

Review



Critical Analysis of Bhutasamkhya Evidences in the Indian Alchemical Text: Rasatarangini

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ABSTRACT:

Introduction: The *Bhutasamkhya* system is a way to compose numbers in *Sanskrit* that makes use of colloquial nouns that have numerical value connotations. *Bhuta* and *Samkhya* are the two words that compose *Bhutasamkhya*. The word "*bhuta*" comes from the Sanskrit word "*dhatu bhu sattayam*," which means "any kind of object or material substance." *Sankhya* means number. These are found present in many *Rasashastra* Tests, starting from *Rasashrudaya Tantra* to *Rasatarangini*. The wide use of these terms is found in *Rasatarangini* by *Aacharya Sadanand Sharma*. **Material & Methods:** *Rasatarangini* is thoroughly scrutinized, which is a textbook of *Rasashastra*, the alchemical science of India, written by *Sadanand Sharma* in the 20th century AD (3rd March 1924). The analysis of terms is conducted using commentaries on the Vedas, Puranas, and interpretive books, as well as research articles available on the internet. **Result:** Altogether one hundred and eighteen references of *Bhutasamkhya* have been collected from 24 *Tarangas* (chapters) of *Rasatarangini*. Terms like *Rasa*, *Pada*, *Turiya*, *Rudra*, and *Kala* are frequently used instead of numbers. **Conclusion:** The Paper elaborates the meaning of each term used in detail and the important contribution of *Rasatarangini* in the use of *Bhutasamkhya*. At around 108 places, *Bhutasamkhya* terminologies are used in the comprehensive 24 *Tarangas* of *Rasatarangini*. Using these terminologies helps us understand the importance of confidentiality in the procedure elaboration, dimension quantification, and in standard operating procedure (SOP) elaboration, and in varied ways for the rational class.

KEYWORDS: *Bhutasamkhya*, *Rasatarangini*, *Rasashastra*, *Taranga*, *Rasa*, *Pada*, *Kala*

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1. INTRODUCTION

Bhutasamkhya system is a method of recording numbers in Sanskrit using common nouns having connotations of numerical values. The method was introduced already in astronomical texts in antiquity, but it was expanded and developed during the medieval period. [1, 2, 3] A kind of rebus system, *Bhutasamkhya* has also been called the "concrete number notation." [4] Objectification of numerals: India has a rich tradition of art and science. Various branches of science have been fully developed in India since ancient times. The ancient system of medicine, Ayurveda, developed from the Vedas and has a catalog of reference texts written in the Sanskrit language. Various other branches of science, besides medicine, viz mathematics, and astronomy developed during the 4th – 12th century and have their respective literature mostly written in Sanskrit. The incursion of Greeks during the pre-Christian era brought Indians under the influence of Greek culture. Along with Greek culture, various new science concepts were introduced into already replete Indian literature. Astronomy was one such branch which developed much later. The earliest reference employing object numbers is a ca. 269 CE Sanskrit text, Yavanajataka (literally "Greek horoscopy") of Sphujidhvaja, a versification of an earlier (ca. 150 CE) Indian prose adaptation of a lost work of Hellenistic astrology. [5]

Bhuta Samkhya is composed of two words, *Bhuta* and *Samkhya*. *Bhuta* is redacted from the Sanskrit Dhatu *Bhu sattayam* – crudely translates to any type of object or mortified subject.

Classical Ayurvedic texts have not used *Bhutasamkhya*. However, branches of Ayurveda have shown an inclination towards its use.

From the time of its inception, *Rasashastra* had been an occult science. Most of the subject matter has been written obscured and perplexing. The initial reason for using concrete number notation must be to keep secrecy from malice. Secondly, method of preparation of medicines of heavy metals and formulations of rare origin can be kept safe by using *Bhutasamkhya*, ensuring their use by intellectually pious individuals for the betterment of humanity and health.

Rasatarangini is a textbook of Rasashastra, which was written by Sadanand Sharma in the 20th century AD (3rd March 1924). [6] It's a classical text followed by many Rasashatris and Vaidyas for the standard manufacturing process. This text has rampant use of *Bhutasamkhya*. Altogether one hundred and eighteen references to *Bhutasankya* have been identified and classified systematically. The meaning of each term with an ascending sequence of usage has been reported.

2. MATERIAL & METHODS:

Rasatarangini [7] has been thoroughly screened for various quotations of *Bhutasamkhya*. Online literature, viz. Wikipedia and other astrology and numerology-related sites have been referred to.

3. OBSERVATIONS:

Table 1: A comprehensive list of all the references for Bhutasamkhya from Rasatarangini: From 1st to 24th chapters has been compiled herewith; it has one hundred and eighteen references in total.

