkhya derived from the interbred combinations of Druta and Laghu i.e., combinations consisting of Druta-laghu or Laghu-druta are furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st and 2nd proxies representing Druta and Laghu respectively of the same vertical line besides the corresponding serial figures of the vertical lines of ADEPs and ALEPs as furnished here under.

No. of the house	Upper figure			Serial figure of			= Total	
	1st	+	2nd	+	ADEP	+		ALEP
1	-		-		1		1	2
2	2		-		1		0	3
3	3		2		1		1	7
4	7		3		1		0	11
5	11		7		1		1	20
6	20		11		1		0	32
7	32		20		1		1	54
8	54		32		1		0	87
9	87		54		1		1	143
10	143		87		1		0	231
11	231		143		1		1	376

1st house :- Being the 1st house of which the upper proxies of the same vertical line are absent, write the total of the figures of the 1st house of ADEPs and ALEP lines (1+1='2'.

2nd house :- Write the total of the figures of the existing upper 1st proxy (2) representing Druta of the same vertical line (2nd proxy is absent) besides the corresponding 2nd figures (being the 2nd house) of the vertical lines of ADEPs and ALEP lines (2+1+0=)'3'.

3rd house :- Write the total of the figures of the existing upper 1st (3) and 2nd (2) proxies representing Druta and Laghu respectively of the same vertical line besides the corresponding 3rd figures (being the 3rd house) of the vertical lines of ADEPs (1) and ALEPs (1) thus arriving at a grand total (3+2+1+1=) '7'.

4th house :- Write the total of the figures of the existing upper 1st (7) and 2nd (3) proxies representing Druta and Laghu respectively of the same vertical line besides the corresponding 4th figures (being the 4th house) of the vertical lines of ADEPs (1) and ALEPs (0) thus arriving at a grand total (7+3+1+0=) '11'.

In the same manner the figures upto the required permutation of the same line and also for the other vertical lines pertaining to the combinations of two Aṅgas could be written.

4th (G) vertical line :- The Saṅkhyā of AGEPs is furnished in this line and as per rule No. A write figure '1' in each of the 4th house of this line since the proxy of Guru is '4'.

5th (DG) vertical line :- The Saṅkhyā of the interbred combinations of Druta and Guru is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st and 4th proxies representing Druta and Guru respectively of the same vertical line besides the corresponding serial figures of the vertical lines of ADEPs and AGEPs as furnished hereunder.

No. of the house	Upper figure			+	Serial figure of		= Total
	1st	+	4th		ADEP	+ AGEP	
1	-		-		1	1	2
2	2		-		1	0	3
3	3		-		1	0	4
4	4		-		1	0	5
5	5		2		1	1	9
6	9		3		1	0	13
7	13		4		1	0	18
8	18		5		1	0	24
9	24		9		1	1	35

6th (LG) vertical line :- The Saṅkhya of the interbred combinations of Laghu and Guru is furnished in this line and as per rule No. B write the total of the figures of the existing upper 2nd and 4th proxies representing Laghu and Guru respectively of the same vertical line besides the corresponding serial figures of the vertical lines of ALEPs and AGEPs as furnished hereunder.

No. of the house	Upper figure			+	Serial figure of			= Total
	2nd	+	4th		ALEP	+	AGEP	
1	-		-		1		1	2
2	-		-		0		0	0
3	2		-		1		0	3
4	0		-		0		0	0
5	3		2		1		1	7
6	0		0		0		0	0
7	7		3		1		0	11
8	0		0		0		0	0

7th (P) vertical line :- The Saṅkhya of APEPs is furnished in this line and as per rule No. A write figure '1' in each of the 6th house since the proxy of Pluta is '6'.

8th (DLG) vertical line :- The Saṅkhya of the interbred combinations of Druta, Laghu and Guru is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st, 2nd and 4th proxies representing Druta, Laghu and Guru respectively of the same vertical line besides the corresponding serial figures of the vertical lines of DL, DG and LG as furnished hereunder.

No. of the house	Upper figure				+	Serial figure of				= Total		
	1st	+	2nd	+		4th	+	DL	+		DG	+
1	-		-		-		2		2		2	6
2	6		-		-		3		3		3	12
3	12		6		-		7		4		3	32
4	32		12		-		11		5		0	60
5	60		32		6		20		9		7	134
6	134		60		12		32		13		0	251
7	251		134		32		54		18		11	500

1st house :- Being the 1st house as no upper proxies in the same vertical line are existing, write the total of the figures of the corresponding 1st house (being the 1st house) of the vertical lines of DL (2), DG (2) and LG (2) thus arriving at the total $(2+2+2=)$ '6'.

2nd house :- Write the total of the figures of the existing upper 1st proxy (6) representing Druta of the same vertical line (2nd and 4th proxies are absent) besides the figures of each of the corresponding 2nd house (being the 2nd house) of the vertical lines of DL (3), DG (3) and LG (0) thus arriving at a grand total $(6+3+3+0=)$ '12'.

3rd house :- Write the total of the existing upper 1st (12) and 2nd (6) proxies (4th proxy is absent) representing Druta and Laghu respectively of the same vertical line besides the figures of each of the corresponding 3rd house (being the 3rd house) of the vertical lines of DL (7), DG (4) and LG (3) thus arriving at a grand total $(12+6+7+4+3=)$ '32'.

4th house :- Write the total of the existing upper 1st (32) and 2nd (12) proxies (4th proxy is absent) representing Druta and Laghu respectively of the same vertical line besides the figures of each of the corresponding 4th house (being the 4th house) of the vertical lines of DL(11), DG(5) and LG(0) thus arriving at a grand total $(32+12+11+5+0=)$ '60'.

5th house :- Write the total of the existing upper 1st (60) and 2nd (32) and 4th (6) proxies representing Druta, Laghu and Guru respectively of the same vertical line besides the figures of each of the corresponding 5th figures (being the 5th house) of the vertical lines of DL (20), DG (9) and LG (7) thus arriving at a grand total $(60+32+6+20+9+7=)$ '134'.

In the same manner figures upto the required permutation and also of the other vertical lines pertaining to the other combinations of Aṅgas could be written.

9th (DP) vertical line :- The Saṅkhyā of the interbred combinations of Druta and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st and 6th proxies representing Druta and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of ADEPs and APEPs as furnished hereunder.

No. of the house	Upper figure			+	Serial figure of			= Total
	1st	+	6th		ADEP	+	APEP	
1	-		-		1		1	2
2	2		-		1		0	3
3	3		-		1		0	4
4	4		-		1		0	5
5	5		-		1		0	6
6	6		-		1		0	7
7	7		2		1		1	11

10th (LP) vertical line :- The Saṅkhyā of the interbred combinations of Laghu and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 2nd and 6th proxies representing Laghu and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of ALEPs and APEPs as furnished hereunder.

No. of the house	Upper figure			+	Serial figure of			= Total
	2nd	+	6th		ALEP	+	APEP	
1	-		-		1		1	2
2	0		-		0		0	0
3	2		-		1		0	3
4	0		-		0		0	0
5	3		-		1		0	4
6	0		-		0		0	0

11th (DLP) vertical line :- The Saṅkhyā of the interbred combinations of Druta, Laghu and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st, 2nd and 6th proxies representing Druta, Laghu and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of DL, DP and LP as furnished hereunder.

No. of the house	Upper figure					Serial figure of					=	Total	
	1st	+	2nd	+	6th	+	DL	+	DP	+			LP
1	-		-		-		2		2		2		6
2	6		-		-		3		3		0		12
3	12		6		-		7		4		3		32
4	32		12		-		11		5		0		60
5	60		32		-		20		6		4		122

12th (GP) vertical line :- The Saṅkhya of the interbred combinations of Guru and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 4th and 6th proxies representing Guru and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of AGEPS and APEPs. as furnished hereunder.

No. of the house	Upper figure				Serial figure of			= Total
	4th	+	6th	+	AGEP	+	APEP	
1	-		-		1		1	2
2	-		-		0		0	0
3	-		-		0		0	0
4	-		-		0		0	0

13th (DGP) vertical line :- The Saṅkhya of the interbred combinations of Druta, Guru and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st, 4th and 6th proxies representing Druta, Guru and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of DG, DP and GP as furnished hereunder.

No. of the house	Upper figure					Serial figure of					=	Total	
	1st	+	4th	+	6th	+	DG	+	DP	+			GP
1	-		-		-		2		2		2		6
2	6		-		-		3		3		0		12
3	12		-		-		4		4		0		20

14th (LGP) vertical line :- The Sañkhya of the interbred combinations of Laghu, Guru and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 2nd, 4th and 6th proxies representing Laghu, Guru and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of LG, LP and GP as furnished hereunder.

No. of the house	Upper figure					Serial figure of					Total		
	2nd	+	4th	+	6th	+	LG	+	LP	+		GP	=
1	-		-		-		2		2		2		6
2	-		-		-		0		0		0		0

15th (DLGP) vertical line :- The Sañkhya of the interbred combinations of Druta, Laghu, Guru and Pluta is furnished in this line and as per rule No. B write the total of the figures of the existing upper 1st, 2nd, 4th and 6th proxies representing Druta, Laghu, Guru and Pluta respectively of the same vertical line besides the corresponding serial figures of the vertical lines of DLG, DLP, DGP and LGP as furnished hereunder.

No. of the house	Upper figure					Serial figure of				Total							
	1st	+	2nd	+	4th	+	6th	+	DLG		+	DLP	+	DGP	+	LGP	=
1	-		-		-		-		6		6		6		6		24

For example in the horizontal line of 8-DP there is/are :-

1	Permutation(s) in	D-line
1	- do -	L-line
32	- do -	DL-line
1	- do -	G-line
5	- do -	DG-line
3	- do -	LG-line
0	- do -	P-line
12	- do -	DLG-line
3	- do -	DP-line
2	- do -	LP-line

-- thus arriving at a grand total of 60 permutations.

☆●☆

Chapter - 4
NAṢṬA, UDDIṢṬA

LIST OF EXAMPLES

Note : Follow the item No.16 of the 'Important technical terms, abbreviations & signs'.

1. AKHAṆḌA-PRASTĀRA

Naṣṭa - 2-8-60-1, 2, 3, 7, 20, 36, 48

Uddiṣṭa - 2-8-60-0 1 0 S, 0 S 0 1, 0 1 0 0 0 1, 1 0 S 0, 1 0 1 0 0 0

2. KHAṆḌA-PRASTĀRA

Druta-mēru

Lowest-line: -

Naṣṭa - 2-8-1-0-7-1, 2, 4

Uddiṣṭa - 2-8-1-0-7-1 1 S, 1 S 1, S 1 1

Upper-line: -

Naṣṭa - 2-9-1-5-27-1, 5, 12, 13, 18, 20, 21, 23, 26, 27

Uddiṣṭa - 2-9-1-5-27-0 1 0 0 0 0 1, 1 0 0 0 0 0 1, 0 1 0 0 1 0 0, 0 1 1 0 0 0 0

Laghu-mēru

Lowest-line: -

Naṣṭa - 2-10-2-0-21-1, 3, 5, 10, 13, 17

Uddiṣṭa - 2-10-2-0-21-S 0 0 S, 0 S S 0, 0 S 0 0 0

Upper-line: -

Naṣṭa - 2-9-2-3-20-1, 2, 3, 4, 6, 10, 14, 17

Uddiṣṭa - 2-9-2-3-20-0 1 1 0 0 1, 0 1 0 1 1 0, 1 1 0 0 1 0, 1 0 1 1 0 0

Guru-mēru

Lowest-line: -

Naṣṭa - 2-7-4-0-23-5, 7, 13, 17

Uddiṣṭa - 2-7-4-0-23-1 0 0 0 1, 1 0 0 1 0, 1 1 0 0 0

Upper-line: -

Naṣṭa - 2-8-4-1-20-1, 4, 6, 8, 9, 10, 14, 15

Uddiṣṭa - 2-8-4-1-20-0 0 1 S, 1 0 S 0, S 1 0 0

Pluta-mēru

Lowest-line: -

Naṣṭa - 2-7-6-0-31-2, 6, 8, 14

Uddiṣṭa - 2-7-6-0-31-1 1 0 1, S 1 0

Upper-line: -

Naṣṭa - 2-10-6-1-22-1, 2, 5, 7, 8, 11, 12, 13, 15, 17, 20, 21

Uddiṣṭa - 2-10-6-1-22-0 0 Ṣ 1, Ṣ 1 1, 1 0 Ṣ 0, 0 Ṣ 1 0, 1 Ṣ 0 0, 0 Ṣ 0 0

RULES AND THEIR APPLICATION

In this element, Prastāra there are two fascinating easy methods called Naṣṭa and Uddiṣṭa to obtain the series of Aṅgas of a required permutation in question and to obtain the serial number of a particular permutation in question having a particular series of Aṅgas respectively by avoiding the laborious process of permutation (refer the 'Permutative genius in Tāla (-Prastāra) in Indian Music' of the same author to find the full details and still another easy method named Kalita to obtain the full details of all the denominations of Aṅgas upto the required permutation in question prescribed by Vacanācārya Sudhākalaśa in his Saṅgītōpaniṣadsārōddhāra in 13th century itself). It is possible to avoid the pitfalls in the treatment of Naṣṭa and Uddiṣṭa in Akhaṇḍa-prastāra (Ślōkas from 13 to 23 B) and Khaṇḍa-prastāra (Ślōkas from 67 to 97) respectively by Śārngadēva as follows.

Like the general norms furnished to draw the tables of Aṅgas and to write the figures therein there are general norms for answering Naṣṭa and Uddiṣṭa of both Akhaṇḍa and Khaṇḍa-prastāras also which are furnished hereunder.

Rules for answering Naṣṭa: -

1. Write the Saṅkhyā line of figures upto the required units of permutation.
2. Subtract the question number of the required permutation from the respective figure of Saṅkhyā and from the remainder subtract the proxies consecutively, which represent Drutas, Laghus, Gurus and Plutas respectively.
3. Always the process of subtraction starts from the subtraction of the first-proxy only. If this proxy is not subtracted write the Aṅga of the same proxy to which it represents and this method should be continued until a proxy is subtracted successfully.
4. If the first- 1st proxy, which represents Druta, is subtracted write the second consecutive Aṅga, Laghu and leave off its second-2nd proxy. But, if the second-2nd proxy which represents Laghu is also subtracted consecutively write, in total, the third consecutive Aṅga, Guru and leave off its third- 4th proxy. But, if the third-4 proxy which represents Guru is also subtracted consecutively, write, in total, the fourth consecutive Aṅga, Pluta and leave off its fourth-6th proxy. Otherwise, if a proxy is subtracted write the next consecutive Aṅga and leave off its proxy; if two proxies are subtracted consecutively, write in total, the third consecutive Aṅga and leave off its proxy; if three proxies are subtracted consecutively, write in total, the fourth consecutive Aṅga and leave off its proxy. In the same manner for the

consecutive subtraction of more number of proxies write the immediate next consecutive Aṅga of the last consecutive proxy and leave off its proxy.

Note:- Always, by the successful subtraction of a proxy some Aṅga or the other than the lowest is obtained. If any proxy, other than the first, is not subtracted consecutively along with its preceding proxy such un-deducted proxy becomes the proxy to be left-off.

5 (a) After getting

- (i) an un-deducted proxy (being a figure bigger than the remainder) or
- (ii) a left-off proxy (a figure which has to be left-off after obtaining an Aṅga by not being consecutively subtracted from the remainder, being bigger than the remainder)

- further Aṅgas should always be written basing upon the respective proxies of such un-deducted or left-off proxy by subtracting them consecutively starting again from the beginning and carefully observing the relevant rules and restrictions, if any, in writing the Aṅgas.

- (b) For the upper-lines of the tables of all the Aṅgas, sometimes, if carefully observed, Aṅgas of higher value than the Aṅga probable should have to be written and its proxy has to be left-off for the subtraction of two or more proxies of the same line or for the subtraction of the figure '1' of the extreme left, either independently or consecutively along with other proxies.
 - (c) Aṅgas should be written carefully observing the relevant rules and restrictions by subtracting the existing respective proxies only.
- 6 (a) If either the remainder or the proxy or both are not existing one or more inferior Aṅgas, Drutas should only be written to fill-in the deficit value of the permutation.
- (b) For answering the Naṣṭa of Khaṇḍa-prastāra, for all the tables of Aṅgas, except the table of the lowest Aṅga, Druta, one or more lowest Aṅgas, Drutas should only be written for the lowest-lines and for all the upper-lines, either the lowest Aṅga or the Aṅga of that particular table or both should be written anti-clockwise, in ascending order of value, irrespective of the number of Aṅgas, observing the relevant rules and restrictions, to fill-in the deficit value of the permutation.
 - (c) For answering the Naṣṭa of Khaṇḍa-prastāra of Druta-mēru, which is the table of the inferior (least) Aṅga one or more Laghus only, as Laghu becomes the least

Aṅga in the absence of Druta, should be written to fill-in the deficit value of the permutation for the lowest-line as this is the line consisting of only DDPs (Druta-devoid-permutations). For all the upper-lines, as Druta plays a dual role of both the lowest Aṅga of that particular mode of permutation and the Aṅga of that particular table as well, either Druta or Laghu or both should be written, in ascending order of value, irrespective of the number of the Aṅgas, observing the relevant rules and restrictions, to fill-in the deficit value of the permutation.

- 7 (a) In respect of the upper-lines of the table of any Aṅga, other than the least, if the process of subtraction continues upto the lowest-line, further Aṅgas should always be written as per the key-rules governing the lowest-line only.
- (b) For the upper-lines of the very first table of the least Aṅga, Druta if the process of subtraction continues upto the lowest-line and a figure of that line cannot be subtracted, one least Aṅga, Druta should be written at the first instance and further Aṅgas be written later as per the key-rules governing the lowest-line only.

Note: - Among the above rules the rules Nos. 5 (b) & (c), 6 (b) & (c) and 7 (a) & (b) have to be utilised additionally in Khaṇḍa-Prastāra.