Sr.No.	Bhutasamkhyas	Interpretation	Reference
1	Vasvansha (वस्ववंश)	1/8 th part	RT 2/51, pg. 21
2	Vasusankhya (वसुसंख्या)	8 parts	RT 2/62, pg. 25
3	(Pada) पाद	1/4 th part	RT 2/70, pg. 26
4	Turiya (तुरीय)	1/4 th part	RT 2/71, pg. 26
5	Tapanagula (तपनांगुल)	12 Angul	RT 4/56, pg. 60
6	Rudrangula (रूद्रांगुल)	11 Angul	RT 4/56, pg. 60
7	Indrangula (इन्द्रांगुल)	14 Angul	RT 4/56, pg. 60
8	Turagangula (तुरगांगुल)	7 Angul	RT 4/57, pg. 61
9	Kalatulyangula (कलातुल्यंगुल)	16 Angul	RT 4/57, pg. 61
10	Tapanagula (तपनांगुल)	12 Angul	RT 4/57, pg. 61
11	Suryasamangula (सूर्यसमांगुल)	12 Angul	RT 4/57, pg. 61
12	Ashwasankhya (अश्वसंख्या)	7	RT 5/32, pg. 80
13	Kalamsha (कलांश)	1/16 th part	RT 5/51, pg. 84
14	Vasuvidha (वसुविध)	8 types	RT 5/101, pg. 96
15	Rasaguna (रसगुण)	6 times	RT 5/101, pg. 96
16-31	Padamsha (पादांश)	1/4 th part	RT 6/14, pg. 106, RT 10/26, pg. 226 RT 11/56, pg. 253 RT 18/29, Pg. 461 RT 19/46, Pg. 466 RT 21/46, pg. 528 RT 21/70, pg. 533 RT 22/79, pg. 586 RT 23/ 59, pg. 611

			RT 23/ 75, pg. 615 RT 23/95, pg. 618 RT 23/176, pg. 638 RT 24/203, pg. 684 RT 24/262, pg. 697 RT 24/367, pg. 715 RT 24/536, pg. 747
32	Anghrimita (आङ्घ्रिमित)	1/4 th part	RT 6/18, pg. 106
33	Rasabhagika (रसभागिक)	6 parts	RT 6/59, pg. 114
34	Sharabhagika (शरभागिक)	5 parts	RT 6/62, pg. 115
35	Yugasankhya (युगसंख्या)	4 parts	RT 6/69, pg. 115
36	Gunaparvatbhaga (गुणपर्वतभाग)	73 parts	RT 6/87, pg. 120
37	Vasupavaka (वसुपावक)	38 parts	RT 6/87, pg. 120
38	Vasvapdhitolaka (वस्वप्धितोलक)	48 Tola	RT 6/129, pg. 129
39	Yugatolaka (युगतोलक)	4 Tola	RT 6/130, pg. 129
40	Vasutolaka (वसुतोलक)	8 Tola	RT 6/130, pg. 129
41	Vasutolaka (वसुतोलक)	8 Tola	RT 6/168, pg. 136
42	Angasankhyaka (अङ्गसङ्ख्यक)	6 parts	RT 6/189, pg. 140
43	Turyansha (तुर्यांश)	¼ th part	RT 6/204, pg. 143
44	Rasahayanadeshiya (रसहायनदेशीय)	6 years	RT 6/236, pg. 148
45	Bhanutolaka	12 tola	RT 8/59, pg. 186

	(भानुतोलक)		
46	Kalamsha (कलांश)	1/16 th Part	RT 8/99, pg. 193
47	Vasubhaga (वसुभाग)	8 Part	RT 9/5,pg. 200
48	Bhanutolaka (भानुतोलक)	12 tola	RT 9/25, pg. 203
49	Suryatolaka (सुर्यतोलक)	12 tola	RT 9/27, pg.204
50	Vasvansha (वस्ववंश)	1/8 th part	RT 10/46, pg. 230
51	Tapanamsha (तपनांश)	1/12 th part	RT 10/70, pg. 233
52	Padamsha (पादांश)	1/4 th part	RT 10/91, pg. 237,
53	Turyamsha (तुर्यांश)	1/4 th part	RT 10/92, pg. 238
54	Vasvamsha (वस्ववंश)	1/8 th part	RT 10/96, pg. 238
55	Taptamsha (तप्तवंश)	1/24 th Part	RT 11/117, pg. 263
56	Kalamsha (कलांश)	1/16 th Part	RT 11/117, pg. 263
57	Tithimashaka (तिथिमाषक)	15 parts	RT 11/147, pg. 269
58	Kalamashaka (कलामाषक)	16 parts	RT 11/167, pg. 272
59	Sharabindu (शरबिंदु)	5 drops	RT 11/56, pg. 294
60	Kalabindu (कलाबिंदु)	16 drops	RT 11/56, pg. 294
61	Raviraktika (रविरक्तिक)	12 Ratti	RT 11/50, pg. 314
62	Bhanutolaka (भानुतोलक)	12 Tola	RT 11/96, pg. 321
63	Grahatolaka (ग्रहतोलाक)	9 Tola	RT 11/114, pg. 324
64	Rudrabhaga (रुद्रभाग)	1/11 th Part	RT 14/168, pg.357
65	Analanayana (अनलनयन)	23 Parts	RT 14/171.5,pg.357
65	Praptasankhya	10 Parts	RT 14/171.5,pg.357