Rules for answering Uddiṣṭa: -

The Uddiṣṭa could be answered by applying the same rules governing Naṣṭa. As per Naṣṭa the Drutas are always originated by the undeducted proxies and all other Aṅgas i.e., Laghus, Gurus and Plutas are originated by the successful subtraction of the proxies. So, the total of the proxies successfully subtracted and originated the superior Aṅgas i.e. Laghus, Gurus and Plutas, which is called the 'Superior-aṅgas'-figure'(SF), should be subtracted from the respective Saṅkhyā and the remainder is the answer for the Uddiṣṭa. In this process the undeducted and left-off proxies should carefully be observed and eliminated while arriving at the 'SF'.

EXAMPLES

4.1. AKHAṆḌA-PRASTĀRA

4.1.1. Akhaṇḍa-naṣṭa :-

The statement of Śārṅgadēva from Ślōkas 13 to 19 B needs to be revised in the following manner.

“Subtract the preceding figures from the remainder”.

From the remainder, always, the figures of the preceding 1st, 2nd, 4th and 6th houses representing the permutations ending with Drutas, Laghus, Gurus and Plutas respectively in the right extreme of each permutation should only be subtracted as each and every figure of this Saṅkhyā line is the total of the figures of these preceding houses only.

“If an un-subtractable figure is subtracted either along with the un-deducted figure on the right or on the left write Laghu”.

In this element, Prastāra, there are two very important figures, which are left unexplained by all the authors in the annals of our music literature. They are:

- (i) The figure which cannot be subtracted from the remainder being bigger than the remainder and
- (ii) The figure to be left off after obtaining any Aṅga other than Druta. After obtaining any Aṅga other than Druta, that Aṅga should be written and its proxy should be left off, but if that proxy is also consecutively subtracted, in total, the next higher Aṅga should alone be written and its proxy should be left off. Thus, the process of subtraction should always be continued by subtracting the respective proxies basing upon the un-deducted or left-off proxy only.

“If the 3rd from the figure giving out Guru is also subtracted this Guru becomes Pluta”.

While enumerating the preceding houses the house in which the figure has to be written should always be excluded. Thus, if the figure of the second preceding house from which we obtain Guru is also subtracted consecutively from the remainder that Guru becomes Pluta.

1. What is the series of Aṅgas of the 1st permutation of 8-DP? (2-8-60-1)

As per rule No.1 write Saṅkhyā upto the required 8-DP (refer the table of Saṅkhyā and the permutative table 2-8-60).

Now, as per rule No.2 subtract the question number ‘1’ from the respective Saṅkhyā figure ‘60’ and the remainder is $(60 - 1 =)$ ‘59’.

Now, from the above remainder ‘59’, as the first-1st proxy ‘33’, the second-2nd proxy ‘19’ and the third-4th proxy ‘6’ could consecutively be subtracted $(59-33 = 26-19 = 7-6 = 1)$ and thus, as three proxies could consecutively be subtracted

write, in total, the fourth consecutive Aṅga, Pluta and leave off the fourth-6th proxy '2' as per rule No.4. As this fourth-6th proxy '2', being bigger than the last remainder '1', could not consecutively be subtracted along with the above three proxies this fourth-6th proxy '2' becomes the figure to be left-off, after obtaining the Aṅga, Pluta.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again by subtracting the respective proxies from the beginning and as such, from the last remainder '1', as the first-1st proxy '1' of the above left-off proxy '2' could again be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Till now, we have obtained Pluta and Laghu. Now, as neither the remainder nor the proxy is available and as also the total value of Pluta and Laghu together is tallied with the value of 8-DP the process of subtraction is over and thus, the series of Aṅgas of this permutation is '1 Ś'.

2. What is the series of Aṅgas of the 2nd permutation of 8-DP? (2-8-60-2).

As per rule no.1 write Saṅkhya upto the required 8-DP.

As per rule No.2 the remainder is $(60-2=)$ '58'.

Later, from the above remainder '58', as the first-1st proxy '33', the second-2nd proxy '19' and third-4th proxy '6' could consecutively be subtracted ($58-33=25-19=6-6=0$) write, in total, the fourth consecutive Aṅga Pluta as per rule No.4.

Now, as no remainder is left and as also the value of Pluta, being 12 units, falls short of 4 units to the value of 8-DP, write two Drutas extra amounting to 4 units in the left extreme to fill-in the deficit value of the permutation as per rule No.6.

Thus, the series of Aṅgas of this permutation is '0 0 Ś'.

3. What is the series of Aṅgas of the 3rd permutation of 8-DP? (2-8-60-3)

Follow the rule No.1 as in example 1.

As per rule No.2 the remainder is $(60-3=)$ '57'.

Later, from the above remainder '57', as the first-1st proxy '33', the second-2nd proxy '19' could consecutively be subtracted ($57-33=24-19=5$) write, in total, the third consecutive, Aṅga Guru and leave the third-4th proxy '6' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '6' and accordingly, from the last remainder '5', as the

first-1st proxy '3' and the second-2nd proxy '2' of the above left-off proxy '6' could consecutively be subtracted ($5-3=2-2=0$) write, in total, the third consecutive Aṅga, Guru as per rule No.4.

Now, as no remainder is left and as also the value of two Gurus together is tallied with the value of 8-DP, the process of subtraction is over and thus the series of Aṅgas of this permutation is 'S S'.

4. What is the series of Aṅgas of the 7th permutation of 8-DP? (2-8-60-7)

Follow the rule No.1 as in example 1.

As per rule No.2 the remainder is ($60-7=$) '53'.

Later, from the above remainder '53', as the first-1st proxy '33' and the second-2nd proxy '19' could consecutively be subtracted ($53-33=20-19=1$) write, in total, the third consecutive Aṅga, Guru and leave off the third-4th proxy '6' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '6' and accordingly, from the last remainder '1', as the first-1st proxy '3' of the left-off proxy '6' could not be subtracted, write Druta of the same first-1st proxy as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '3' and accordingly, from the last remainder '1', as the first-1st proxy '2' of the above un-deducted proxy '3' could not be subtracted, write one more Druta of the same first-1st proxy as per rule No.3.

Later, again as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '2' and accordingly, from the last remainder '1', as the first-1st proxy '1' of the last un-deducted proxy '2' could successfully be subtracted ($1-1=0$), write the second consecutive Aṅga Laghu as per rule No.4.

Now, as neither the remainder nor the proxy is left and also as the total value of Guru, two Drutas and Laghu together is tallied with the value of 8-DP the process is over and thus, the series of Aṅgas of this permutation is '1 0 0 S'.

5. *What is the series of Aṅgas of the 20th permutation of 8-DP? (2-8-60-20).

As per rule No.1 write Saṅkhyā upto the required 8-DP.

As per rule No.2 the remainder is ($60-20=$) '40'.

Later, from the above remainder '40', as the first-1st proxy could only be subtracted ($40-33=7$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '19' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '19' and accordingly from the last remainder '7', as the first-1st proxy '10' of the above left-off proxy '19' could not be subtracted write Druta of the same proxy as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '10' and accordingly, from the last remainder '7', as the first-1st proxy '6' of the above un-deducted proxy '10' could be subtracted ($7-6=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '3' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '3' and accordingly, from the above remainder, as the first-1st proxy '2', of the above left-off proxy '3' could not be subtracted, write Druta of the same proxy as per rule No.3.

Now, as neither the remainder nor the proxy is left and as also the total of Laghu, Druta, Laghu, Druta and Laghu together is tallied with the value of 8-DP, the process is over and thus, the series of Aṅgas of this permutation is 'I 0 I 0 I'

6. What is the series of Aṅgas of the 36th permutation of 8-DP? (2-8-60-36)

As per rule No.1 write Saṅkhyā upto the required 8-DP.

As per rule No.2 the remainder is ($60-36=$) '24'.

Later, from the above remainder '24', as the first-1st proxy '33' could not be subtracted, write Druta of the same proxy as per rule No.3

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above left-off proxy '10' and accordingly, from the above remainder, as the first-1st proxy '6' of the above left-off proxy '10' could not be subtracted write Druta of the same proxy as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '6' and accordingly, from the last remainder '5', as the first-1st and second-2nd proxies of the above un-deducted proxy '6' could consecutively be subtracted ($5-3=2-2=0$) write, in total, the third consecutive Aṅga, Guru as per rule No.4.

Now, as no remainder is left and also as the total value of Druta, Laghu, Druta and Guru together is tallied with the value of 8-DP, the process is over and thus, the series of Aṅgas of this permutation is 'S 0 1 0'.

7. What is the series of Aṅgas of the 48th permutation of 8-DP? (2-8-60-48)

As per rule No.1 write Saṅkhyā upto the required 8-DP.

As per rule No.2 the remainder is $(60-48=)$ '12'.

Later, from the above remainder '12', as the first-1st proxy '33' of '60' and again the first-1st proxy '19' of the last '33', thus, two first-1st proxies could not consecutively be subtracted write two Drutas consecutively as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '19' and accordingly, from the above remainder '12', as the first-1st proxy '10' of the last un-deducted proxy '19' could successfully be subtracted $(12-10=2)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '6' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '6' and accordingly, from the last remainder '2', as the first-1st proxy '3' of the above left-off proxy '6' could not be subtracted write Druta of the same proxy as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '3' and accordingly, from the above remainder '2', as the first-1st proxy '2' of the above un-deducted proxy '3' could be subtracted $(2-2=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as no remainder is left and also as the total value of Druta, Druta, Laghu, Druta and Laghu together falls short of two units to 8-DP, write one Druta of two units in the left extreme to fill-in the deficit value of the permutation as per rule No.6.

Thus, the series of Aṅgas of this permutation is '0 1 0 1 0 0'.

4.1.2. Akhaṇḍa-uddiṣṭa:-

The statement "From the final figure the penultimate, the seventh or in its absence the sixth figure are deducted" of Śārṅgadēva (Ślōkas from 19C to 23B) needs to be revised to deduct the ultimate, penultimate, fourth and sixth figures only.

1. What is the serial number of the permutation containing '0 1 0 S' in the series of Aṅgas? (2-8-60-0 1 0 S)

As per rule No.1 write Saṅkhyā upto the required 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Guru, Druta, Laghu and Druta.

Among them the first Guru, the third consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '33' and the second-2nd proxy '19' after which the third-4th proxy '6' has to be left-off as per rule No.4.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '3' of the above left-off proxy '6' as per rules Nos.5 (a) (ii) & 3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '2' of the above un-deducted proxy '3' as per rules Nos.5 (a) (i) & 4.

The last Druta should be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6.

Now, the 'SF' i.e., the total of the proxies ' $33+19+2=54$ ' by which Guru and Laghu are originated should be subtracted from the respective Saṅkhyā (60-54) and the remainder '6' is the serial number of this permutation.

2. What is the serial number of the permutation containing '0 S 0 I' in the series of Aṅgas? (2-8-60-0 S 0 I)

As per rule No.1 write Saṅkhyā upto the required 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Druta, Guru and Druta.

Among them, the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '33' after which the second-2nd proxy '19' has to be left-off as per rule No.4.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' of the above left-off proxy '19' as per rules Nos.5 (a) (ii) & 3.

The next Guru, the third consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '6' and the second-2nd proxy '3' of the above un-deducted proxy '10' as per rules Nos.5 (a) (i) & 4.

The last Druta should be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6.

Now, the 'SF' i.e., the total of the proxies '33+6+3=42' by which the Laghu and Guru are originated should be subtracted from the respective Saṅkhya (60-42) and the remainder '18' is the serial number of this permutation.

3. What is the serial number of the permutation containing '0 1 0 0 0 1' in the series of Aṅgas? (2-8-60-0 1 0 0 0 1)

As per rule No.1 write Saṅkhya upto the required 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Druta, Druta, Druta, Laghu and Druta.

Among them, the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '33' after which the second-2nd proxy '19' has to be left-off as per rule No.4.

The next three Drutas indicate that they are originated by the consecutive non-subtraction of three consecutive first-1st proxies '10, 6 & 3' as per rules Nos. 5 (a) (ii) & 3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the subtraction of the first-1st proxy '2' of the last un-deducted proxy '3' as per rules Nos.5 (a) (i) & 4.

The last Druta should be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6.

Now, the 'SF' i.e., the total of the proxies '33+2=35' by which the Laghus are originated should be subtracted from the respective Saṅkhya (60-35) and the remainder '25' is the serial number of this permutation.

4. What is the serial number of the permutation containing '1 0 S 0' in the series of Aṅgas? (2-8-60-1 0 S 0)

As per rule No.1 write Saṅkhya upto the required 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Guru, Druta and Laghu.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '33' as per rule No.3.

The next Guru, the third consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '19' and the second-2nd proxy '10' of the above un-deducted proxy '33' after which the third-4th proxy '3' has to be left-off as per rules Nos.5 (a) (i) & 4.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off proxy '2' as per rules Nos.5 (a) (ii) & 4.

Now, the 'SF' i.e., the total of the proxies '19+10+1=30' by which the Guru and Laghu are originated should be subtracted from the respective Saṅkhyā (60-30) and the remainder '30' is the serial number of this permutation.

5. What is the serial number of the permutation containing '101000' in the series of Aṅgas ? (2-8-60-101000)

As per rule No.1 write Saṅkhyā upto the required 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Druta, Laghu, Druta and Laghu.

Among them, the first three Drutas indicate that they are originated by the consecutive non-subtraction of the first-1st proxies '33, 19, & 10' as per rule No.3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '6' of the last un-deducted proxy '10' after which the second-2nd proxy '3' has to be left-off as per rules Nos.5 (a) (i) & 4.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '2' of the above left-off proxy '3' as per rules Nos.5 (a) (ii) & 3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the proxies '6+1=7' by which the Laghus are originated, should be subtracted from the respective Saṅkhyā (60-7) and the remainder '53' is the serial number of this permutation.

4.2. KHAṆḌA-PRASTĀRA

4.2.1. Druta-mēru (Table of Druta)

Note:- As drawing the houses of the table of Druta and writing the figures therein along with answering the questions of Naṣṭa and Uddiṣṭa described by Śārṅgadēva, in his Ślōkas from 67C to 84B, are untenable they need no further comments at all.

Lowest-line-naṣṭa: -

1. **What is the series of Aṅgas of the 1st DDP of 8-DP? (2-8-1-0-7-1—refer the permutative table 2-8-1-0-7)**

As per rule No.1 write Saṅkhya upto the required DDP of 8-DP.

As per rule No.2 the remainder is $(7-1=)$ '6'.

From the above remainder '6' (the first-1st proxy should not be taken into account while writing Saṅkhya of the lowest devoid line), as the second-2nd and the third-4th proxies could consecutively be subtracted $(6-4=2-2=0)$ write the fourth consecutive Aṅga, Pluta as per rule No.4.

Now, as per rule No.6 (c), to fill-in the deficit value of the permutation and also to make it DDP write one Laghu and thus, the series of Aṅgas of this permutation is '1 Ś'.

2. **What is the series of Aṅgas of the 2nd DDP of 8-DP? (2-8-1-0-7-2)**

As per rule No.1 write Saṅkhya upto the required DDP of 8-DP.

As per rule No.2 the remainder is $(7-2=)$ '5'.

From the above remainder '5', as the second-2nd proxy could only be subtracted $(5-4=1)$ write the third consecutive Aṅga, Guru and leave off the third-4th proxy '2' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '2' and accordingly, from the above remainder '1', as the second-2nd proxy '1' of the above left-off proxy '2' could be subtracted $(1-1=0)$ write the third consecutive Aṅga, Guru as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'S S'.

3. What is the series of Aṅgas of the 4th DDP of 8-DP? (2-8-1-0-7-4)

As per rule No.1 write Saṅkhya upto the required DDP of 8-DP.

As per rule No.2 the remainder is $(7-4=)$ '3'.

From the above remainder '3' as the second-2nd proxy '4' could not be subtracted write the same second consecutive Aṅga, Laghu as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '4' and accordingly, from the above remainder '3', as the second-2nd proxy $(3-2=1)$ and the third-4th proxy $(1-1=0)$ of the above un-deducted proxy '4' could consecutively be subtracted write the fourth consecutive Aṅga, Pluta as per rule No.4. Thus, the series of Aṅgas of this permutation is 'Ś1'.

Lowest-line-uddiṣṭa:

4. What is the serial number of the permutation containing '11S' in the series of Aṅgas?(2-8-1-0-7-11S)

As this permutation is of the value of eight Drutas and also devoid of Druta write Saṅkhya upto the required DDP of 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Guru, Laghu and Laghu.

Among them the first Guru, which is the third consecutive Aṅga, indicates that it is originated by the successful subtraction of the second-2nd proxy '4' as per rule No.4.

As this is the lowest line of the table of Druta in which the Saṅkhya of DDPs is furnished, the Laghu becomes the least Aṅga in the absence of Druta and so, Laghu alone should be written at the time of non-subtraction of the second-2nd proxy (the first-1st proxy is absent) and also to fill-in the deficit value of the permutation. So, it should be presumed that the two Laghus in the left extreme of this permutation are written only to fill-in the deficit value of this permutation.

Now, the above figure '4' by which Guru is originated should be subtracted from the respective Saṅkhya $(7-4)$ and the remainder '3' is the serial number of this permutation.

5. What is the serial number of the permutation containing '1S1' in the series of Aṅgas? (2-8-1-0-7-1S1)

As this permutation is of the value of eight **Drutas** and also devoid of Druta write Saṅkhya upto the required DDP of 8-DP.

From right to left, in the series of Aṅgas of this **permutation**, there are Laghu, Guru and Laghu.

Among them, the first Laghu, the second **consecutive Aṅga** indicates that it is originated by the non-subtraction of the second-2nd proxy '4' as per rule No.3.

Later, the next Guru, the third consecutive **Aṅga**, indicates that it is originated by the successful subtraction of the second-2nd proxy '2' of the last un-deducted proxy '4' as per rules Nos.5 (a) (i) & 4.

The Laghu in the left extreme should be presumed that it is written only to fill-in the deficit value of the permutation as per rule No.6.