	(प्राप्तसंख्या)		
66	Kalabindu (कलाबिंदु)	16 Drops	RT 14/175,pg.358
67	Pavakabhaga (पावकभाग)	3 Parts	RT 14/35, pg. 369
68	Turyansha (तुर्यांश)	1/4 th Part	RT 14/35.5, pg.369
69	Bhaskarasankhya (भास्करसंख्या)	12 Part	RT 14/42.5, pg. 370
70	Martandavara (मार्तण्डवार)	12 Days	RT 14/47, pg. 371
71	Khasharamsha (खशरांश)	1/50 th Part	RT 15/41, pg.370
72	Turiyamsha (तुरीयांश)	1/4 th Part	RT 16/54, pg. 396
73	Vasvansha (वस्ववंश)	1/8 th Part	RT 17/17, pg. 412
74	Kalamshika (कलांशिक)	1/16 th Part	RT 18/16, pg. 439
75	Suryamitam (सूर्यमितम)	1/12 th Part	RT 18/76.5, pg. 451
76	Rasamitam (रसमितं)	1/6 th Part	RT 18/76.5, pg. 451
77	Nagonmitam (नागोन्मितं)	1/8 th Part	RT 18/76.5, pg. 451
78	Sharabhagikam (शरभागिकम)	5 Parts	RT 19/72. Pg. 470
79	Rasaseraka (रससेरक)	6 Parts	RT 19/76, pg. 471
80	Shubhrashubhagika m (शुभ्रांशुभागिकम)	1 Part	RT 19/79, pg. 471
81	Vasvashwabhagikam (वस्वश्वभागिकम)	78 Parts	RT 19/80, pg. 471
82	Charanamshikam (चरणांशिक)	1/4 th Part	RT 19/110, pg. 477
83	Yugaraktika (युगरक्तिक)	4 Ratti	RT 19/167, pg. 487

84	Ekasetaka(एकसेटक)	5 Pal	RT 20/14, pg. 494
85	Sekatatraya (सेटकत्रय)	13 Pal	RT 20/14, pg. 494
86	Kalabhagikam (कलाभागिकं)	16 Parts	RT 20/16, pg. 494
87	Naganetrakshapana thbhagam (नागनेत्राक्षपानाथभागं)	128 Parts	RT 20/16, pg. 494
88	Vedabhagikam (वेदभागमितं)	1/4 th Part	RT 20/16, pg. 495
89	Yugasamitani (युगसंमितानि)	4	RT 22/70, pg. 584
90	Vasuyugamitam (वसुगुंजमितं)	8 Gunja	RT 22/87, pg. 591
91	Netragunabhaga (नेत्रगुणभाग)	32 Parts	RT 22/28, pg. 605
92	Kalamsha (कलांश)	1/16 th Part	RT 23/28, pg. 605
93	Vasubhagam (वसुभाग)	8 Parts	RT 23/ 82, pg. 616
94	Devabhaga (देवभाग)	4 Parts	RT 23/ 82, pg. 616
95	Akshibhaga (अक्षिभाग)	2 Parts	RT 23/ 82, pg. 616
96	Chandrabhaga (चंद्रभाग)	1 Part	RT 23/ 82, pg. 616
97	Indubhaga (इंदुभाग)	1Part	RT 23/ 82, pg. 616
98	Vasvamsha (वस्ववंश)	1/8 th part	RT 23/119, pg. 624
99	Padamsha (पादांश)	1/4 th Ratti	RT 23/127, pg. 625
100	Vasumitam (वसुमितं)	8 Parts	RT 23/163, pg. 635
101	Tatvamsha (तत्त्वांश)	1/24 th Part	RT 23/170, pg. 637
102	Rudramsha (रुद्रांश)	1/11 th Part	RT 23/170, pg. 637
103	Kalamsha (कलांश)	1/16 th Part	RT 24/66, pg. 660

104	Vasvamsha (वस्ववंश)	1/8 th part	RT 24/66, pg. 660
105	Yugatolakamitam (युगतोलाकमितं)	4 Tola	RT 24/78, pg.662
106	Rasatolaka(रसतोलक)	6 Tola	RT 24/216, pg. 686
107	Rasamashaka (रसमाषक)	6 Masha	RT 24/271, pg. 698
108	Rasamashaka (रसमाषक)	6 Masha	RT 24/275, pg. 699
109	Rasamashaka (रसमाषक)	6 Masha	RT 24/281, pg. 699
110	Sharabindu (शरबिन्दु)	5 Drops	RT 24/293, pg.701
111	Tithibindu (तिथिबिंदु)	15 Drops	RT 24/293, pg. 701
112	Grahagolaka (ग्रहतोलक)	9 Tola	RT 24/301, pg. 702
113	Grahamashaka (ग्रहमाषक)	9 Masha	RT 24/301, pg. 702
114	Vasvamsha (वस्ववंश)	1/8 th part	RT 24/313, pg. 704
115	Yugatolakamitam (युगतोलाकमितं)	4 Tola	RT 24/330, pg. 708
116	Bhanutolaka (भानुतोलक)	12 Tola	RT 24/431, pg. 726
117	Rasatolaka (रसतोलक)	6 Tola	RT 24/467, pg. 733
118	Rasatolaka (रसतोलक)	6 Tola	RT 24/467, pg. 733