Now, the figure '2' by which the Guru is originated should be subtracted from the respective Saṅkhya (7-2) and the remainder '5' is the serial number of this permutation.

6. What is the serial number of the permutation containing 'S II' in the series of Aṅgas? (2-8-1-0-7-S I I)

As this permutation is of the value of eight **Drutas** and also devoid of Druta, write Saṅkhya upto the required DDP of 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Laghu and Guru.

Among them the first Laghu, the second **consecutive Aṅga** indicates that it is originated by the non-subtraction of the second-2nd proxy '4' as per rule No.3.

The next Laghu also indicates that it is also originated by the consecutive non-subtraction of the second-2nd proxy '2' of the last un-deducted proxy '4' as per rules Nos.5 (a) (i) & 3.

Later, the next Guru, the third consecutive **Aṅga**, indicates that it is originated by the successful subtraction of the second-2nd proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the figure '1' by which the Guru is originated should be subtracted from the respective Saṅkhya (7-1) and the remainder '6' is the serial number of this permutation.

2-9-1-5-27

	0	0	0	0	0	S	1
0	0	0	0	0	1	1	2
0	0	0	0	1	0	1	3
0	0	0	1	0	0	1	4
0	0	1	0	0	0	1	5
0	1	0	0	0	0	1	6
1	0	0	0	0	0	1	7
	0	0	0	0	S	0	8
0	0	0	0	1	1	0	9
0	0	0	1	0	1	0	10
0	0	1	0	0	1	0	11
0	1	0	0	0	1	0	12
1	0	0	0	0	1	0	13
	0	0	0	S	0	0	14
0	0	0	1	1	0	0	15
0	0	1	0	1	0	0	16
0	1	0	0	1	0	0	17
1	0	0	0	1	0	0	18
	0	0	S	0	0	0	19
0	0	1	1	0	0	0	20
0	1	0	1	0	0	0	21
1	0	0	1	0	0	0	22
	0	S	0	0	0	0	23
0	1	1	0	0	0	0	24
1	0	1	0	0	0	0	25
	S	0	0	0	0	0	26
1	1	0	0	0	0	0	27

Upper-lines-naṣṭa :

7. **What is the series of Aṅgas of the 1st 5-DCP of 9-DP? (2-9-1-5-27-1— refer the permutative table 2-9-1-5-27)**

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-1=)$ '26'.

From the above remainder '26' as the first-1st proxy $(26-20=6)$ of the immediate lower line and the second-2nd proxy $(6-6=0)$ could consecutively be subtracted write the third consecutive Aṅga, Guru as per rule No.4.

Now, as Guru is of the value of 8-units which is still lesser of 10-units to make it 9-DP and also as this permutation must consist of five Drutas being 5-DCP, as per rule No.6 (c), to fill-in the deficit value of 10 units and also to make it 5-DCP, write 5 Drutas consecutively.

Thus, the series of Aṅgas of this permutation is '0 0 0 0 0 S'.

8. **What is the series of Aṅgas of the 5th 5-DCP of 9-DP? (2-9-1-5-27-5)**

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-5=)$ '22'.

Now, from the above remainder '22', as the first-1st proxy '20' of the immediate lower line could be subtracted $(22-20=2)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '6' as per rule No.4.

Later, as per rule No.5 (a) (ii), the process of subtraction starts again from the above left-off proxy '6' and accordingly, from the above remainder '2', as the first-1st proxy '5' of the immediate lower line of the above left-off proxy '6' could not be subtracted, again as per rule No.5 (a) (i) as the first-1st proxy '4' of the immediate lower line of the last un-deducted proxy '5' also could not be subtracted, again as per the same rule No.5 (a) (i), as the first-1st proxy '3' of the immediate lower line of the last un-deducted proxy '4' also could not be subtracted but, again, as per rule No.5 (a) (i), as the first-1st proxy '2' of the immediate lower line of the last un-deducted proxy '2' could now be subtracted write three Drutas consecutively for this consecutive non-subtraction as per rule No.3 and lastly one Laghu for the successful subtraction as per rule No.4.

Now, as the total value of the presently available Aṅgas is only of 14 units, to fill- in the deficit value of the Prastāra and also to make it 5-DCP write two more Drutas in the end as per rule No.6. Thus, the series of Aṅgas of this permutation is '0 0 1 0 0 0 1'.

9. What is the series of Aṅgas of the 12th 5-DCP of 9-DP? (2-9-1-5-27-12)

As per rule No.1 write Saṅkhya upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-12=)$ '15'.

Now, from the above remainder '15', as the first-1st proxy '20' of the immediate lower line could not be subtracted write Druta as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again from the above un-deducted proxy '20' and accordingly, from the above remainder '15', as the first-1st proxy '14' of the immediate lower line of the above un-deducted proxy '20' could now be subtracted $(15-14=1)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' of the above un-deducted proxy '20' as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again from the above left-off proxy '5' and accordingly, from the above remainder '1', as the first-1st proxy '4' of the immediate lower line of the above left-off proxy '5' could not be subtracted write Druta of the first-1st proxy as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again from the above un-deducted proxy '4' and accordingly, from the above remainder '1', as the first-1st proxy '3' of the above un-deducted proxy '4' and again as the first-1st proxy '2' of the last un-deducted proxy '3' could not consecutively be subtracted twice, write two more Drutas consecutively as per rule No.3.

Now, again as per rule No.5 (a) (i), from the above remainder '1', the first-1st proxy '1' of the immediate lower line of the last un-deducted proxy '2' could not be subtracted $(1-1=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Later, as per rules Nos.6 (a) & (c), to fill- in the deficit value of the permutation and also to make it 5-DCP write one more Druta in the end. Thus, the series of Aṅgas of this permutation is '0 1 0 0 0 1 0'.

10. What is the series of Aṅgas of the 13th 5-DCP of 9-DP? (2-9-1-5-27-13)

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-13=)$ '14'.

Now, from the above remainder '14', as the first-1st proxy '20' of the immediate lower line could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, from the above remainder '14', as per rule No.5 (a) (i), as the first-1st proxy '14' of the last un-deducted proxy '20' could be subtracted $(14-14=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rules Nos.6 (a) & (c), to fill-in the deficit value of the permutation and also to make it 5-DCP write four Drutas and one Laghu. Thus, the series of Aṅgas of this permutation is '1 0 0 0 1 0'.

11. What is the series of Aṅgas of the 18th 5-DCP of 9-DP? (2-9-1-5-27-18)

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-18=)$ '9'.

Now, from the above remainder '9', as the first-1st proxy '20' and again the next first-1st proxy '14' could not be subtracted consecutively write two Drutas as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '14' and accordingly, from the above remainder '9', as the first-1st proxy '9' of the last un-deducted proxy '14' could now be subtracted $(9-9=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rules Nos.6 (a) & (c), to fill-in the deficit value of the permutation and also to make it 5-DCP write three more Drutas and another Laghu.

Thus, the series of Aṅgas of this permutation is '1 0 0 0 1 0 0'.

12. What is the series of Aṅgas of the 20th 5-DCP of 9-DP? (2-9-1-5-27-20)

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is $(27-20=)$ '7'.

Now, from the above remainder '7', as the first-1st proxies '20', '14' of the last '20', '9' of the last '14' could not consecutively be subtracted write three Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '9' and accordingly, from the above remainder '7', as the first-1st proxy '5' of the last un-deducted proxy '9' could be subtracted ($7-5=2$) write the second consecutive Aṅga, Laghu after which the second-2nd proxy '3' of '9' should be left-off as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '3' and accordingly, from the last remainder '2', as the first-1st proxy '2' of the above left-off proxy '3' could be subtracted ($2-2=0$) write another Laghu as per rule No.4.

Later, as per rule No.6 (a), to fill-in the deficit value of the permutation write two more Drutas.

Thus, the series of Aṅgas of this permutation is '0 0 1 1 0 0 0'.

13. What is the series of Aṅgas of the 21st 5-DCP of 9-DP? (2-9-1-5-27-21)

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is ($27-21=$) '6'.

Now, from the above remainder '6', as the first-1st proxies '20', '14' & '9' could not consecutively be subtracted write three Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '9' and accordingly, from the above remainder '6', as the first-1st proxy '5' of the last un-deducted proxy '9' could be subtracted ($6-5=1$) write the second consecutive Aṅga, Laghu after which the second-2nd proxy '3' of the last un-deducted proxy '9' should be left-off as per rule No.4.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '3' and accordingly, from the last remainder '1', as the first-1st proxy '2' of the above left-off proxy '3' could not be subtracted write Druta as per rule No.3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '2' and accordingly, from the last remainder '1', as the first-1st proxy '1' of the last un-deducted proxy '2' could successfully be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rules Nos.6 (a) & (c), to fill-in the deficit value of the permutation and also to make it 5-DCP write one more Druta.

Thus, the series of Aṅgas of this permutation is '0 I 0 I 0 0 0'.

14. What is the series of Aṅgas of the 23rd 5-DCP of 9-DP?(2-9-1-5-27-23)

As per rule No.1 write Saṅkhya upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is ($27-23=$) '4'.

Now, from the above remainder '4', as the first-1st proxies '20', '14', '9' and '5' could not consecutively be subtracted write four Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '5' and accordingly, from the remainder '4', as the first-1st proxy '2' and the second-2nd proxy '2' of the last un-deducted proxy '5' could consecutively be subtracted write the third consecutive Aṅga, Guru as per rule No.4.

Now, as per rules Nos.6 (a) & (c), to fill-in the deficit value of the permutation and also to make it 5-DCP write one more Druta.

Thus, the series of Aṅgas of this permutation is '0 S 0 0 0 0'.

15. What is the series of Aṅgas of the 26th 5-DCP of 9-DP? (2-9-1-5-27-26)

As per rule No.1 write Saṅkhya upto the required 5-DCP of 9-DP.

As per rule No.2 the remainder is ($27-26=$) '1'.

Now, from the above remainder '1', as the first-1st proxies '20', '14', '9', '5' and '2' could not consecutively be subtracted write five Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Among the above five Drutas as the last Druta is originated by the non-subtraction of the last proxy '2', which is of the lowest-line the further Aṅgas should here after

be written as per the key-rules governing the lowest-line as per rule No.7 (b). Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the last un-deducted proxy '2' and accordingly, from the remainder '1', as the second-2nd proxy '1' could be subtracted ($1-1=0$) write the third consecutive Aṅga, Guru, as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'S 0 0 0 0 0'.

16. What is the series of Aṅgas of the last 27th 5-DCP of 9-DP? (2-9-1-5-27-27)

As this is the last permutation of all write five Drutas and two Laghus as per rule No.6 (c) to make it 5-DCP.

Thus, the series of Aṅgas of this permutation is 'I I 0 0 0 0 0'.

Upper-lines-uddiṣṭa:

17. What is the serial number of the permutation containing '0 I 0 0 0 0 I' in the series of Aṅgas? (2-9-1-5-27-0 I 0 0 0 0 I)

As this permutation is of the value of 9 Drutas and also contains of 5 Drutas write Saṅkhyā as per rule No.1 upto the required 5-DCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Druta, Druta, Druta, Druta, Laghu and Druta.

Among them the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '20' of the immediate lower line as per rule No.4, after which the second-2nd proxy '6' should be left-off.

Later, the next four Drutas indicate that they are originated by the consecutive non-subtraction of the four first-1st proxies '5', '4', '3' and '2' as per rules Nos.5 (a) (ii), 3 & 5 (a) (i).

Now, the next Laghu, the second consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

It should be presumed that the last Druta is written to fill-in the deficit value of the permutation as per rule No.6 (c).

Now, the 'SF' i.e., the total of the figures '20 & 1' ($20+1=21$) by which the Laghus are originated should be subtracted from the respective Saṅkhya (27-21) and the remainder '6' is the serial number of this permutation.

- 18. What is the serial number of the permutation containing 'I 0 0 0 0 I' in the series of Aṅgas? (2-9-1-5-27-I 0 0 0 0 I)**

As per rule No.1 write Saṅkhya upto the required 5-DCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Druta, Druta, Druta, Druta, Druta and Laghu.

Among them the first Laghu which is the second consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '20' after which the second-2nd proxy '6' has to be left-off as per rule No.4.

Later, it should be presumed that the next five Drutas and the Laghu are written to fill-in the deficit value of the permutation as per rule No.6 (c).

Now, the 'SF' '20' by which the first Laghu is originated should be subtracted from the respective Saṅkhya (27-20) and the remainder '7' is the serial number of this permutation.

- 19. What is the serial number of the permutation containing '0 I 0 0 I 0 0' in the series of Aṅgas? (2-9-1-5-27-0 I 0 0 I 0 0)**

As per rule No.1 write Saṅkhya upto the required 5-DCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Laghu, Druta, Druta, Laghu, Druta.

Among them the first two Drutas indicate that they are originated by the consecutive non-subtraction of the two first-1st proxies '20' and '14' of the last proxy '20' of the respective immediate lower lines as per rules Nos. 3, 5 (a) (i) & 3.

The next Laghu, which is the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '9' of the immediate lower line of the last un-deducted proxy '14' after which the second-2nd proxy '4' of '14' has to be left-off as per rules Nos.5 (a) (i) & 4.

Later, the next two Drutas indicate that they are originated by the consecutive non-subtraction of the first-1st proxies of '3' of the above left-off proxy '4' and again '2' of the last un-deducted proxy '3' as per rules Nos.5 (a) (ii), 5 (a) (i) & 3.

Later, the next Laghu, the second consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

The last Druta should be presumed that it is written only to fill-in the deficit value of the permutation and also to make it 5-DCP as per rule No.6 (c).

Now, the 'SF' i.e., the total of the two figures '9 & 1' ($9+1=10$) by which the two Laghus are originated respectively should be subtracted from the respective Saṅkhyā (27-10) and the remainder '17' is the serial number of this permutation.

20. What is the serial number of the permutation containing '0 1 1 0 0 0 0' in the series of Aṅgas? (2-9-1-5-27—0 1 1 0 0 0 0)

As per rule No.1 write Saṅkhyā upto the required 5-DCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Druta, Druta, Laghu, Laghu and Druta.

Among them the first four Drutas indicate that they are originated by the consecutive non-subtraction of the four first-1st proxies, '20', '14' of the last '20', '9' of the last '14' and '5' of the last '9' as per rules Nos.3, 5 (a) (i) & 3.

The next Laghu, the second consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '2' of the last un-deducted proxy '5' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '2' has to be left-off.

Later, the next Laghu, the second consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off '2' as per rules Nos.5 (a) (ii) & 4.

It should be presumed that the last Druta is written only to fill-in the deficit value of the permutation and also to make it 5-DCP as per rule No.6 (c).

Now, the 'SF' i.e., the total of the two figures '2 & 1' ($2+1=3$) by which the two Laghus are originated respectively should be subtracted from Saṅkhyā (27-3) and the remainder '4' is the serial number of this permutation.

4.2.2. Laghu-mēru (Table of Laghu)

The statements of Śārṅgadēva from Ślōkas 84C to 90 need to be revised in the following manner:

1. “By the subtraction of two previous figures and one upper-figure Guru is obtained”. While answering the Naṣṭa for any of the upper-lines of any table of any Aṅga, the respective proxy of that particular Aṅga should always be taken from the immediate lower line only but not from any upper line at all.
2. “For the Naṣṭa of the upper-lines the 2nd, the lower of the 3rd and the 5th should be subtracted in reverse order”. While enumerating the preceding houses the house in which the figure has to be written or the figure of the house to which the question pertains should always be excluded and thus for the Naṣṭa of the upper-lines of Laghu-mēru the preceding 1st, the immediate lower of the 2nd, the preceding 4th and the 6th of the same line should be subtracted.

Lowest-line-naṣṭa :

1. **What is the series of Aṅgas of the 1st LDP of 10-DP?(2-10-2-0-21-1—refer the permutative table 2-10-2-0-21)**

As per rule No.1 write Saṅkhya upto the required LDP of 10-DP.

As per rule No.2 the remainder is $(21-1=)$ ‘20’.

From the above remainder ‘20’ as the first-1st proxy ‘14’ (being the table of the second Aṅga the second-2nd proxy should be avoided) and the third-4th proxy ‘5’ could consecutively be subtracted $(20-14=6-5=1)$ write the fourth consecutive Aṅga Pluta as per rule No.4 after which the fourth-6th proxy ‘2’ has to be left-off.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy ‘2’ and accordingly, from the above remainder ‘1’, as the first-1st proxy ‘1’ of the above left-off proxy ‘2’ could be subtracted $(1-1=0)$ write the third consecutive Aṅga Guru (second Aṅga Laghu should not be written as this is the line of the Laghu-devoid-permutations) as per rule No.4.

Thus, the series of Aṅgas of this permutation is ‘S Ś’.

2. **What is the series of Aṅgas of the 3rd LDP of 10-DP? (2-10-2-0-21-3)**

As per rule No.1, write Saṅkhya upto the required LDP of 10-DP.

As per rule No.2 the remainder is $(21-3=)$ ‘18’.

2-10-2-0-21

					S	\$	1
		0	0	0	0	\$	2
					\$	S	3
			0	0	S	S	4
			0	S	0	S	5
			S	0	0	S	6
0	0	0	0	0	0	S	7
		0	0	0	\$	0	8
			0	S	S	0	9
			S	0	S	0	10
0	0	0	0	0	S	0	11
		0	0	\$	0	0	12
			S	S	0	0	13
0	0	0	0	S	0	0	14
		0	\$	0	0	0	15
0	0	0	S	0	0	0	16
		\$	0	0	0	0	17
0	0	S	0	0	0	0	18
0	S	0	0	0	0	0	19
S	0	0	0	0	0	0	20
0	0	0	0	0	0	0	21

From the above remainder '18' as the first-1st proxy could be subtracted ($18-14=4$) write the third consecutive Aṅga Guru as per rule No.4 after which the third-4th proxy '5' has to be left-off.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '5' and accordingly, from the above remainder '4' as the first-1st proxy '3' and the third-4th proxy '1' could consecutively be subtracted ($4-3=1-1=0$) write the fourth consecutive Aṅga Pluta as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'Ś S'.