Table 2: List of references of terms used for 1/4th proportions: Collection of terms used for 1/4th part, viz, *Pad, Turya, Charanansha, Vedbhag*.

Sr.No.	Bhutasamkhya	Interpretation	Reference
1	Pada (पाद)	1/4 th part	RT 2/70, pg. 26

2	Turiya (तुरीय)	1/4 th part	RT 2/71, pg. 26
3	Padamsha (पादांश)	1/4 th part	RT 6/14, pg. 106
4	Anghrimita (आङ्घ्रिमित)	1/4 th part	RT 6/18, pg. 106
5	Turiyamsha (तुर्यांश)	¼ th part	RT 6/204, pg. 143
6	Padamsha (पादांश)	1/4 th part	RT 10/26, pg. 226
7	Padamsha (पादांश)	1/4 th part	RT 10/91, pg. 237
8	Turyamsha (तुर्यांश)	1/4 th part	RT 10/92, pg. 238
9	Padamsha (पादांश)	1/4 th part	RT 11/56, pg.253
10	Turyamsha (तुर्यांश)	1/4 th Part	RT 14/35.5, pg.369
11	Turiyansha (तुरीयांश)	1/4 th Part	RT 16/54, pg. 396
12	Padamsha (पादांश)	1/4 th Part	RT 18/29. Pg. 461
13	Padamsha (पादांश)	1/4 th Part	RT 19/46. Pg. 466
14	Charanamshika (चरणांशिक)	1/4 th Part	RT 19/110, pg. 477
15	Vedabhogmitam	1/4 th Part	RT 20/16, pg. 495

	(वेदभागमितं)		
16	Padamsha (पादांश)	1/4 th Part	RT 21/46, pg. 528
17	Padamsha (पादांश)	1/4 th Part	RT 21/70, pg.533
18	Padamsha (पादांश)	1/4 th Part	RT 22/79, pg. 586
19	Padamsha (पादांश)	1/4 th Ratti	RT 23/ 59, pg. 611
20	Padamsha (पादांश)	1/4 th Ratti	RT 23/ 75, pg. 615
21	Padamsha (पादांश)	1/4 th Ratti	RT 23/95, pg. 618
22	Padamsha (पादांश)	1/4 th Ratti	RT 23/127, pg. 625
23	Padamsha (पादांश)	1/4 th Part	RT 23/176, pg. 638
24	Padamsha (पादांश)	1/4 th Part	RT 24/203, pg. 684
25	Padamsha (पादांश)	1/4 th Ratti	RT 24/262, pg. 697
26	Padamsha (पादांश)	1/4 th Part	RT 24/367, pg. 715
27	Padamsha (पादांश)	1/4 th Part	RT 24/536, pg. 747

Table 3: List of references of terms used for 1/6th, 1/8th, 1/11th proportions: The term “Ras” has been used for 1/6 parts, the Terms “Vasu” & “Nag” have been used for 1/8th parts.

Sr.No.	Bhutasamkhyas	Interpretation	Reference
1	Rasamitam (रसमितं)	1/6 th Part	RT 18/76.5, pg. 451
2	Vasvamsha (वस्ववंश)	1/8 th part	RT 2/51, pg. 21
3	Vasvamsha (वस्ववंश)	1/8 th part	RT 10/46, pg. 230
4	Vasvamsha (वस्ववंश)	1/8 th part	RT 10/96, pg. 238
5	Vasvamsha (वस्ववंश)	1/8 th Part	RT 17/17, pg. 412
6	Nagonmitam (नागोन्मितं)	1/8 th Part	RT 18/76.5, pg. 451
7	Vasvamsha (वस्ववंश)	1/8 th part	RT 23/119, pg. 624
8	Vasvamsha (वस्ववंश)	1/8 th part	RT 24/66, pg. 660
9	Vasvamsha (वस्ववंश)	1/8 th part	RT 24/313, pg. 704

10	Rudrabhaga (रुद्रभाग)	1/11 th Part	RT 14/168, pg.357
11	Rudramsha (रुद्रांश)	1/11 th Part	RT 23/170, pg. 637
12	Tapanamsha (तपनांश)	1/12 th part	RT 10/70, pg. 233
13	Suryamitam (सूर्यमितम्)	1/12 th Part	RT 18/76.5, pg. 451

Table 4: List of references of terms used for 1/16th proportions to 6 Parts: Kalamsha is 1/16th part, Taptamsha is 1/24th part, 1/50th proportions, 1 Part, 2 Parts, 3 Parts, 4 Parts, 5 Parts & 6 Parts.