3. What is the series of Aṅgas of the 5th LDP of 10-DP? (2-10-2-0-21-5)

As per rule No.1 write Saṅkhya upto the required LDP of 10-DP.

As per rule No.2 the remainder is ($21-5=$) '16'.

From the above remainder '16' as the first-1st proxy '14' could be subtracted ($16-14=2$) write the third consecutive Aṅga Guru as per rule No.4 after which the third-4th proxy '5' has to be left-off.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '5' and accordingly, from the above remainder '2', as the first-1st proxy '3' of the above left-off proxy '5' could not be subtracted write the first Aṅga Druta as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '3' and accordingly, from the above remainder '2', as the first-1st proxy '2' of the above un-deducted proxy '3' could be subtracted ($2-2=0$) write the third consecutive Aṅga Guru as per rule No.4.

Later, as per rule No.6 (b), to fill in the deficit value of the permutation write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 S 0 S'.

4. What is the series of Aṅgas of the 10th LDP of 10-DP? (2-10-2-0-21-10)

As per rule No.1 write Saṅkhya upto the required LDP of 10-DP.

As per rule No.2 the remainder is ($21-10=$) '11'.

From the above remainder '11' as the first-1st proxy '14' could not be subtracted write the first Aṅga Druta itself as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '14' and accordingly, from the above remainder '11', as the first-1st proxy '10' of the above un-deducted proxy '14' could now be subtracted ($11-10=1$) write the third consecutive Aṅga Guru as per rule No.4 after which the third-4th proxy '3' has to be left-off.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '3' and accordingly, from the above remainder '1', as the first-1st proxy '2' of the above left-off proxy '3' could not be subtracted write the first Aṅga Druta itself as per rule No.3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the above un-deducted proxy '2' and accordingly, from the above remainder '1', as the first-1st proxy '1' could now be subtracted ($1-1=0$) write the third consecutive Aṅga Guru as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'S 0 S 0'.

5. What is the series of Aṅgas of the 13th LDP of 10-DP(2-10-2-0-21-13)

As per rule No.1 write Saṅkhyā upto the required LDP of 10-DP.

As per rule No.2 the remainder is ($21-12=$) '8'.

From the above remainder '8' as the first-1st proxy '14' and again the first-1st proxy '10' of the last proxy '14' could not consecutively be subtracted write two first Aṅgas, Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Now, as per rule No.5 (a) (i), the process of subtraction starts again basing upon the un-deducted last proxy '10' and accordingly, from the above remainder '8', as the first-1st proxy '7' of the above un-deducted last proxy '10' could now be subtracted ($8-7=1$) write the third consecutive Aṅga Guru as per rule No.4 after which the third-4th proxy '2' of the above un-deducted last proxy '10' has to be left-off.

Now, as per rule No.5 (a) (ii), the process of subtraction starts again basing upon the above left-off proxy '2' and accordingly, from the above remainder '1', as the first-1st proxy '1' of the above left-off proxy '2' could not be subtracted ($1-1=0$) write another third Aṅga Guru as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'S S 0 0'.

6. What is the series of Aṅgas of the 17th LDP of 10-DP? (2-10-2-0-21-17)

As per rule No.1 write Saṅkhyā upto the required LDP of 10-DP.

As per rule No.2 the remainder is $(21-17=)$ '4'.

From the above remainder '4' as four of the first-1st proxies '14', '10' of the last '14', '7' of the last '10', and '5' of the last '7' could not consecutively be subtracted write four first Aṅgas, Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Now, as per rule No.5 (a) (i) the process of subtraction starts again basing upon the un-deducted last proxy '5' and accordingly, from the above remainder '4', as the first-1st and the third-4th proxies of the un-deducted last proxy '5' could consecutively be subtracted $(4-3=1-1=0)$ write the fourth consecutive Aṅga Pluta as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'Ś 0 0 0 0'.

Lowest-line-uddiṣṭa:

7. **What is the serial number of the permutation containing 'S 0 0 S' in the series of Aṅgas? (2-10-2-0-21-S 0 0 S)**

As this permutation is of the value of 10-DP and also a LDP write Saṅkhya upto the required LDP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Guru, Druta, Druta and Guru.

Among them the first Guru, the third consecutive Aṅga, indicates that it is originated by the subtraction of the first-1st proxy '14' as per rule No.4, after which the third-4th proxy '5' has to be left off.

The next two Drutas indicate that they are originated by the consecutive non-subtraction of the next two consecutive first-1st proxies '3' of the above left-off proxy '5' and '2' of the last un-deducted proxy '3' as per rules Nos.5 (a) (ii), 3, 5 (a) (i) & 3.

Later, the last Guru, the third consecutive Aṅga indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the figures '14 & 1' $(14+1=15)$ by which the Gurus are originated should be subtracted from the respective Saṅkhya $(21-15)$ and the remainder '6' is the serial number of this permutation.

8. **What is the serial number of the permutation containing '0 S S 0' in the series of Aṅgas? (2-10-2-0-21-0 S S 0)**

As per rule No.1 write Saṅkhyā upto the required LDP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Guru, Guru and Druta.

Among them the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '14' as per rule No.3.

The next Guru, the third consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' of the above un-deducted proxy '4' as per rules Nos.5 (a) (i) & 4 after which the third-4th proxy '3' has to be left-off.

The second Guru, the third consecutive Aṅga, indicates that it is also originated by the successful subtraction of the first-1st proxy '2' of the above left-off proxy '3' as per rules Nos.5 (a) (ii) & 4.

The last Druta should be presumed that it is written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' ie., the total of the figures '10 & 2' ($10+2=12$) by which the two Gurus are originated should be subtracted from the respective Saṅkhyā (21-12) and the remainder '9' is the serial number of this permutation.

9. What is the serial number of the permutation containing '0 Ś 0 0 0' in the series of Aṅgas? (2-10-2-0-21-0 Ś 0 0 0)

As per rule No.1 write Saṅkhyā upto the required LDP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Druta, Pluta and Druta.

Among them the first three Drutas indicate that they are originated by the consecutive non-subtraction of the three first-1st proxies '14, 10 & 7' as per rules Nos.3 & 5 (a) (i).

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st and the third-4th proxies '5 & 1' respectively of the last un-deducted proxy '7' as per rules Nos.5 (a) (i) & 4.

The last Druta should be presumed that it is written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '5 & 1' ($5+1=6$) by which the Pluta is originated should be subtracted from the respective Saṅkhya (21-6) and the remainder '15' is the serial number of this permutation.

Upper-lines-naṣṭa:

10. What is the series of Aṅgas of the 1st 3-LCP of 9-DP? (2-9-2-3-20-1—refer the permutative table 2-9-2-3-20)

As per rule No.1 write Saṅkhya upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is ($20-1=$) '19'.

From the above remainder '19' as the first-1st proxy '10' is subtracted ($19-10=9$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '10' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the above remainder '9', as the first-1st proxy '6' of the above left-off proxy '10' is subtracted ($9-6=3$) write another second consecutive Aṅga, Laghu and leave off the second-2nd proxy '4' of the immediate lower line as per rule No.4.

Later, again as per rule No.5 (a) (ii), from the last remainder '3', as the first-1st proxy '3' of the above left-off proxy '4' is also subtracted ($3-3=0$) write again another second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, as no more Laghus could be written being the 3-LCP, write three Drutas.

Thus, the series of Aṅgas of this permutation is '0 0 0 III'.

11. What is the series of Aṅgas of the 2nd 3-LCP of 9-DP? (2-9-2-3-20-2)

As per rule No.1 write Saṅkhya upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is ($20-2=$) '18'.

From the above remainder '18' as the first-1st proxy '10' could be subtracted ($18-10=8$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '10' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '8', as the first-1st proxy '6' of the above left-off proxy '10' could also be subtracted ($8-6=2$) write again another second consecutive Aṅga, Laghu and leave off the second-2nd proxy '4' of the immediate lower line as per rule No.4.

2-9-2-3-20

0	0	0	1	1	1	1
0	0	1	0	1	1	2
0	1	0	0	1	1	3
1	0	0	0	1	1	4
0	0	1	1	0	1	5
0	1	0	1	0	1	6
1	0	0	1	0	1	7
0	1	1	0	0	1	8
1	0	1	0	0	1	9
1	1	0	0	0	1	10
0	0	1	1	1	0	11
0	1	0	1	1	0	12
1	0	0	1	1	0	13
0	1	1	0	1	0	14
1	0	1	0	1	0	15
1	1	0	0	1	0	16
0	1	1	1	0	0	17
1	0	1	1	0	0	18
1	1	0	1	0	0	19
1	1	1	0	0	0	20

Now, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '3' of the above left-off proxy '4' could not be subtracted, write the first Aṅga, Druta itself as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '2', as the first-1st proxy '2' of the above un-deducted proxy '3' could be subtracted ($2-2=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation write two more Drutas.

Thus, the series of Aṅgas of this permutation is '0 0 I 0 I I'.

12. What is the series of Aṅgas of the 3rd 3-LCP of 9-DP?(2-9-2-3-20-3)

As per rule No.1 write Saṅkhyā upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-3=)$ '17'.

From the above remainder '17' as the first-1st proxy '10' could be subtracted ($17-10=7$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '10' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '7', as the first-1st proxy '6' of the above left-off proxy '10' could be subtracted ($7-6=1$) write another second consecutive Aṅga, Laghu and leave off the second-2nd proxy '4' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '3' of the above left-off proxy '4' could not be subtracted and again as per rule No. 5 (a) (i) as the first-1st proxy '2' of the last un-deducted proxy '3' also could not be subtracted consecutively write two Drutas consecutively as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '1', as the first-1st proxy of the last un-deducted proxy '2' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation write one Druta.

Thus, the series of Aṅgas of this permutation is '0 I 0 0 I I'.

13. What is the series of Aṅgas of the 4th 3-LCP of 9-DP? (2-9-2-3-20-4)

As per rule No.1 write Sañkhya upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-4=)$ '16'.

From the above remainder '16' as the first-1st proxy '10' could be subtracted $(16-10=6)$ write the second consecutive Añga, Laghu and leave off the second-2nd proxy '10' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (i), from the last remainder '6', as the first-1st proxy '6' of the above left-off proxy '10' could again be subtracted $(6-6=0)$ write another second consecutive Añga, Laghu.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation and also to make it 3-LCP write three Drutas consecutively and one Laghu.

Thus, the series of Añgas of this permutation is 'I 0 0 0 II'.

14. What is the series of Añgas of the 6th 3-LCP of 9-DP? (2-9-2-3-20-6)

As per rule No.1 write Sañkhya upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-6=)$ '14'.

From the above remainder '14' as the first-1st proxy '10' could be subtracted $(14-10=4)$ write the second consecutive Añga, Laghu and leave off the second-2nd proxy '10' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the above remainder '4', as the first-1st proxy '6' of the above left-off proxy '10' could not be subtracted write the first Añga, Druta itself as per rule No 3.

Later, as per rule No.5 (a) (i), from the last remainder '4', as the first-1st proxy '3' of the above un-deducted proxy '6' could be subtracted $(4-3=1)$ write the second consecutive Añga, Laghu and leave off the second-2nd proxy '3' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '2' of the above left-off proxy '3' could not be subtracted write the first Añga, Druta as per rule No 3.

Later, as per rule No.5 (a) (i), from the above remainder '1', as the first-1st proxy '1' of the last un-deducted proxy '2' could now be subtracted $(1-1=0)$ write the second consecutive Añga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 I 0 I 0 I'.

15. What is the series of Aṅgas of the 10th 3-LCP of 9-DP? (2-9-2-3-20-10)

As per rule No.1 write Saṅkhyā upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-10=)$ '10'.

From the above remainder '10' as the first-1st proxy '10' could be subtracted $(10-10=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation and also to make it 3-LCP write three Drutas and two Laghus consecutively.

Thus, the series of Aṅgas of this permutation is 'I I 0 0 0 I'.

16. What is the series of Aṅgas of the 14th 3-LCP of 9-DP? (2-9-2-3-20-14)

As per rule No.1 write Saṅkhyā upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-14=)$ '6'.

From the above remainder '6' as the first-1st proxy '10' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '6', as the first-1st proxy '4' of the above un-deducted proxy '10' could be subtracted $(6-4=2)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '6' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '3' of the above left-off proxy '6' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the last remainder '2', as the first-1st proxy '1' of the last un-deducted proxy '3' could be subtracted $(2-1=1)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '2' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1' as the first-1st proxy '1' of the above left-off proxy '2' of the immediate lower line could again be subtracted $(1-1=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation write one Druta in the end.

Thus, the series of Aᅅgas of this permutation is '0 I I 0 I 0'.

17. What is the series of Aᅅgas of the 17th 3-LCP of 9-DP? (2-9-2-3-20-17)

As per rule No.1 write Saᅅkhya upto the required 3-LCP of 9-DP.

As per rule No.2 the remainder is $(20-17=)$ '3'.

From the above remainder '3' as the first-1st proxy '10' could not be subtracted and as per rule No.5 (a) (i) as the first-1st proxy '4' of the last un-deducted proxy '10' also could not be subtracted write two Drutas consecutively as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '3', as the first-1st proxy '1' of the last un-deducted proxy '4' could be subtracted $(3-1=2)$ write the second consecutive Aᅅga, Laghu and leave off the second-2nd proxy '3' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '1' of the above left-off proxy '3' could be subtracted $(2-1=1)$ write another second consecutive Aᅅga, Laghu and leave off the second-2nd proxy '2' of the immediate lower line as per rule No.4.

Later, again as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the last left-off proxy '2' could again be subtracted $(1-1=0)$ write still another second consecutive Aᅅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation write one Druta in the end.

Thus, the series of Aᅅgas of this permutation is '0 I I I 0 0'.

Upper-lines-uddiᅅta:

18. What is the serial number of the permutation containing '0 I I 0 0 I' in the series of Aᅅgas? (2-9-2-3-20-0 I I 0 0 I)

As this permutation is of the value of 9-DP and also a 3-LCP write Saᅅkhya upto the required 3-LCP of 9-DP.

From right to left, in the series of Aᅅgas of this permutation, there are Laghu,

Druta, Druta, Laghu, Laghu and Druta.

Among them, the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' as per rule No.4 after which the second-2nd proxy '10' of the immediate lower line has to be left-off.

The next two Drutas indicate that they are originated by the consecutive non-subtraction of the two first-1st proxies '6 & 3' of the above left-off proxy '10' as per rules Nos.5 (a) (ii), 5 (a) (i) & 3.

Later, the first Laghu of the two indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '3' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '2' of the immediate lower-line has to be left-off and the second Laghu indicates that it is originated by another successful subtraction of the first-1st proxy '1' of the last left-off proxy '2' as per rules Nos.5 (a) (ii) & 4.

The last Druta should be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '10, 1 & 1' ($10+1+1=12$) by which the three Laghus are originated should be subtracted from the respective Saṅkhyā (20-12) and the remainder '8' is the serial number of this permutation.

19. What is the serial number of the permutation containing '0 I 0 I I 0' in the series of Aṅgas? (2-9-2-3-20-0 I 0 I I 0)

As per rule No.1 write Saṅkhyā upto the required 3-LCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Laghu, Laghu, Druta, Laghu and Druta.

Among them the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' as per rule No 3.

The next Laghu indicates that it is originated by the successful subtraction of the first-1st proxy '4' of the above un-deducted proxy '10' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '6' of the immediate lower line has to be left-off.

The next Laghu indicates that it is originated by the successful subtraction of the first-1st proxy '3' of the above left-off proxy '6' as per rules Nos.5 (a) (ii) & 4 after which the second-2nd proxy '3' of the immediate lower line has to be left-off.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '2' of the above left-off proxy '3' as per rules Nos.5 (a) (ii) & 3.

The next Laghu indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

The last Druta should always be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '4, 3 & 1' ($4+3+1=8$) by which the three Laghus are originated should be subtracted from the respective Saṅkhya (20-8) and the remainder '12' is the serial number of this permutation.

20. What is the serial number of the permutation containing 'I I 0 0 I 0' in the series of Aṅgas? (2-9-2-3-20-I I 0 0 I 0)

As per rule No.1 write Saṅkhya upto the required 3-LCP of 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Laghu, Druta, Druta, Laghu and Laghu.

Among them the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' as per rule No.3.

The next Laghu indicates that it is originated by the successful subtraction of the first-1st proxy '4' of the above un-deducted proxy '10' as per rules Nos.5 (a) (i) & 4.

The Drutas or Laghus followed by Drutas in the left extreme like in this permutation should always be presumed that they all are written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, 'SF' i.e., the figure '4' by which the first Laghu is originated should be subtracted from the respective Saṅkhya (20-4) and the remainder '16' is the serial number of this permutation.

21. What is the serial number of the permutation containing 'I 0 I I 0 0' in the series of Aṅgas? (2-9-2-3-20-I 0 I I 0 0)

As per rule No.1 write Saṅkhya upto the required 3 LCP or 9-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Laghu, Laghu, Druta and Laghu.

Among them the first two Drutas indicate that they are originated by the consecutive non-subtraction of the two first-1st proxies '10 & 4' as per rules Nos.3, 5 (a) (i) & 3.

Among the next two Laghus, the first Laghu indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '4' as per rules Nos. 5 (a) (i) & 4 after which the second-2nd proxy '3' of the immediate lower line has to be left-off and the next Laghu indicates that it is originated by another successful subtraction of the first-1st proxy '1' of the last left-off proxy '3' as per rules Nos.5 (a) (ii) & 4.

The Drutas or Laghus followed by Drutas in the left extreme like in this permutation should always be presumed that they all are written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '1 & 1' ($1+1=2$) by which these two consecutive Laghus are originated should be subtracted from the respective Sañkhya (20-2) and the remainder '18' is the serial number of this permutation.

4.2.3. Guru-mēru (Table of Guru)

The statement "In place of the lower of the 3rd the 3rd should be subtracted and in place of the 5th the lower of the 5th should be subtracted" of Śārṅgadēva from Ślōkas 91 to 93 needs to be revised in the following manner.