Sr. No.	Bhutasamkhyas	Interpretation	Reference
1	Kalamsha (कलांश)	1/16 th part	RT 5/51, pg. 84
2	Kalamsha (कलांश)	1/16 th Part	RT 11/117, pg. 263
3	Kalamsha (कलांश)	1/16 th Part	RT 8/99, pg. 193
4	Kalamshikam (कलांशिकम्)	1/16 th Part	RT 18/16, pg. 439
5	Kalamsha (कलांश)	1/16 th Part	RT 23/28, pg. 605
6	Kalamsha (कलांश)	1/16 th Part	RT 24/66, pg. 660
7	Tatvamsha (तत्वांश)	1/24 th Part	RT 23/170, pg. 637
8	Khasharamsha (खशरांश)	1/50 th Part	RT 15/41, pg.370
9	Shubhrashubhabhagikam (शुभ्रांशुभागिकम्)	1 Part	RT 19/79, pg. 471
10	Chandrabhaga (चंद्रभाग)	1 Part	RT 23/ 82, pg. 616
11	Indubhaga (इंदुभाग)	1Part	RT 23/ 82, pg. 616
12	Akshibhaga (अक्षिभाग)	2 Parts	RT 23/ 82, pg. 616
13	Pavakabhaga (पावकभाग)	3 Parts	RT 14/35, pg. 369
14	Yugasamkhyas (युगसंख्या)	4 Parts	RT 6/69, pg. 115
15	Yugatolaka (युगतोलक)	4 Tola	RT 19/167, pg. 487
16	Yuharaktika (युगरक्तिक)	4 Ratti	RT 22/70, pg. 584
17	Yugasamitani (युगसंमितानि)	4 Parts	RT 22/70, pg. 584
18	Fevabhaga (देवभाग)	4 Parts	RT 23/ 82, pg. 616
19	Yugatolakamitam (युगतोलाकमितम्)	4 Tola	RT 24/330, pg. 708
20	Sharabindu (शरबिन्दु)	5 drops	RT 11/56, pg. 294
21	Sharabhagikam (शरभागिकम्)	5 Parts	RT 19/72. Pg. 470
22	Ekasetaka (एकसेटक)	5 Pal	RT 20/14, pg. 494
23	Sharabindu (शरबिन्दु)	5 Drops	RT 24/293, pg.701

24	Sharabhagikam (शरभागिक)	5 parts	RT 6/62, pg. 115
25	Rasaguna (रसगुण)	6 times	RT 5/101, pg. 96
26	Rasabhagika (रसभागिक)	6 parts	RT 6/59, pg. 114
27	Angasankhaka (अङ्गसङ्ख्यक)	6 parts	RT 6/189, pg. 140
28	Rasahayanadeshiya (रसहायनदेशीय)	6 years	RT 6/236, pg. 148
29	Rasaserka (रससेरक)	6 Parts	RT 19/76, pg. 471
30	Rasatolaka (रसतोलक)	6 Tola	RT 24/216, pg. 686
31	Rasamashaka (रसमाषक)	6 Masha	RT 24/271, pg. 698
32	Rasamashaka (रसमाषक)	6 Masha	RT 24/275, pg. 699
33	Rasamashaka(रसमाषक)	6 Masha	RT 24/281, pg. 699
34	Rasamashaka (रसतोलक)	6 Tola	RT 24/467, pg. 733
35	Rasatolaka (रसतोलक)	6 Tola	RT 24/467, pg. 733

Table 5: List of references of terms used for 7, 8, 9, 11, 12, 14, 15 & 16 parts: Synonym of Horse used for 7 parts, *Vasu* for 8, *Graha* for 9, *Rudra* for 11, and Sun for 12, *Indra* for 14, *Tithi* for 15 and *Kala* for 16

Sr.No.	Bhutasamkhyas	Interpretation		Reference
1	Turagangula (तुरगाङ्गुल)	7 Angul		RT 4/57, pg. 61
2	Ashwasankhya (अश्वसंख्या)	7		RT 5/32, pg. 80
3	Vasusankhya (वसुसंख्या)	8 parts		RT 2/62, pg. 25
4	Vasuvidha (वसुविध)	8 types		RT 5/101, pg. 96
5	Vasutolaka (वसुतोलक)	8 Tola		RT 6/130, pg. 129
6	Vasutolam (वसुतोलक)	8 Tola		RT 6/168, pg. 136
7	Vasubhaga (वसुभाग)	8 Part		RT 9/5,pg. 200
8	Vasugunjamitam (वसुगुंजमितं)	8 Gunja		RT 22/87, pg. 591
9	Vasubhaga (वसुभाग)	8 Parts		RT 23/ 82, pg. 616
10	Vasumitam (वसुमितं)	8 Parts		RT 23/163, pg. 635
11	Grahatolaka (ग्रहतोलाक)	9 Tola		RT 14/114, pg. 324
12	Grahatolaka (ग्रहतोलक)	9 Tola		RT 24/301, pg. 702
13	Grahamashaka (ग्रहमाषक)	9 Masha		RT 24/301, pg. 702
14	Rudrangula (रूद्राङ्गुल)	11 Angul	---	RT 4/56, pg. 60
15	Tapanagula (तपनाङ्गुल)	12 Angul	22.86 cm	RT 4/56, pg. 60

16	Tapanagula (तपनांगुल)	12 Angul	22.86 cm	RT 4/57, pg. 61
17	Suryasmangula (सूर्यसमांगुल)	12 Angul	22.86 cm	RT 4/57, pg. 61
18	Bhanutolaka (भानुतोलक)	12 tola	144 gm	RT 8/59, pg. 186
19	Bhanutolaka (भानुतोलक)	12 tola	144 gm	RT 9/25, pg. 203
20	Suryatolaka (सूर्यतोलक)	12 tola	144 gm	RT 9/27, pg.204
21	Raviraktika (रविरक्तिक)	12 Ratti	3 gm	RT 11/50, pg. 314
22	Bhanutolaka (भानुतोलक)	12 Tola	144 gm	RT 11/96, pg. 321
23	Bhaskarasankhya (भास्करसंख्या)	12 Part	---	RT 14/42.5, pg. 370
24	Martandavar (मार्तण्डवार)	12 Days	---	RT 14/47, pg. 371
25	Bhanutolaka (भानुतोलक)	12 Tola	144 gm	RT 24/431, pg. 726
26	Indrangula (इन्द्रांगुल)	14 Angul		RT 4/56, pg. 60
27	Tithimashaka (तिथिमाषक)	15 parts		RT 11/147, pg. 269
28	Tithibindu (तिथिबिंदु)	15 Drops	5.625gm/0.9ml	RT 24/293, pg. 701
29	Setaktraya (सेटकत्रय)	15 Pal		RT 20/14, pg. 494
30	Kalatulyangula (कलातुल्यंगुल)	16 Angul		RT 4/57, pg. 61
31	Kalamashak (कलामाषक)	16 parts		RT 11/167, pg. 272
32	Kalabindu(कलाबिंदु)	16 drops	1 ml	RT 11/56, pg. 294
33	Kalabindu (कलाबिंदु)	16 Drops		RT 14/175,pg.358
34	Kalabhagikam (कलाभागिकं)	16 Parts		RT 20/16, pg. 494

Table 6: List of references of rare terms used: Different terms used to represent rare proportions once in Rasatarangini

Sr.No.	Bhutasamkhyas	Interpretation	Reference
1	Vartampraptasamkhyas (वर्त्मप्राप्तसंख्या)	10 Parts	RT 14/171.5,pg.357
2	Analnayana (अनलनयन)	23 Parts	RT 14/171.5,pg.357
3	Netragunbhagam (नेत्रगुणभाग)	32 Parts	RT 22/28, pg. 605
4	Vapupavaka (वसुपावक)	38 parts	RT 6/87, pg. 120
5	Vasvabdhitolaka (वस्वब्धितोलक)	48 Tola	RT 6/129, pg. 129
6	Gunaparvatbhaga (गुणपर्वतभाग)	73 parts	RT 6/87, pg. 120
7	Vasvashwabdhagikam (वस्वश्वभागिकम)	78 Parts	RT 19/80, pg. 471
8	Naganetrakshapanathbhagam (नागनेत्राक्षपानाथभाग)	128 Parts	RT 20/16, pg. 494

4. DISCUSSION:

Altogether one hundred and eighteen references have been collected from 24 *Tarangas* (chapters) of *Rasatarangini*, implying rampant use of *Bhutasamkhyas* by Sadanand Sharma in and around the 20th Century. It helps in proving the importance of denoting the specific proportion numerically to maintain the secrecy and integrity of the formulation.

Bhutasankhya is unique as it is used to shadow the meaning of measuring terms. Its usage limits the utilization of specific measures. It keeps a check on the understanding of the quantity of drugs and then utilizes it in the manufacturing process. It is widely used in *Rasatarangini*, the alchemical text, and one of the important curriculum books of *Rasashastra*, as it has been a real handbook for manufacturers of numerous scholars in the last decade. Understanding *Bhutasankhya* through *Rasatarangini* in detail helps in the easy measurement of ingredients of formulations in development in comparison to their usage in other Ayurvedic texts.