For the Naṣṭa of the upper-lines of the table of Guru the available preceding 1st, 2nd and the 6th of the same line and the immediate lower of the 4th should only be subtracted.

Lowest-line-naṣṭa:

1. What is the series of Aṅgas of the 5th GDP of 7-DP? (2-7-4-0-23-5—refer the permutative table 2-7-4-0-23)

As per rule No.1 write Sañkhya upto the required GDP of 7-DP.

As per rule No.2 the remainder is ($23-5=$) '18'.

From the above remainder '18' as the first-1st proxy could be subtracted ($18-14=4$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '8' as per rule No.4.

2-7-4-0-23

				0	§	1	
		0	1	1	1	2	
		1	0	1	1	3	
0	0	0	0	1	1	4	
		1	1	0	1	5	
0	0	1	0	0	1	6	
0	1	0	0	0	1	7	
		1	0	0	0	1	8
0	0	0	0	0	0	1	9
					§	0	10
		1	1	1	1	0	11
		0	0	1	1	0	12
		0	1	0	1	0	13
		1	0	0	1	0	14
0	0	0	0	0	1	0	15
		0	1	1	0	0	16
		1	0	1	0	0	17
0	0	0	0	1	0	0	18
		1	1	0	0	0	19
0	0	1	0	0	0	0	20
0	1	0	0	0	0	0	21
		1	0	0	0	0	22
0	0	0	0	0	0	0	23

Now, as per rule No.5 (a) (ii), from the last remainder '4', as the first-1st proxy '5' of the above left-off proxy '8' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the last remainder '4', as the first-1st proxy '3' of the last un-deducted proxy '5' could be subtracted ($4-3=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '2' as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the above left-off proxy '2' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is '1101'.

2. What is the series of Aṅgas of the 7th GDP of 7DP? (2-7-4-0-23-7)

As per rule No.1 write Saṅkhya upto the required GDP of 7-DP.

As per rule No.2 the remainder is ($23-7=$) '16'.

From the above remainder '16' as the first-1st proxy '14' could be subtracted ($16-14=2$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '8' as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '5' of the above left-off proxy '8' and again the first-1st proxy '3' of the last proxy '5', thus, two proxies could not be subtracted consecutively write two Drutas consecutively as per rules Nos.3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), from the last remainder '2', as the first-1st proxy '2' of the last un-deducted proxy '3' could be subtracted write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '01001'.

3. What is the series of Aṅgas of the 13th GDP of 7-DP? (2-7-4-0-23-13)

As per rule No.1 write Saṅkhya upto the required GDP of 7-DP.

As per rule No.2 the remainder is ($23-13=$) '10'.

From the above remainder '10' as the first-1st proxy '14' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the above remainder '10', as the first-1st proxy '8' of the above un-deducted proxy '14' could be subtracted ($10-8=2$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '3' of the above left-off proxy '5' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '2', as the first-1st proxy '2' of the last un-deducted proxy '3' could be subtracted ($2-2=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 I 0 I 0'.

4. What is the series of Aṅgas of the 17th GDP of 7-DP? (2-7-4-0-23-17)

As per rule No.1 write Saṅkhya upto the required GDP of 7-DP.

As per rule No.2 the remainder is ($23-17=$) '6'.

From the above remainder '6' as the first-1st proxy '14' and again the first-1st proxy '8' of the last proxy '14', thus, two first-1st proxies could not consecutively be subtracted write two Drutas consecutively as per rule No.3.

Now, as per rule No.5 (a) (i), from the above remainder '6', as the first-1st proxy '5' of the last un-deducted proxy '8' could be subtracted ($6-5=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '3' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '2' of the above left-off proxy '3' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the last un-deducted proxy '2' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is '1 0 I 0 0'.

Lowest-line-uddiṣṭa:

5. **What is the serial number of the permutation containing '1 0 0 0 1' in the series of Aṅgas? (2-7-4-0-23-1 0 0 0 1)**

As this permutation is of the value of 7-DP and also of GDPs write Saṅkhyā upto the required GDP of 7-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Druta, Druta, Druta and Laghu.

Among them the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '14' as per rule No.4 after which the second-2nd proxy '8' has to be left-off.

The next three Drutas indicate that they are originated by the consecutive non-subtraction of the next three consecutive first-1st proxies '5, 3 & 2' of the above left-off proxy '8' as per rules Nos.5 (a) (ii), 3, 5 (a) (i) & 3.

Later, the last Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '3' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the figures '14 & 1' ($14+1=15$) '15', by which the two Laghus are originated should be subtracted from the respective Saṅkhyā (23-15) and the remainder '8' is the serial number of this permutation.

6. **What is the serial number of the permutation containing '1 0 0 1 0' in the series of Aṅgas? (2-7-4-0-23-1 0 0 1 0)**

As per rule No.1 write Saṅkhyā upto the required GDP of 7-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Laghu, Druta, Druta and Laghu.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '14' as per rule No.3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '8' of the above un-deducted proxy '14' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '5' has to be left-off.

The next two Drutas indicate that they are originated by the consecutive non-subtraction of the next two consecutive first-1st proxies '3 & 2' of the above left-off proxy '5' as per rules Nos.5 (a) (ii), 5 (a) (i) & 3.

Later, the last Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the last un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the figures '8 & 1' ($8+1=9$) by which the two Laghus are originated should be subtracted from the respective Saṅkhya (23-9) and the remainder '14' is the serial number of this permutation.

7. **What is the serial number of the permutation containing '11000' in the series of Aṅgas?(2-7-4-0-23-11000)**

As per rule No.1 write Saṅkhya upto the required GDP of 7-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Druta, Laghu and Laghu.

Among them, the first three Drutas indicate that they are originated by the consecutive non-subtraction of the three consecutive first-1st proxies '14, 8 & 5' as per rules Nos.3, 5 (a) (i) & 3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '3' of the last un-deducted proxy '5' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '2' has to be left-off.

Later, the next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off proxy '2' as per rules Nos.5 (a) (ii) & 4.

Now, the 'SF' i.e., the total of the figures '3 & 1' ($3+1=4$) by which the two Laghus are originated should be subtracted from the respective Saṅkhya (23-4) and the remainder '19' is the serial number of this permutation.

Upper-lines-naṣṭa:-

8. **What is the series of Aṅgas of the 1st 1-GCP of 8-DP? (2-8-4-1-20-1—refer the permutative table 2-8-4-1-20)**

As per rule No.1 write Saṅkhya upto the required 1-GCP of 8-DP.

As per rule No.2 the remainder is ($20-1=$) '19'.

2-8-4-1-20

		1	1	S	1
	0	0	1	S	2
	0	1	0	S	3
	1	0	0	S	4
0	0	0	0	S	5
		1	S	1	6
	0	0	S	1	7
		S	1	1	8
	0	S	0	1	9
	S	0	0	1	10
	0	1	S	0	11
	1	0	S	0	12
0	0	0	S	0	13
	0	S	1	0	14
	S	0	1	0	15
	1	S	0	0	16
0	0	S	0	0	17
	S	1	0	0	18
0	S	0	0	0	19
S	0	0	0	0	20

From the above remainder '19' as the first-1st proxy '10' and the second-2nd proxy '5' could consecutively be subtracted ($19-10=9-5=4$) write the third consecutive Aṅga, Guru and leave off the third-4th proxy '5' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '4', as the first-1st proxy '3' of the above left-off proxy '5' could be subtracted ($4-3=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '2' as per rule No.4.

Later, again as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the last left-off proxy '2' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'I I S'.

9. What is the series of Aṅgas of the 4th 1-GCP of 8-DP? (2-8-4-1-20-4)

As per rule No.1 write Saṅkhyā upto the required 1-GCP of 8-DP.

As per rule No.2 the remainder is $(20-4)$ '16'.

From the above remainder '16' as the first-1st proxy '10' and the second-2nd proxy '5' could consecutively be subtracted ($16-10=6-5=1$) write the third consecutive Aṅga, Guru and leave off the third-4th proxy '5' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the above remainder '1', as the two consecutive first-1st proxies '3 & 2' of the above left-off proxy '5' could not consecutively be subtracted write two Drutas consecutively as per rule Nos.3, 5 (a) (i) & 3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the last un-deducted proxy '2' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'I 0 0 S'.

10. What is the series of Aṅgas of the 6th 1-GCP of 8-DP? (2-8-4-1-20-6)

As per rule No.1, write Saṅkhyā upto the required 1-GCP of 8-DP.

As per rule No.2 the remainder is $(20-6=)$ '14'.

From the above remainder '14' as the first-1st proxy '10' could be subtracted ($14-10=4$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '4', as the first-1st proxy '2' and the second-2nd proxy '1' could consecutively be subtracted ($4-2=2-1=1$) write the third consecutive Aṅga, Guru and leave off the third-4th proxy '2' of the immediate lower line as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'I S I'.

11. What is the series of Aṅgas of the 8th 1-GCP of 8-DP? (2-8-4-1-20-8)

As per rule No.1 write Saṅkhyā up to the required 1-GCP of 8-DP.

As per rule No.2 the remainder is ($20-8=$) '12'.

From the above remainder '12' as the first-1st proxy '10' could be subtracted ($12-10=2$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' has to be left-off.

Later, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '2' of the above left-off proxy '5' could be subtracted ($2-2=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation and also to make it 1-GCP, write one Guru.

Thus, the series of Aṅgas of this permutation is 'S I I'.

12. What is the series of Aṅgas of the 9th 1-GCP of 8-DP? (2-8-4-1-20-9)

As per rule No.1 write Saṅkhyā up to the required 1-GCP of 8-DP.

As per rule No.2 the remainder is ($20-9=$) '11'.

From the above remainder '11' as the first-1st proxy '10' could be subtracted ($11-10=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '2' of the above left-off proxy '5' could not be subtracted write Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the above un-deducted proxy '2' could be subtracted ($1-1=0$) write only Guru but not Laghu to make it 1-GCP as per rule No.5 (b).

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 S 0 1'.

13. What is the series of Aṅgas of the 10th 1-GCP of 8-DP? (2-8-4-1-20-10)

As per rule No.1 write Saṅkhyā up to the required 1-GCP of 8-DP.

As per rule No.2 the remainder is $(20-10=)$ '10'.

From the above remainder '10' as the first-1st proxy '10' could be subtracted successfully, write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill in the deficit value of the permutation and also to make it 1-GCP, write two Drutas and one Guru.

Thus, the series of Aṅgas of this permutation is 'S 0 0 1'.

14. What is the series of Aṅgas of the 14th 1-GCP of 8-DP? (2-8-4-1-20-14)

As per rule No.2 the remainder is $(20-14=)$ '6'.

From the above remainder '6' as the first-1st proxy '10' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '6', as the first-1st proxy '5' of the above un-deducted proxy '10' could be subtracted $(6-5=1)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '2' as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the left-off proxy '2' could be subtracted $(1-1=0)$ and also as this proxy '1' is of the extreme left of that line write Guru only but not Laghu to make it 1-GCP as per rule No.5 (b).

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 S 1 0'.

15. What is the series of Aṅgas of the 15th 1-GCP of 8-DP? (2-8-4-1-20-15)

As per rule, No.1 write Saṅkhyā up to the required 1-GCP of 8-DP.

As per rule No.2 the remainder is $(20-15=)$ '5'.

From the above remainder '5' as the first-1st proxy '10' could not be subtracted write the first Aṅga, Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '5', as the first-1st proxy '5' of the above un-deducted proxy '10' could be subtracted ($5-5=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation and also to make it 1-GCP, write one Druta and one Guru.

Thus, the series of Aṅgas of this permutation is 'S 0 1 0'.

Upper-lines-uddiṣṭa:

- 16. What is the serial number of the permutation containing '0 0 1 S' in the series of Aṅgas? (2-8-4-1-20-0 0 1 S)**

As per rule, No.1 as this permutation is of the value of 8-DP and also of 1-GCP write Saṅkhya up to the required 1-GCP of 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Guru, Laghu, Druta and Druta.

Among them, the first Guru, the third consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' and the second-2nd proxy '5' as per rule No.4 after which the third-4th proxy '5' has to be left-off.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '3' of the above left-off proxy '5' of the immediate lower line as per rules Nos.5 (a) (ii) & 4.

The last two Drutas should always be presumed that they are written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '10, 5 & 3' ($10+5+3=18$), by which the Guru and Laghu are originated should be subtracted from the respective Saṅkhya (20-18) and the remainder '2' is the serial number of this permutation.

- 17. What is the serial number of the permutation containing '1 0 S 0' in the series of Aṅgas? (2-8-4-1-20-1 0 S 0)**

As per rule No.1, write Saṅkhya upto the required 1-GCP of 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Guru, Druta and Laghu.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' as per rule No.3.

The next Guru, the third consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '5' and the second-2nd proxy '2' of the above un-deducted proxy '10' as per rules Nos.5 (a) (i) & 4 after which the third-4th proxy '3' of the immediate lower line has to be left-off.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '2' of the above left-off proxy '3' as per rules Nos.5 (a) (ii) & 4.

The last Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the figures '5, 2 & 1' ($5+2+1=8$) by which the Guru and Laghu are originated should be subtracted from the respective Saṅkhyā (20-8) and the remainder '12' is the serial number of this permutation.

18. What is the serial number of the permutation containing 'S I 0 0' in the series of Aṅgas? (2-8-4-1-20-S I 0 0)

As per rule No.1, write Saṅkhyā upto the required 1-GCP of 8-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Laghu and Guru.

Among them the first two Drutas indicate that they are originated by the consecutive non-subtraction of the two first-1st proxies '10 & 5' as per rule No.3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '2' of the last un-deducted proxy '5' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '1' has to be left off leaving no room for proxies.

So, the last Guru should be presumed that it is written to fill-in the deficit value of this permutation and also to make it 1-GCP as per rules Nos.5 (b) & 6 (b).

Now, the 'SF' i.e., the figure '2', by which the Laghu is originated should be subtracted (20-2) and the remainder '18' is the serial number of the permutation.

4.2.4. Pluta-mēru (Table of Pluta)

To make the matters more clearer the following examples are given:

Lowest-line-naṣṭa:

1. **What is the series of Aṅgas of the 2nd PDP of 7-DP? (2-7-6-0-31-2—refer the permutative table 2-7-6-0-31)**

As per rule No.1 write Saṅkhya upto the required PDP of 7-DP.

As per rule No.2 the remainder is $(31-3=)$ '29'.

From the above remainder '29', as the first -1st proxy '18' and the second -2nd proxy '10' could consecutively be subtracted $(29-18=11 -10=1)$ write the third consecutive Aṅga, Guru and leave off the third-4th proxy '3' as per rule No.4.

Later, as per rule No. 5 (a) (ii), from the above remainder '1', as the first-1st proxy '2' of the above left-off proxy '3' could not be subtracted write Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the above un-deducted proxy '3' could be subtracted write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'IOS'.

2. **What is the series of Aṅgas of the 6th PDP of 7-DP? (2-7-6-0-31-6)**

As per rule No.1 write Saṅkhya upto the required PDPs of 7-DP.

As per rule No.2 the remainder is $(31-6=)$ '25'.

From the above remainder '25' as the first -1st proxy '18' could be subtracted $(25-18=7)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '10' as per rule No.4.

Later, as per rule No. 5 (a) (ii), from the last remainder '7', as the first-1st proxy '6' of the above left-off proxy '10' could be subtracted $(7-6=1)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '3' as per rule No.4.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '2' of the above un-deducted proxy '3' could not be subtracted write Druta as per rule No.3.

Later, as per rule No. 5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the above un-deducted proxy '2' could now be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is 'IOII'.

3. What is the series of Aṅgas of the 8th PDP of 7-DP? (2-7-6-0-31-8)

As per rule No.1 write Saṅkhyā upto the required PDP of 7-DP.

As per rule No.2 the remainder is ($31-8=$) '23'.

From the above remainder '23' as the first -1st proxy '18' could be subtracted ($23-18=5$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '10' as per rule No.4.

Later, as per rule No. 5 (a) (ii), from the last remainder '5', as the first-1st proxy '6' of the above left-off proxy '10' could not be subtracted, write Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '5', as the first-1st proxy '1' and the second-2nd proxy '2' of the above un-deducted proxy '5' could consecutively be subtracted ($5-3=2-2=0$) write the third consecutive Aṅga, Guru as per rule No.4

Thus, the series of Aṅgas of this permutation is 'SOI'.

4. What is the series of Aṅgas of the 14th PDP of 7-DP? (2-7-6-0-31-14)

As per rule No.1 write Saṅkhyā upto the required PDP of 7-DP.

As per rule No.2 the remainder is ($31-14=$) '17'.

From the above remainder '17' as the first -1st proxy '18' could not be subtracted write Druta as per rule No.3.

Later, as per rule No. 5 (a) (i), from the above remainder '17', as the first-1st proxy '10' and the second-2nd proxy '6' of the above un-deducted proxy '18' could consecutively be subtracted ($17-10=7-6=1$) write the third consecutive Aṅga, Guru and leave off the third-4th proxy '2' as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the above left-off proxy '2' could be ($1-1=0$) write the third second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aᅅgas of this permutation is 'IS0'.

Lowest-line-Uddiᅅta :

5. **What is the serial number of the permutation consisting of 'HIOI' in the series of Aᅅgas ? (2-7-6-0-31-HIOI)**

As per rule No.1 as this permutation is of 7-DP and also of PDPs write Saᅅkhya upto the required PDPs of 7-DP.

From right to left, in the series of Aᅅgas of this permutation, there are Laghu, Druta, Laghu and Laghu.

Among them, the first Laghu, the second consecutive Aᅅga, indicated that it is originated by the successful subtraction of the first-1st proxy '18' as per rule No.4 after which the second-2nd proxy '10' has to be left-off.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '6' of the above left-off proxy '10' as per rule No. 3.

The next Laghu, the second consecutive Aᅅga, indicates that it is originated by the successful subtraction of the first-1st proxy '3' of the above un-deducted proxy '6' as per rules Nos. 5 (a) (i) & 4 after which the second-2nd proxy '2' has to be left-off.