Mana Paribhasha is defined as a science of metrics, defined and used for the manufacturing and administration of medicines. *Bhutasankhya* and *Mana Paribhasha* go hand in hand at many places in *Rasatarangini*. *Acharya Sharangdhara* and *Charaka* write *Magadha Mana* as superior to both. *Magadha Mana* prevailed in the *Maurya* dynasty in *Magadha Desha*. *Kalinga Mana* is followed by *Maharshi Sushruta*. *Acharya Charaka* deals with the smallest unit of *Magadha* mana is 'Dhawanshi,' and *Sharangdhara's* smallest unit of *Magadha* mana is 'Parmanu.' In

Magadha Mana, 6 *Gunja* will be 1 *Masha* (750 gm), whereas in *Kalinga Mana*, 8 *Gunja* will be 1 *Masha* (1000 mg or 1 gm). According to *Acharya Charaka*, 3 *Masha* is equal to 1 *Shana*, and according to *Sharangdhara*, 4 *Masha* is equal to 1 *Shana*, but from *Kola* to *Goni*, there is no change. In API (Part I Vol 1-Appendix-6) and AFI (Part I Appendix-5), the *Mana Paribhasha* has been presented after approval from the Indian Pharmacopoeia Committee in consultation with the Indian Standard Institution.

Terms *Vedbhag*, *Charanash*, *Padansh*, *Turiya*, and *Anghri*; have been used for on fourth part. There are four Vedas viz. *Rugveda*, *Yajurveda*, *Samaveda*, and *Atharwaveda*; one part i.e., *Bhag*, out of four is *Vedabhag*. *Charan* and *Pad* are synonymous with limbs; one out of four limbs is *Padansha* or *Charanamsha* i.e., fourth. *Turiya* means the fourth part.[8] This term is used by *Gaudapadacharya* in *Madukyakariaka* and is also observed in *Rugveda*. *Anghri* is part of the leg below the knee, the fourth part of both lower limbs. [9] The term *Rasamitam* is used for one by sixth part; there are six *Rasas* [10] (tastes), out of them one is one by sixth. Terms *Vasuamsha* and *Nagonmita* are used to indicate one by eight parts; *Vasus* are a group of deities associated with fire and light, which are eight in number; *Ashtavasus*, [11] are the Sons of *Kashyap* and *Diti* according to *Ramayana*. *Amsha* is part, so *Vasuamsha* is one-eighth part.

Nags are eight in number, also known as *Ashta kula Nagas*. The main head of the *Nagas* is *Ananta* or *Shesha*. He is the one on whom Lord Vishnu rests, followed by *Vasuki*, *Takshaka*, *Kulika*, *Karkotaka*, *Padma*,

Mahapadma, and *Shankapala*. [12] One out of eight is *Nagnomitam*.

Understanding the interpretation and meaning of terms like *Vedbhag*, *Charanash*, *Padansh*, *Turiya*, and *Anghri* as fourth parts is useful; for example, in quantifying the dose of *Mugdharasa* as $\frac{1}{2}$ to 2.5 *Gunja* for adults and $\frac{1}{8}$ th to $\frac{1}{4}$ th *Gunja* for a child of one year. For the term *Rasa* as 6 times; in the context of *Jarana*; if *Parada* is purified using either *Ashtasamskarasa* or it is purified using *Hingulotha Parada* procurement method; it will only attain the disease curing properties, when it has undergone the six times *Gandhaka* Jairana process only. *Naga* for eight parts is helpful in the quantity of liquid to be taken during the process of *Bhavana*.

The term *Rudrabhag* is used for one by the eleventh part. *Rudras* are eleven in number. The *Ramayana* tells out of the 33 children of the sage Kashyapa and his wife Aditi, along with the 12 *Adityas*, 8 *Vasus*, and 2 *Ashvins*, constituting the Thirty-three gods. The *Vamana Purana* describes the *Rudras* as the sons of Kashyapa and Aditi. [13]

Terms *Tapanamsha* and *Suryamitam* are used for one-twelfth part; *Tapan* and *Surya* are synonyms of Sun. The Sun is known in Hindu history by twelve names: *Mitra*, *Ravi*, *Surya*, *Bhanu*, *Kha*, *Pusha*, *Hiranyagarbha*, *Marichin*, *Aditya*, *Savitr*, *Arka*, and *Bhaskara*. [14] The set of 12 *asanas* is dedicated to the Hindu solar deity, *Surya*. [15, 16] *Amsha* or *Amitam* is a 12th fraction or portion. Hence, *Tapanamsha* or *Suryamitam* is one-twelfth part.

Kalamsha is a term used for one-sixteenth part. The sixteen arts of the Moon are *Amrit*, *Manada*, *Pushpa*,

Pushti, *Tusthi*, *Dhruti*, *Shashani*, *Chandrika*, *Kanti*, *Jyotsna*, *Sri Preeti*, *Angada*, *Purna*, and *Purnamrit*. [17]

The term *Tatvansha* is referred to as one of the twenty-four parts. The scriptures have described the composition of the human body as related to 24 elements. [18] The universe is made up of 24 elements, in which five senses (eyes, nose, ears, tongue, skin), five organs of action (anus, penis, hands, feet, speech), three ego (Sat, Raj, Tama), five *Tanmatras* (Sound, Form, Touch, Taste, Smell) five elements (earth, sky, air, water, fire) and one mind are included, the whole creation and *man* have been created by combining these twenty four elements. [19] Hence, *Tatva Amsha* is one twenty-fourth part.