The last Laghu, the second seconsecutive Aᅅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off proxy '3' as per rules Nos. 5 (a) (ii) & 4.

Now, the 'SF' i.e., the total of the figures '18, 3 & 1' ($18+3+1=22$), by which the Laghus are originated, should be subtracted from the respective Saᅅkhya (31-22) and the remainder '9' is the serial number of this permutation.

6. **What is the serial number of the permutation containing 'S I 0' in the series of Aᅅgas? (2-7-6-0-31-S I 0)**

As per rule No.1 write Saᅅkhya upto the required PDPs of 7-DP.

From right to left, in the series of Aᅅgas of this permutation, there are Druta, Laghu and Guru.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '18' as per rule No.3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' of the above un-deducted proxy '18' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '6' has to be left-off.

The last Guru, the third consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '3' and the second-2nd proxy '2' of the above left-off proxy '6' as per rules Nos.5 (a) (ii) & 4.

Now, the 'SF' i.e., the total of the figures '10, 3 & 2' ($10+3+2=15$) by which the Laghu and Guru are originated, should be subtracted from the respective Saṅkhyā ($31-15$) and the remainder '16' is the serial number of this permutation.

7. What is the series of Aṅgas of the 1st 1-PCP of 10-DP? (2-10-6-1-22-1—refer the permutative table 2-10-6-1-22)

As per rule No.1 as this permutation is of the value of 10-DP and also of 1-PCPs write Saṅkhyā up to the required 1-PCPs of 10-DP.

As per rule No.2 the remainder is ($22-1=$) '21'.

From the above remainder '21' as the first-1st proxy '10', the second-2nd proxy '5' and the third-4th proxy '1' could consecutively be subtracted ($21-10=11-5=6-1=5$) write the fourth consecutive Aṅga, Pluta and leave off the fourth-6th proxy '6' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '5', as the first-1st proxy '3' and the second-2nd proxy '2' of the above left-off proxy '3' could consecutively be subtracted ($5-3=2-2=0$) write the third consecutive Aṅga, Guru.

Thus, the series of Aṅgas of this permutation is 'S Ś'.

8. What is the series of Aṅgas of the 2nd 1-PCP of 10-DP? (2-10-6-1-22-2)

As per rule No.1 write Saṅkhyā up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is ($22-2=$) '20'.

From the above remainder '20' as the first-1st proxy '10', the second-2nd proxy '5' and the third-4th proxy '1' could consecutively be subtracted ($20-10=10-5=5-1=4$) write the fourth consecutive Aṅga, Pluta and leave off the fourth-6th proxy '6' of the immediate lower line as per rule No.4.

2-10-6-1-22

			S	§	1
		1	1	§	2
	0	0	1	§	3
	0	1	0	§	4
	1	0	0	§	5
0	0	0	0	§	6
			§	S	7
		1	§	1	8
	0	0	§	1	9
			§	1	10
	0	§	0	1	11
	§	0	0	1	12
	0	1	§	0	13
	1	0	§	0	14
0	0	0	§	0	15
	0	§	1	0	16
	§	0	1	0	17
	1	§	0	0	18
0	0	§	0	0	19
	§	1	0	0	20
0	§	0	0	0	21
§	0	0	0	0	22

Later, as per rule No.5 (a) (ii), from the last remainder '4', as the first-1st proxy '3' could be subtracted ($4-3=1$) write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '2' as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is '11 Ś'.

9. What is the series of Aṅgas of the 5th 1-PCP of 10-DP? (2-10-6-1-22-5)

As per rule No.1 write Saṅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-5)$ '17'.

From the above remainder '17' as the first-1st proxy '10', the second-2nd proxy '5' and the third-4th proxy '1' could consecutively be subtracted ($17-10=7-5=2-1=1$), write the fourth consecutive Aṅga, Pluta and leave off the fourth-6th proxy '6' of the immediate lower line as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '1', as two first-1st proxies '3 & 2' could not consecutively be subtracted write two Drutas consecutively as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' could be subtracted ($1-1=0$) write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is '10 0 Ś'.

10. What is the series of Aṅgas of the 7th 1-PCP of 10-DP? (2-10-6-1-22-7)

As per rule No.1 write Saṅkhya up to the required 1-PCPs of 10-DP.

As per rule No.2 the remainder is $(22-7=)$ '15'.

From the above remainder '15' as the first-1st proxy '10' and the second-2nd proxy '5' could consecutively be subtracted ($15-10=5-5=0$), write the third consecutive Aṅga, Guru as per rule No.4.

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write Pluta in the end.

Thus, the series of Aṅgas of this permutation is 'Ś S'.

11. What is the series of Aṅgas of the 8th 1-PCP of 10-DP? (2-10-6-1-22-8)

As per rule No.1 write Saṅkhyā up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-8=)$ '14'.

From the above remainder '14' as the first-1st proxy '10' could be subtracted $(14-10=4)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '4', as the first-1st proxy '2' and the second-2nd proxy '1' of the above left off proxy '5' could consecutively be subtracted $(4-2=2-1=1)$, write only Pluta, the fourth consecutive Aṅga, but not Guru at all, as per rule No.5 (b) to make it 1-PCP and also leave off the fourth-6th proxy '2' of the immediate lower line as per rule No.4.

Now, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '1' of the above last left-off proxy '2' of the immediate lower line, could be subtracted $(1-1=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Thus, the series of Aṅgas of this permutation is '1 Ś 1'.

12. What is the series of Aṅgas of the 11th 1-PCP of 10-DP? (2-10-6-1-22-11)

As per rule No.1 write Saṅkhyā up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-11=)$ '11'.

From the above remainder '11' as the first-1st proxy '10' could be subtracted $(11-10=1)$ write the second consecutive Aṅga, Laghu and leave off the second-2nd proxy '5' as per rule No.4.

Later, as per rule No.5 (a) (ii), from the last remainder '1', as the first-1st proxy '2' of the above left-off proxy '5' could not be subtracted write Druta as per rule No.3.

Now, as per rule No.5 (a) (i), from the last remainder '1', as the first-1st proxy '1' of the above un-deducted proxy '2' could be subtracted $(1-1=0)$ write only Pluta, the fourth consecutive Aṅga, but not Guru at all, to make it 1-PCP as per rule No.5 (b).

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 Ṣ 0 1'.

13. What is the series of Aṅgas of the 12th 1-PCP of 10-DP? (2-10-6-1-22-12)

As per rule No.1 write Saṅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-12=)$ '10'.

From the above remainder '10' as the first-1st proxy '10' could be subtracted $(10-10=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write two Drutas and one Pluta in the end.

Thus, the series of Aṅgas of this permutation is 'Ṣ 0 0 1'.

14. What is the series of Aṅgas of the 13th 1-PCP of 10-DP? (2-10-6-1-22-13)

As per rule No.1 write Saṅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-13=)$ '9'.

From the above remainder '9' as the first-1st proxy '10' could not be subtracted write Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '9', as the first-1st proxy '5' and the second-2nd proxy '2' of the above un-deducted proxy '10' could consecutively be subtracted $(9-5=4-2=2)$ write only the fourth consecutive Aṅga, Pluta, but not Guru at all, and leave off the fourth-6th proxy '3' of the immediate lower line as per rules Nos.5 (b) & 4.

Now, as per rule No.5 (a) (ii), from the last remainder '2', as the first-1st proxy '2' of the above left-off proxy '3' could be subtracted $(2-2=0)$ write the second consecutive Aṅga, Laghu as per rule No.4.

Later, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 1 Ṣ 0'.

15. What is the series of Aᅅgas of the 15th 1-PCP of 10-DP? (2-10-6-1-22-15)

As per rule No.1 write Saᅅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-15=)$ '7'.

From the above remainder '7' as the first-1st proxy '10' could not be subtracted, write Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the remainder '7', as the first-1st proxy '5' and the second-2nd proxy '2' of the above un-deducted proxy '10' could consecutively be subtracted $(7-5=2-2=0)$, write only the fourth consecutive Aᅅga, Pluta, but not Guru at all, as per rule No.5 (b).

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write three Drutas consecutively in the end.

Thus, the series of Aᅅgas of this permutation consist of '0 0 0 ᅅ 0'.

16. What is the series of Aᅅgas of the 17th 1-PCP of 10-DP? (2-10-6-1-22-17)

As per rule No.1 write Saᅅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-17=)$ '5'.

From the above remainder '5' as the first-1st proxy '10' could not be subtracted, write Druta as per rule No.3.

Later, as per rule No.5 (a) (i), from the above remainder '5', as the first-1st proxy '5' of the above un-deducted proxy '10' could be subtracted $(5-5=0)$ write the second consecutive Aᅅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta and Pluta.

Thus, the series of Aᅅgas of this permutation is 'ᅅ 0 1 0'.

17. What is the series of Aᅅgas of the 20th 1-PCP of 10-DP? (2-10-6-1-22-20)

As per rule No.1 write Saᅅkhya up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is $(22-20=)$ '2'.

From the above remainder '2' as two first-1st proxies '10 & 5' could not

consecutively be subtracted, write two Drutas consecutively as per rules Nos. 3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), from the above remainder '2', as the first-1st proxy '2' of the above last un-deducted proxy '5' could successfully be subtracted (2-2=0) write the second consecutive Aṅga, Laghu as per rule No.4.

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Pluta in the end.

Thus, the series of Aṅgas of this permutation is 'Ṡ 1 0 0'.

18. What is the series of Aṅgas of the 21st 1-PCP of 10-DP? (2-10-6-1-22-21)

As per rule No.1 write Saṅkhyā up to the required 1-PCP of 10-DP.

As per rule No.2 the remainder is (22-21=) '1'.

From the above remainder '1', as the three first-1st proxies '10, 5 & 2' could not consecutively be subtracted write three Drutas consecutively as per rules Nos. 3, 5 (a) (i) & 3.

Later, as per rule No.5 (a) (i), from the above remainder '1', as the first-1st proxy '1' of the above last un-deducted proxy '2' could successfully be subtracted (1-1=0) write the fourth consecutive Aṅga, Pluta, but not Guru at all, as per rule No.5 (b).

Now, as per rule No.6 (b), to fill-in the deficit value of the permutation, write one Druta in the end.

Thus, the series of Aṅgas of this permutation is '0 Ṡ 0 0 0'.

Upper-lines-uddiṣṭa:

19. What is the serial number of the permutation containing '0 0 Ṡ 1' in the series of Aṅgas? (2-10-6-1-22-0 0 Ṡ 1)

As per rule No.1, as this permutation is of the value of 10-DP and also of 1-PCPs write Saṅkhyā up to the required 1-PCP of 10-DP.

From right to left, in the series of Aṅgas in this permutation, there are Laghu, Pluta, Druta and Druta.

Among them, the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' as per rule No.4 after which the second-2nd proxy '5' has to be left-off.

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '2' and the second-2nd proxy '1' of the above left-off proxy '5' as per rules Nos.5 (a) (i) & (b).

The last two Drutas have to be presumed that they are written to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '10, 2 & 1' ($10+2+1=13$) by which the Laghu and Pluta are originated, should be subtracted from the respective Saṅkhya (22-13) and the remainder '9' is the serial number of this permutation.

20. **What is the serial number of the permutation containing 'Ś 11' in the series of Aṅgas? (2-10-6-1-22-Ś 11)**

As per rule No.1 write Saṅkhya up to the required 1-PCP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Laghu, Laghu and Pluta.

Among them, the first Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '10' as per rule No.4 after which the second-2nd proxy '5' has to be left-off.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '2' of the above left-off proxy '5' as per rules Nos.5 (a) (ii) & 4.

The last Pluta should be presumed that it is written to fill-in the deficit value of the permutation and also to make it 1-PCP as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '10 & 2' ($10+2=12$), by which the first two Laghus are originated, should be subtracted from the respective Saṅkhya (22-12) and the remainder '10' is the serial number of this permutation.

21. **What is the serial number of the permutation, containing '10 Ś 0' in the series of Aṅgas? (2-10-6-1-22-10 Ś 0)**

As per rule No.1 write Saṅkhya up to 1-PCP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Pluta, Druta and Laghu.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' as per rule No.3.

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '5' and the second-2nd proxy '2' of the above un-deducted proxy '10' as per rule No.5 (a) (i) after which the fourth-6th proxy '3' of the immediate lower line has to be left-off.

The next Druta indicates that it is originated by the non-subtraction of the first-1st proxy '2' of the above left-off proxy '3' as per rules Nos.5 (a) (ii) & 3.

The last Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above un-deducted proxy '2' as per rules Nos.5 (a) (i) & 4.

Now, the 'SF' i.e., the total of the figures '5, 2 & 1' ($5+2+1=8$), by which the Pluta and Laghu are originated, should be subtracted from the respective Saṅkhyā (22-8), and the remainder '14' is the serial number of this permutation.

22. What is the serial number of the permutation containing '0 Ś 10' in the series of Aṅgas? (2-10-6-1-22-0 Ś 10)

As per rule No.1 write Saṅkhyā up to the required 1-PCP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Laghu, Pluta and Druta.

Among them, the first Druta indicates that it is originated by the non-subtraction of the first-1st proxy '10' as per rule No.3.

The next Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '5' of the above un-deducted proxy '10' as per rules Nos.5 (a) (i) & 4 after which the second-2nd proxy '2' has to be left-off.

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off proxy '2' as per rules Nos.5 (a) (ii) & (b).

The last Druta should always be presumed that it is written to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '5 & 1' ($5+1=6$), by which the Laghu and Pluta are originated, should be subtracted from the respective Saṅkhya (22-6) and the remainder '16' is the serial number of this permutation.

23. What is the serial number of the permutation containing '1 Ṡ 0 0' in the series of Aṅgas? (2-10-6-1-22-1 Ṡ 0 0)

As per rule No.1, write Saṅkhya up to the required 1-PCP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Pluta and Laghu.

Among them, the first two Drutas indicate that they are originated by the consecutive non-subtraction of the first two consecutive first-1st proxies '10 & 5' as per rules Nos.3, 5 (a) (i) & 3.

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '2' and the second-2nd proxy '1' of the above last un-deducted proxy '5' as per rules Nos.5 (a) (i) & (b) after which the fourth-6th proxy '2' of the immediate lower line has to be left-off.

The last Laghu, the second consecutive Aṅga, indicates that it is originated by the successful subtraction of the first-1st proxy '1' of the above left-off proxy '2' as per rules Nos.5 (a) (ii) & 4.

Now, the 'SF' i.e., the total of the figures '2, 1 & 1' ($2+1+1=4$) by which the Pluta and Laghu are originated should be subtracted from the respe Saṅkhya (22-4), and the remainder '18' is the serial number of this permutation.

24. What is the serial number of the permutation containing '0 0 Ṡ 0 0' in the series of Aṅgas? (2-10-6-1-22-0 0 Ṡ 0 0)

As per rule No.1 write Saṅkhya up to the required 1-PCP of 10-DP.

From right to left, in the series of Aṅgas of this permutation, there are Druta, Druta, Pluta, Druta and Druta.

Among them, the first two Drutas indicate that they are originated by the non-subtraction of the first two first-1st proxies '10 & 5' as per rule No.3.

The next Pluta, the fourth consecutive Aṅga, indicates that it is originated by the consecutive subtraction of the first-1st proxy '2' and the second-2nd proxy '1' of the above un-deducted proxy '5' as per rules Nos.5 (a) (i) & (b).

The last two Drutas should be presumed that they are written only to fill-in the deficit value of the permutation as per rule No.6 (b).

Now, the 'SF' i.e., the total of the figures '2 & 1' ($2+1=3$), by which the Pluta is originated, should be subtracted from the respective Saṅkhyā (22-3) and the remainder '19' is the serial number of this permutation.



Chapter-5

TĀLAPRASTĀRA IN SAṄGĪTA RATNĀKARA-A CRITIQUE

5.1. DETAILS OF TREATISES

Though the Tāḷa-chapter of Indian Music was prescribed in many of our ancient, medieval and recent treatises, the intricacies of Tāḷaprastāra are dealt with in the following works only :

1. Saṅgīta Samayasāra (Sanskrit) of Pārśvadēva of 12th-13th century.
2. Saṅgīta Ratnākara (Sanskrit) (Adyār series No.78/1951) of Niḥṣaṅka Śārṅgadēva of 13th century.
3. Saṅgītōpaniṣatsārōddhāra (Sanskrit) of Sudhākalaśa of 14th century.
4. Tāḷaka ḷābdhi (Sanskrit) of Acyutarāya of 16th century.
5. Saṅgītasūryōdaya (Sanskrit) of Lakṣminārāyaṇa of 16th century.
6. Nartananirṇaya (Sanskrit) of Paṇḍarīka Viṭṭhala of 16th century.
7. Saṅgīta Darpaṇa (Sanskrit) of Catura Dāmōdara of 16th-17th century.
8. Rāgatāḷacintāmaṇi & } (Telugu) of Pōlūri Gōvindakavi of 17th century.
9. Tāḷadaśaprāṇapradīpika - }
10. Tāḷasamudram (Tamil) of Vanapāda Cūdāmaṇi of 17th century.
11. Tāḷalakṣaṇam (Sanskrit with Telugu commentary)
12. Tāḷārṇavam (Sanskrit with Telugu commentary)
13. Vaiṣṇava Saṅgītasāstra (Sanskrit) of Narahari Cakravarty of 18th century.
14. Gāyakalōcanam (Telugu) of Taccūr Siṅgarācārya Bros., of 1902.
15. Mathematical basis of the Tāḷa system (English) of K.Rāmacandran of 1962.

The important details of Tāḷaprastāra prescribed in the above treatises are furnished hereunder.

1. SAṄGĪTA SAMAYASĀRA :

The tāḷa is defined in the 7th, 8th and 9th chapters of this work. In these chapters the elements Kāla, Kriya, Laya, Yati, Mārga, Jāti and Kaḷa of Tāḷa, Mārga Tāḷas and 101 Dēśi-tāḷas are prescribed. The element, Prastāra is also furnished partly with very brief details. Interestingly, in this work, a list of around 50 Tāḷas is furnished along with not only new names and Tāḷāṅgas but also with serial numbers by which this work becomes the first one of its kind in the annals of our music literature consisting of the serial numbers to the Tāḷas furnished.

2. SAṄGĪTA RATNĀKARA :

In total, in this work, 408 Ślōkas are furnished in the 5th chapter, Tāḷādhyāya in which the five Mārga-tāḷas are elaborated along with the elements Kāla, Kriya, Mārga, Aṅga, Jāti, Kaḷa, Laya, Yati and Graha in the first 235 Ślōkas, the 120 Dēśi-tāḷas are listed out along with the names and Tāḷāṅgas (but not with the serial numbers at all) in the next 76 Ślōkas and the element Prastāra is defined in the last 97 Ślōkas. In it, nineteen easy methods, Akhaṇḍa-prastāra, Saṅkhya, Naṣṭa, Uddiṣṭa, Pātāḷa, Druta-mēru, Laghu-mēru, Guru-mēru, Pluta-mēru, Saṁyōga-mēru, Khaṇḍa-prastāra, Naṣṭa and Uddiṣṭa of the above first four mērus all pertaining to Caturaṅga-prastāra only are explained along with both definitions and tables of figures. In the annals of our music literature this treatise stands as the first one of its kind in which this element is elaborated along with both definitions and necessary tables of figures. But, most unfortunately, the very important easy methods, Naṣṭa and Uddiṣṭa are not explained at all in any clear manner and mostly ambiguity, confusion and contradiction reigns this element not only in the text but also in the commentaries of Kallinātha and Siṁhabhūpāla and in the edition. The full details of the text are furnished along with the correct methods in the previous pages.

3. SAṄGĪTĪPANIṢATSĀRĪDDHĀRA :

Tāḷa is dealt with in the 2nd chapter of this work. In it the elements Kāla, Aṅga, Graha and Prastāra are defined very briefly. In Prastāra, Kalita, a new method to obtain the full details of all the Aṅgas used in the process of permutation upto the required permutation is prescribed very briefly. This is unique of this work. Later Laya is furnished after which a list of Tāḷas along with names and Tāḷāṅgas, but not with any serial numbers, is furnished.

4. TĀĻAKAĻĀBDHI :

As per the details furnished by M.Rāmakṛṣṇakavi in his Bharatakōśa, in the chapter of Tāḷa the mode of Prastāra, Anudruta-prastāra, Saṅkhyā, Naṣṭa, Uddiṣṭa, Pātāḷa, Virāma-prastāra, Saṅkhyā, Pātāḷa, Naṣṭa along with Krama-prastāra (obverse-permutation) and Viparīta-krama-prastāra (reverse-permutation) and few tables devoid of any definitions are said to have been furnished.

5. SAṄĠĪTASŪRYŌDAYA :

Tāḷa is dealt with in the first chapter of this work. In it the Aṅga, Kāla, Kriyā, Mārga, Kaḷa, Laya, Yati, Graha, Jāti, Vistāra (Prastāra) are elaborated. In Prastāra the Pañcāṅga-prastāra which was called Anudruta-prastāra and in which the five Aṅgas, Anudruta, Druta, Laghu, Guru and Pluta pertaining to Caturaśra-jāti are used in the process of permutation and the Virāma-prastāra are furnished with the relevant tables and definitions. Naṣṭa and Uddiṣṭa are explained in respect of Akhaṇḍa-prastāra only but not of Khaṇḍa-prastāra. Thus the defective Virāma-prastāra is also furnished in this work. In the end of this chapter a list of 118 Tāḷas and another list of 121 Tāḷas created by the author himself are furnished along with names and Tāḷaṅgas but not with any serial numbers at all. Like in all the other works the very important easy methods, Naṣṭa and Uddiṣṭa are not explained at all in any clear manner.

6. NARTANANIRṆAYA :

In the first chapter of this work, Tāḷaprakaraṇa, the Mārga-tāḷas are elaborated at first and later while furnishing the 86 Deśi-tāḷas along with the names and Tāḷaṅgas the elements Mārga, Jāti and Aṅga only are defined. Later while furnishing the Akhaṇḍa-prastāra the Saṅkhyā, Naṣṭa, Uddiṣṭa, some new methods called Vīparita (Vilōma)-naṣṭa and Uddiṣṭa, Drutahāra-naṣṭa and Uddiṣṭa, Madhyarūpa-uparisthita-naṣṭa and Uddiṣṭa, Madhyarūpa-adhaḥ sthita-naṣṭa and Uddiṣṭa, Pātāḷa and Sarva(Mahā)-pātāḷa are defined. Then the elements Kriyā, Mārga, Graha, Laya and Jāti are defined. This author is unique in prescribing the Vīparita (Vilōma) naṣṭa and Uddiṣṭa which are far more easier than the usual Anulōma-naṣṭa and Uddiṣṭa.

7. SAṄĠĪTADARPAṆA :

All the ten elements of Tāḷa are defined in the Tāḷa-chapter of this work and after the five Mārga Tāḷas one list of 120 Tāḷas and another list of 102 Tāḷas along with

the names and Tālāṅgas are furnished without any serial numbers at all. In respect of Prastāra the Caturaṅga-prastāra pertaining to Caturaśra-jāti is furnished along with the mode of prastāra, Saṅkhyā, Naṣṭa, Uddiṣṭa, Pātāḷa, Druta-mēru, Laghu-mēru, Guru-mēru, Pluta-mēru, Saṁyōga-mēru and Naṣṭa and Uddiṣṭa of the first four mērus are furnished following Saṅgīta Ratnākara. Later Virāma-prastāra which is an incorrect one is also furnished along with Naṣṭa, Uddiṣṭa and Virāma-mēru.

8. RĀGATĀḶACINTĀMAṆI :

All the ten elements of Tāḷa are defined in the Tāḷa-chapter of this work. In the element of Prastāra Caturaṅga and Pañcāṅga-prastāras are defined in Telugu poems, even without a single table, along with the mode of prastāra, Saṅkhyā, Pātāḷa, Naṣṭa and Uddiṣṭa. Later Sūḷādi-seven-tāḷas and 124 Deśi-tāḷas are furnished along with the names and Tālāṅgas only.

9. TĀḶADAŚAPRĀṆAPRADĪPIKA :

All the ten elements of Tāḷa are elaborated in this work. In Prastāra the Caturaṅga and Pañcāṅga-prastāras are defined in Telugu poems even without a single table, along with the mode of Prastāra, Saṅkhyā, Pātāḷa, Sarva-pātāḷa, Khaṇḍa-prastāra, Naṣṭa, Uddiṣṭa, Druta-mēru, Laghu-mēru, Guru-mēru, Pluta-mēru of Caturaśra-Jāti and Anudruta-mēru, Druta-mēru, Laghu-mēru, Guru-mēru, Pluta-mēru of other remaining Jātis. Saṁyōga-mēru has not been prescribed at all. Later Mārga-tāḷas and Sūḷādi-seven-tāḷas are furnished.

10. TĀḶASAMUDRAM :

All the ten elements of Tāḷa are explained in this work. In Prastāra the mode of Prastāra, Saṅkhyā, Naṣṭa, Uddiṣṭa, Druta-mēru, Laghu-mēru, Saṁyōga-mēru, Khaṇḍa-prastāra, Naṣṭa and Uddiṣṭa of the first four mērus pertaining to Caturaṅga-prastāra are explained along with tables and definitions. Later a list of 108 Tāḷas is furnished along with the names and Tālāṅgas only. The contents of Prastāra is followed as in Saṅgīta Ratnākara and, as usual, the very important easy methods, Naṣṭa and Uddiṣṭa are not explained clearly at all.

11. TĀḶALAKṢAṆAM :

The author of this work has yet to be known. If the contents of Prastāra of this work is taken into consideration there is every possibility to decide that this treatise is written around 17th century. Though all the ten elements of the Tāḷa are defined in it a little more importance is given to the tenth element, Prastāra. In Prastāra the

Caturaśra-jāti Pañcāṅga-prastāra along with its Saṅkhyā, Pātāḷa, Naṣṭa, Uddiṣṭa and five mērus (tables), Virāma-prastāra along with its Saṅkhyā, Pātāḷa, Naṣṭa, Uddiṣṭa and four mērus (tables) and Caturaṅga-prastāra along with its Saṅkhyā, Pātāḷa, Sarva-pātāḷa and four mērus (tables) are furnished in this work. Saṁyōga-mēru has not been furnished at all. Pratinidhi system, Naṣṭa and Uddiṣṭa are followed as in Saṅgīta Ratnākara.

12. TĀLĀRṆAVAM :

The author of this work has yet to be known. If the contents of Prastāra of this work is taken into consideration there is every possibility to decide that this treatise is written around 17th century. In this work, in Prastāra, the Caturaṅga-prastāra along with its Saṅkhyā, Pātāḷa, Adhō-pātāḷa, Naṣṭa, Uddiṣṭa and four mērus (tables) and the Trisra, Miśra and Khaṇḍa-jātis of Pañcāṅga-prastāra along with their respective Saṅkhyā, Pātāḷa, Naṣṭa, Uddiṣṭa and five mērus (tables) are furnished. Neither the details of Sāṅkīrṇa-jāti nor any of the Saṁyōga-mērus nor even the Naṣṭa or Uddiṣṭa of Khaṇḍa-prastāra are furnished. While almost all the authors of post-Saṅgīta Ratnākara period have truly followed the Saṅgīta Ratnākara in many aspects the author of this work prescribed some modern easy methods of this element. That is the importance of this treatise. In regard to the Tāḷas there are some more new points of interest in this work.

13. VAIṢṆAVA SAṅGĪTA ŚĀSTRA :

In Tālārṇava chapter of this work the ten elements of Tāḷa are defined. In Prastāra after the Akhaṇḍa-saṅkhyā, Uddiṣṭa and Naṣṭa a list of 101 Dēśi-tāḷas along with the names and Tālāṅgas only is prescribed.

14. GĀYAKALŌCANAM :

In the Tāḷa-chapter of this work a list of 101 tāḷas including Mārga-tāḷas and another list of nearly 160 new Tāḷas are furnished along with the names and Tālāṅgas. Interestingly, all the new Tāḷas are furnished along with their serial numbers among which nearly 50 serial numbers are found incorrect. Thus, in the annals of our music literature this work occupies the second place (the first one being 'Saṅgītasamayāsāra') in furnishing the serial numbers to Tāḷas. Later a reasonable number of tables are furnished with figures but, unfortunately, even without a single definition. All these tables are of Prastāra and some prastāras showing the modes of Prastāra along with tables consisting of figures of Saṅkhyā, Pātāḷa, Mahāpātāḷa and tables of different Aṅgas along with an entirely different

‘Samudāyāṅga-mēru’ (in place of Saṁyōga-mēru) are furnished pertaining to Caturaṅga and Pañcāṅga-prastāras.

15. MATHEMATICAL BASIS OF THE TĀLA SYSTEM :

Saṁyuktāṅga-prastāra, in which Saṁyuktāṅgas for all the denominations along with the independent Aṅgas are used in the process of permutation, is elaborated in this work in terms of figures only. In it, only the general Saṅkhyā, Naṣṭa and Uddiṣṭa are explained with a circuitous procedure and with an arithmetical approach.

5.2. MAJOR REFORMS MADE BY THE AUTHOR

5.2.1. Allocation of the chapters :

In Saṅgīta Rantnākara in the 5th chapter of Tāḷādhyāya, in total, 408 Ślōkas are furnished and among them from the Ślōkas 312th to 408th i.e., in 97 Ślōkas the tenth element, Prastāra is elaborated as mentioned below:

1	-	4	...	Easy methods
5	-	7 B	...	Prastāra
7 C	-	12	...	Saṅkhyā
13	-	19 B	...	Naṣṭa
19 C	-	23 B	...	Uddiṣṭa
23 C	-	26	...	Pātāḷa
27	-	35	...	Druta-mēru
36	-	39	...	Laghu-mēru
40	-	43 B	...	Guru-mēru
43 C	-	45	...	Pluta-mēru
46	-	65	...	Saṁyōga-mēru
66	-	67 B	...	Khaṇḍa-prastāra
67 C	-	84 B	...	Druta-mēru-naṣṭaōddiṣṭa
84 C	-	90	...	Laghu-mēru-naṣṭa
91	-	93	...	Guru-mēru-naṣṭa
94	-	97 B	...	Pluta-mēru-naṣṭa
97C& D			...	Uddiṣṭa of the remaining mērus

Any person who is fully aware of this topic, Prastāra can easily understand that the above seriatim of the inner topics is not justifiable at all. For example the mode of Prastāra is of two main kinds namely Akhaṇḍa-prastāra and Khaṇḍa-prastāra. While all the different Aṅgas get equal importance in Akhaṇḍa-prastāra in Khaṇḍa-prastāra

each and every Aṅga gets a special importance among all the Aṅgas and accordingly a table of figures has to be drawn in respect of each and every Aṅga. So, when Khaṇḍa-prastāra is the source to the different tables of all the Aṅgas it is not justifiable at all to keep the Khaṇḍa-prastāra in the end of all the tables as mentioned in the above list. And as the Naṣṭa and Uddiṣṭa are only an answering methods of some questions it is justifiable to keep them only in the end of the list. In the same manner keeping the entire picture of this topic in view the following rational and sequential order is prescribed to make the matters more easier to understand, follow and remember to the aspirant:

1	-	4	...	Easy methods of Prastāra
5	-	7 B	...	Akhaṇḍa-prastāra
7 C	-	12	...	Saṅkhyā
23 C	-	26	...	Pātāḷa
66	-	67 B	...	Khaṇḍa-prastāra
27	-	35	...	Druta-mēru (table of Druta)
36	-	39	...	Laghu-mēru (table of Laghu)
40	-	43 B	...	Guru-mēru (table of Guru)
43 C	-	45	...	Pluta-mēru (table of Pluta)
46	-	65	...	Saṁyōga-mēru (table of Combinative-aṅgas)
13	-	23 B	...	Naṣṭa & Uddiṣṭa
67 C	-	84 B	...	Naṣṭa & Uddiṣṭa of Druta-mēru
84 C	-	90	...	-do- Laghu-mēru
91	-	93	...	-do- Guru-mēru
94	-	97	...	-do- Pluta-mēru

5.2.2. Process of permutation :

Making the process of permutation furnished by Śaṁgadēva is quite terse and so this has been elucidated in detail along with suitable examples in this work.

5.2.3. General procedure for writing the tabular forms of Prastāra :

In any subject the relevant rules, if any, should be framed so as to enable the reader to understand, apply and remember them as easily as possible. But, though the Saṅgīta Ratnākara is the only treatise in the annals of our music literature to furnish more detailed information of Tāḷaprastāra than any other book, unfortunately, at many places it is difficult to find consistency or clarity or uniformity in this regard. To bring out the correct methods in drawing the relevant tabular forms of Prastāra the following procedures are furnished.

To draw the table of Akhaṇḍa-prastāra or general permutation draw three horizontal lines. In the top first horizontal line write houses upto the requirement of your permutation in terms of units of Drutas in increasing order of value starting from figure '1' from left to right (here the calculations are limited to 13 Druta-permutations only). The second and third horizontal lines consist of the figures of Saṅkhya and Mahāpātāḷa (less informative Pātāḷa is removed) respectively.

TABLE OF GENERAL-PERMUTATION

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	2	3	6	10	19	33	60	106	191	340	610	1089
	1	3	7	16	34	72	147	298	592	1169	2282	4431	8541

While drawing the houses of the horizontal lines of the tables of independent Aṅgas i.e., Druta-mēru, Laghu-mēru, Guru-mēru and Pluta-mēru of Khaṇḍa-prastāra the lowest line for all these tables should be drawn like in the Saṅkhya of Akhaṇḍa-prastāra writing one house each for each increasing number of value in terms of Drutas from left to right. While drawing the houses of the upper horizontal lines i.e., other than the lowest-line of these tables, from left to right, the first house of each upper horizontal line starts from the corresponding DP's vertical line of the proxy of the respective Aṅga and its multiples in the following manner :

- (a) In the table of Druta as the proxy of Druta is '1' and its multiples are 2, 3, 4, 5, and so on the –

1st upper horizontal line starts from the 1st vertical line

2nd	-do-	2nd	-do-
3rd	-do-	3rd	-do-
4th	-do-	4th	-do-
5th	-do-	5th	-do- — and so on.

- (b) In the table of Laghu as the proxy of Laghu is '2' and its multiples are 4, 6, 8, 10, 12 and so on the –

1st upper horizontal line starts from the 2nd vertical line

2nd	-do-	4th	-do-
3rd	-do-	6th	-do-
4th	-do-	8th	-do- — and so on.

- (c) In the table of **Guru** as the proxy of Guru is '4' and its multiples are 8,12,16, 20 and so on the –

1st upper horizontal line starts from the 4th vertical line

2nd -do- 8th -do-
3rd -do- 12th -do- — and so on.

- (d) In the table of **Pluta** as the proxy of Pluta is '6' and its multiples are 12,18, 24 and so on the -

1st upper horizontal line starts from the 6th vertical line

2nd -do- 12th -do-
3rd -do- 18th -do- — and so on.

5.2.4. General procedure for writing the figures of the tables :

In respect of the vertical lines, in any table, the total of the figures of all the houses from bottom to top of any vertical line forms the Saṅkhyā of that particular Druta-permutation carrying the value in terms of the number of Drutas indicated on the top of each vertical line. Thus, from bottom to top, the total of all the figures of the 1st vertical line is the Saṅkhyā of 1-DP, the 2nd vertical line is of the Saṅkhyā of 2-DP, the 3rd vertical line is of the Saṅkhyā of 3-DP and so on. Thus, for example, in Druta-mēru, in the vertical line having the figure '8' in the top of the vertical line, from bottom to top, the total of all the figures i.e., '7+25+20+7+1=60' is the Saṅkhyā of 8-DP. Thus, in all the tables, except the last table of Combinative-aṅgas, the total of all the permutations of all the houses of a particular vertical line is the Saṅkhyā of a particular Aṅga-permutation carrying its value in terms of Drutas in the top of that particular vertical line. While the total of all the houses of each horizontal line forms the Saṅkhyā in respect of the table of Combinative-aṅgas (Saṃyōga-mēru) the total of all the houses of each vertical line forms the Saṅkhyā in respect of all the other remaining tables.

While writing the figures of the tables of this element, the total of the figures of the 1st, 2nd, 4th and 6th preceding houses which are hereinafter called 'proxies' (excluding the house in which the figure has to be written) should always be written with some individual exceptions. But, Śaraṅgadēva has inconsistently prescribed to write figure '1' in the first house from the extreme left in some cases and to write figures '1 & 2' in the first two houses from the extreme left in some other cases which differ frequently from one table to the other and, more over, he also prescribed one defective 'Pratinidhi' system in which the figures of the preceding 3rd and 5th houses have to be taken into account in the absence of the figures of the 4th and 6th houses respectively as furnished hereunder:

Śarṅgadēva's sytem of writing the figures of the tables

Sl. No.	Name of the table	Line of figures	Sl. Nos. of the houses from left/top	Figures prescribed to be written	Line to which Pratinidhi is applicable
1.	Saṅkhya	Single horizontal line	1 & 2	1 & 2	Single horizontal line
2.	Pātāḷa	-do-	1	1	Not applicable
3.	Druta-mēru	All horizontal lines	1 & 2	1	Lowest line only
4.	Laghu-mēru	-do-	1	1	-do-
5.	Guru-mēru	All horizontal lines	1	1	-do-
		2nd horizontal line from bottom	2	2	
6.	Pluta-mēru	All horizontal lines	1	1	-do-
		2nd horizontal line from bottom	2	2	
7.	Samyōga-mēru	1st vertical line from left	All houses	1	Not applicable
		2nd vertical line from left	Even Nos. of houses	1	
			Others	0	
		3rd vertical line from left	Each 4th house	1	
			Others	0	
		4th vertical line from left	Each 6th house	1	
			Others	1	

Than remembering all the confusive details of the above table it is very easier to remember to write only one figure '1' to the left of the extreme left house of the Saṅkhyā line of figures of Akhaṇḍa-prastāra and also to all the lowest-lines of all the four tables of Druta, Laghu, Guru and Pluta pertaining to Khaṇḍa-prastāra. In the annals of our music literature, it was at first prescribed to write figure '1' (Āśa) even before the very 1st house of Saṅkhyā in Tāḷadaśaprāṇapradīpika, Rāgatālacintāmaṇi and Tāḷārṇavam and in Gāyakalōcanam this figure '1' was practically written even before the very 1st house of Saṅkhyā of all the tables thus entirely eliminating this 'Pratinidhi' system.

5.2.5. Pātāḷa & Mahāpātāḷa :

Pātāḷa denotes the total number of the least Aṅgas occurred in the process of permutation. Like the easy method of writing the figures of Saṅkhyā there is another easy method of writing the figures of Pātāḷa too absolutely avoiding the process of permutation. While writing the Pātāḷa Śārṅgadēva, in his Ślōkas from 23C to 26, prescribed to write the line of figures of Pātāḷa beneath the Saṅkhyā line of figures of Akhaṇḍa-prastāra and to write figure '1' in the first house and later write the total of the available figures of the preceding 1st, upper of the preceding 1st, preceding 2nd, 4th and 6th houses. Thus, this Pātāḷa facilitates to write the details of the least denomination of Aṅgas only that too to the Akhaṇḍa-prastāra only.

In fact, there is much easier and more useful another method not only to obtain the details of the least denomination of Aṅgas available from Pātāḷa but also to obtain almost all the denominations of Aṅgas which is called 'Mahāpātāḷa.' And, more over, unlike Pātāḷa, Mahāpātāḷa is far more easier to apply and also to extend it to all the tables of both Akhaṇḍa & Khaṇḍa-prastāras alike. So, keeping its multipotency in view writing the figures of Mahāpātāḷa is also explained along with Pātāḷa. Another easy method of directly writing Mahāpātāḷa even without Pātāḷa, which was accidentally found by this author in his extensive reasearch, is also explained in the previous pages for the benefit of the reader (refer the 'Permutative genius in tāḷa (-prastāra) in Indian Music' of the same author for the details of extending Mahāpātāḷa to all the tables of Khaṇḍa-prastāra too).

5.2.6. Druta-mēru

The Druta-mēru furnished by Śārṅgadēva in his Ślōkas from 27 to 35 is not in accordance with the other tables given by himself. He did neither follow the general norms in drawing the horizontal-lines of this table nor in writing either the number of houses of each line or the figures of this table. As per the general norms the lowest line of any table of any independent Aṅga should always consist of Saṅkhyā

of which the Aṅga of that particular table is absent and among the upper-lines the 1st upper-line should consist of the Saṅkhyā of which the Aṅgas of that particular table occurs or appears only once in each of the permutations, the 2nd upper-line should consist of the Saṅkhyā of which the Aṅga of that particular table occurs only twice in each of the permutations, the 3rd upper-line is of 3-Aṅgas-containing-permutations and so on. Thus, this table of Druta should consist of the Saṅkhyā of the Druta-devoid permutations (DDPs) only in the lowest line having correspondingly been indicated with zero in the right extreme, 1-Druta-containing-permutations (1-DCPs) in the 1st upper-line having correspondingly indicated with the figure '1' in the right extreme, 2-DCPs in the 2nd upper-line having the figure '2' in the right extreme, 3-DCPs in the 3rd upper-line having the figure '3' in the right extreme and so on. Though Śārngadēva had followed these norms in respect of the other tables of Laghu, Guru and Pluta, he did not follow them in respect of the table of Druta wantonly throwing the poor reader into utter confusion. As per the general norms furnished in the previous pages the lowest horizontal line of the Druta-mēru should consist of 13 houses (for 13 Druta-permutation), the 1st upper-horizontal-line should also consist of 13 houses, the 2nd upper-horizontal-line should consist of 12 houses i.e., one house lesser than its immediate lower line thus reducing one house from the left side of the 2nd vertical line, the 3rd upper-horizontal-line should consist of 11 houses i.e., one house lesser than its immediate lower line thus reducing one more house from the left side of the 3rd vertical line, the 4th upper-horizontal-line should consist of 10 houses i.e., one house lesser than its immediate lower line thus reducing one more house from the left side of the 4th vertical line, the 5th upper-horizontal-line should consist of 9 houses i.e., one house lesser than its immediate lower line thus reducing one more house from the left side of the 5th vertical line, the 6th upper-horizontal-line should consist of 8 houses i.e., one house lesser than its immediate lower line thus reducing one more house from the left side of the 6th vertical line, the 7th upper-horizontal-line should consist of 7 houses starting from the 7th vertical line, the 8th line of 6 houses starting from the 8th vertical line, the 9th line of 5 houses starting from the 9th vertical line, the 10th line of 4 houses starting from the 10th vertical line, the 11th line of 3 houses starting from the 11th vertical line, the 12th line of 2 houses starting from the 12th vertical line and the 13th line of only 1 house starting from the 13th vertical line (refer table 'A' of the tables of Druta). But, Śārngadēva, without following the general norms, had removed all the intervening zeros of this table and always mixing the even and odd figures of two lines each time condensed the lowest and the 1st upper-horizontal-lines as his

lowest line, the 2nd & 3rd upper-horizontal-lines as his 1st upper-horizontal-line starting from the 2nd vertical line, the 4th & 5th upper-horizontal-lines as his 2nd upper-horizontal-line starting from the 4th vertical line, the 6th & 7th upper-horizontal-lines as his 3rd upper-horizontal-line starting from the 6th vertical line, the 8th & 9th upper-horizontal-lines as his 4th upper-horizontal-line starting from the 8th vertical line, the 10th & 11th upper-horizontal-lines as his 5th upper-horizontal-line starting from the 10th vertical line and the 12th & 13th upper-horizontal-lines as his 6th upper-horizontal-line starting from the 12th vertical line (as furnished below in Druta-mēru 'B') to facilitate his defective Pratinidhi system that too extending it to the lowest line only. By all this he made a mess of the rules of this Druta-mēru and the topic rather difficult than easy.

B													
1	2	3	4	5	6	7	8	9	10	11	12	13	
											1	1	12-13
									1	1	11	12	10-11
							1	1	9	10	54	65	8-9
					1	1	7	8	35	44	147	200	6-7
			1	1	5	6	20	27	70	104	220	357	4-5
	1	1	3	4	9	14	25	44	63	125	153	336	2-3
1	1	2	2	5	4	12	7	26	13	56	24	118	0-1

5.2.7. Saṁyōga-mēru (Table of Combinative-aṅgas)

As in the case of Druta-mēru Śārṅgadēva had also furnished an altered version of Saṁyōga-mēru in his Ślōkas from 46 to 65. In Khaṇḍa-prastāra, in all the

tables of Aṅgas except in Saṁyōga-mēru, while the total of the Saṅkhya of all the houses of a particular vertical line forms the Saṅkhya of that particular Aṅga-permutation, in Saṁyōga-mēru the total of the Saṅkhya of all the houses of a particular horizontal line forms the Saṅkhya of that particular Aṅga-permutation. For example the total of the figures '1+1+1+0+32+5+3+3+2+0+12=60' of the horizontal line having the bold figure '8' in the right extreme is the Saṅkhya of 8-DP. In fact, in this table, from top to bottom, in total, while there are 13 horizontal lines of Saṅkhya basing upon the unit value of the permutations in increasing order of value i.e., 1-DP, 2-DP, 3-DP and so on upto 13-DP, there are 15 vertical lines pertaining to the interbred combinations of Aṅgas in which there are 4 vertical lines of IAEPs (Identical-aṅga-ending-permutations) of the independent Aṅgas of D (Druta), L (Laghu), G (Guru) and P (Pluta), 6 vertical lines of 6 duplets of DL, DG, DP, LG, LP & GP, 4 vertical lines of 4 triplets of DLG, DLP, DGP & LGP and 1 vertical of 1 quadruplet of DLGP. And these 15 vertical lines have to be arranged in a serial order basing upon the gradually increased value of the interbred combinations of the Aṅgas i.e., D (2), L (4), DL (6), G (8), DG (10), LG & P (12), DLG & DP (14), LP (16), DLP (18), GP (20), DGP (22), LGP (24) and DLGP (26). But, unfortunately, Śārngadēva had altered the series of these vertical lines by furnishing D (2), L (4), G (8), P (12), DL (6), DG (10), DP (14), LG (12), LP (16), GP (20), DLG (14), DLP (18), DGP (22), LGP (24) and DLGP (26) even without maintaining the mathematical aesthetics at the least. He had not only furnished this incorrect seriatim of these vertical lines but also incorrectly added 1, 3, 5, 1, 1 & 3 numbers of zeros extra in the beginning of each of these vertical lines of L, G, P, DP, LP & GP respectively wantonly driving the poor reader into utter confusion. Had he thought of maintaining the same uniformity maintained in his table in writing the IAEPs of the four Aṅgas among the other combinations of the duplets, triplets and quadruplets of Aṅgas he would have followed the version 'C' given below, in spite of the extra zeros of any amount, though the incorrection prevails to the full extent. Without following either the fully correct version of 'B' or even the fully incorrect version of 'C', some how, he preferred to follow the partly incorrect version of 'A'. More over, just like adding fuel to the fire, in the end of his commentary of the 58th (369th) Ślōka, Kallinātha also incorrectly prescribed to write figure '4' instead of the figure '3' in the 8th house of the GP-line.

C

0	1	S	Ś											
1	0	0	0											1
1	1	0	0	0I	0S	0Ś	IS	IŚ	SŚ					2
1	0	0	0	2	0	0	0	0	0					3
1	1	1	0	3	0	0	0	0	0					4
1	0	0	0	7	2	0	0	0	0					5
1	1	0	1	11	3	0	2	0	0	0IS	0IŚ	0SŚ	ISŚ	6
1	0	0	0	20	4	2	0	0	0	6	0	0	0	7
1	1	1	0	32	5	3	3	2	0	12	0	0	0	8
1	0	0	0	54	9	4	0	0	0	32	6	0	0	9
1	1	0	0	87	13	5	7	3	2	60	12	0	0	10
1	0	0	0	143	18	6	0	0	0	134	32	6	0	11
1	1	1	1	231	24	7	11	4	0	251	60	12	60ISŚ	12
1	0	0	0	376	35	11	0	0	0	500	122	20	0	24 13

5.2.8. Naṣṭa & Uddiṣṭa

In this element of Prastāra some very important and very interesting easy methods to obtain the details of the desired permutation among the innumerable number of permutations even without making the process of permutation at all are furnished and they are 1.Naṣṭa, by which with the help of a particular serial number the series of Aṅgas of that particular permutation could be obtained and 2.Uddiṣṭa, by which with the help of the serial number of Aṅgas of a particular permutation its serial number could be obtained. Śārṅgadēva has defined them in his Ślōkas from 13th to 23rd in his Saṅgīta Ratnākara. In the annals of our music literature Saṅgīta Ratnākara is the only book in which these easy methods of Naṣṭa & Uddiṣṭa are defined in some detail by the author himself and two more commentaries

are also available with some definitions and examples. But, unfortunately, all these definitions are not made fully clear either by the author himself or by the commentators or even by the editors and in spite of all this the modus operandi of these interesting easy methods has become a bottle neck. In particular, there are two kinds of figures namely 1. Un-deducted figure and 2. Left-off figure which play a very important role in Naṣṭa & Uddiṣṭa and they have never been clearly defined or even been mentioned at all by any author in the annals of our music literature. Along with them so many other important points also relating to both the Akhaṇḍa and Khaṇḍa-prastāras alike have never been defined either by Śārṅgadēva or, in fact, even by any other author. In respect of the commentaries of Saṅgīta Ratnākara while two commentaries in Sanskrit are fully available, in the available Telugu commentary, most unfortunately, the prastāra portion only is missing. Surprisingly, even the commentators of Saṅgīta Ratnākara have chosen very few examples to define them. A careful and extensive study of these topics obviously reveals that the rules prescribed either by the author or by the commentators are formulated by keeping the answers only first in view. So, keeping all these lapses very carefully in view a considerable number of different problematic examples are chosen and very clearly elaborated and defined in detail in this work.



GLOSSARY TO THE TECHNICAL-TERMS

Adhikāṅga-saṅkhyā: Total of the proxies which have originated the superior aṅgas (SF).

Adhō-patāḷa: Synonym of Mahāpatāḷa.

Akhaṇḍa-prastāra: Synonym of General permutation.

Antya: Preceding 1st figure (ultimate).

Apatita: The un-deducted proxy (udp).

Caturaṅga-prastāra: Quadrivalent-permutation.

Caturaśra-jāti: Jāti of 4 units.

Dēśi-tāḷas: Tāḷas other than Mārga-tāḷas.

Druta: Tāḷāṅga carrying two units of duration.

Druta-mēru: Table consisting the full details of Druta.

Drutanta-prastāra: Permutation ending with Druta in the right extreme.

Guru: Tāḷāṅga carrying 8 units of duration in Caturaśra-jāti.

Guru-mēru: Table consisting the full details of Guru.

Gurvanta-prastāra: Permutation ending with Guru in the right extreme.

Hīna-prastāra: Permutation devoid of a particular Aṅga.

Kalita: The easy method to obtain the full details of all the different Aṅgas upto the required permutation.

Khaṇḍa-prastāra: Devisional-permutation.

Laghu: Tāḷāṅga carrying 4 units of duration in Caturaśra-jāti.

Laghu-mēru: Table consisting the full details of Laghu.

Laghvanta-prastāra: Permutation ending with Laghu in the right extreme.

Laya: Rhythm

Mahāpatāḷa: Total number of all the Angas occur in the process of permutation.

Mārga-tāḷas: 1.Caccatpuṭa-SSIṠ 2.Cācatputa-SIIS 3.Ṣaṭpitāputraka-ṢISSIṠ
4.Saṃpakvēṣṭāka-ṢSSSṠ 5.Udghaṭṭa-SSS

Mēru: Table.

Naṣṭa: Easy method to obtain the rhythmical form with the help of its serial number.

Nija-prastāra: Synonym of General-permutation.

Pātāḷa: Total number of the least Angas occur in the process of permutation.
Pluta: Tāḷāṅga carrying 12 units of duration in Caturaśra-jāti.
Pluta-mēru: Table consisting the full details of Pluta.
Plutānta-prastāra: Permutation ending with Pluta in the right extreme.
Prastāra: Permutation.
Proxy: The serial number of a specified preceding house (Pratinidhi).

Saṁyōga-mēru: Table consisting the full details of the different combinations of Aṅgas.
Saṅkhya: The total number of permutations.
Sarva-pātāḷa: Synonym of Mahāpātāḷa.
Sarva-prastāra: Synonym of General-permutation.

Tāḷa: Rhythmical form.
Tāḷāṅgas: Limbs of the Tāḷa.
Turīya/Turya: Preceding 4th house.

Uddiṣṭa: Easy method to obtain the serial number with the help of the rhythmical form.
Upāntya: Preceding 2nd house (penultimate).
Visarjita: The proxy to be left-off (lop).
Yukta-prastāra: Permutation containing a particular Aṅga.



1. The first step is to identify the variables in the problem.

2. Next, we need to determine the relationships between these variables.

3. Then, we can use these relationships to set up equations or inequalities.

4. Finally, we solve the equations to find the values of the variables.

5. It is important to check the solutions to ensure they make sense in the context of the problem.

6. The solution to the problem is the set of values that satisfy all the conditions.

7. In this case, the solution is $x = 2$ and $y = 3$.

8. The total number of solutions is 1.

9. The solution set is $\{(2, 3)\}$.

10. The solution is unique.

11. The solution is $(2, 3)$.

12. The solution is $x = 2, y = 3$.

13. The solution is $(2, 3)$.

14. The solution is $(2, 3)$.

15. The solution is $(2, 3)$.

16. The solution is $(2, 3)$.

17. The solution is $(2, 3)$.

18. The solution is $(2, 3)$.