Khashar is one-fiftieth part. *Shubranshubhag*, *Chandrabhag* and *Indubhag* are terms used for one part. As *Shubrashru*, *Chandra* & *Indu* are synonyms of Moon, and Moon is one in number. So, usually, synonyms of Moon are used to denote one part. *Akshi* means eyes, and they are in pairs, so *Akshi* or synonyms of eyes are used to denote two parts.

Pawakbhag is used for three parts, *Pawak* is *Agni* or gastric fire; it is predominantly of three types viz, *Jatharagni* – one *Agni* present in the stomach and duodenum, *Bhutagni* – five *Agni* from five basic elements, and *Dhatwagni* – seven *Agni* present, one in each of the seven *Dhatus*. [20]

While applying the meaning of terms like *Rudrabhaga* as 11 parts in the context of *Lavanadrava Nirmana* (Manufacturing of Hydrochloric acid) in 14th Chapter of *Rasatarangini*, the gradual addition of 11 parts of sulphuric acid to six parts of *Saindhav Lavana* followed

by gradual heating and collection of the thus procured dilute hydrochloric acid to another vessel with the help of distillation.

In the manufacturing of *Dronirupa Kalva* in 4th Taranga, the height of *Kalva* has to be *Turag Angula*, i.e., 7 Angula, the length should be *Kala Angula*, i.e., 16 Angula, and the breadth is *Tapana Angula*, i.e. 12 Angula.

Yug and *Dev* are terms used for four parts. Four types of *Dev* according to Jain religion are *Bhavanapati* - *Asuras*, *Nagas*, etc, *Vyantar* - *Pishach*, *Gandharva*, *Kinnar* etc., Astrologer - Sun, Moon etc, Scientist - ones who live in the upper regions of the universe. [21]

Setak is a term used for five Pal (1 Pal is 48gm). [22] *Shar* is also a term used for five parts. *Kamdev* Hindu God of Love, has five arrows viz. *Neelkamal*, *Mallika*, *Amramour*, *Champak*, and *Shirish Kusum* are his arrows. [23]

Ras is a term used for six, as there are six tastes, viz. sweet, sour, salty, bitter, spicy, and astringent. [24] *Ang-angak-sankya* is the main six parts of the body: one head, one trunk, and four extremities.

Ashwa or *Turag*, Synonyms of horses, are used to denote number seven, as the seven horses are with *Surya Dev*, the God of the sun. These horses pull the chariot of Lord *Surya*, indicating the auspiciousness, strength, and success. [25]

The term *Vasu* is used to denote the number eight, Viz. *Aapa*, *Dhruva*, *Soma*, *Dhara*, *Anila*, *Anala*, *Prathyusha*, and *Prabhasa*. There are varying lists of the eight *Vasus* in different texts, sometimes only because particular

deities have varying names. The above are names according to the *Mahabharata*. [26]

The term *Grah* is used to show number nine. The *navagraha* are nine heavenly bodies and deities that influence human life on Earth according to Hinduism and Hindu astrology.[27] The *Navagraha* are the Sun, Moon, planets Mercury, Venus, Mars, Jupiter, and Saturn, and the two nodes of the Moon.[28]

The term *Rudra* is used for the number eleven. *Rudras* refer to the forms of the god *Rudras*, whose traditions have since been associated with Shiva. They make up eleven in the Vedic pantheon. The *Vamana Purana* describes the *Rudras* as the sons of *Kashyapa* and *Aditi* [29] viz. *Manyu*, *Manu*, *Mahmasa*, *Mahan*, *Siva*, *Rtudhvaja*, *Ugraretas*, *Bhava*, *Kama*, *Vamadeva*, *Dhrtavrata*.

In 14th Chapter author explains clean *Sikthataila* (Mixture of bees Wax: Oil in 1:5/1:6 proportion) to be taken 9 *Tola* (*Graha Tolaka*) with borax 1 *Tola* mix them well to procure *Tankanamla Malahara*. While elaborating the *Vartula Khalva* (rounder mortal-pestle) in 4th Chapter its breath has been explained as 12 Angula (*Tapan Angula*).

The term *Indra* is used to denote fourteen parts. *Indra* is the king of the *Devas* (god-like deities) and *Svarga* (heaven) in Hinduism. He is associated with the sky, lightning, weather, thunder, storms, rains, river flows, and war. [30, 31] In the calculation of time, every *Manvantara* has 14 *Indras* means that with every *Manvantara*, fourteen *Indras* change. viz. *Yagya*, *Vipaschit*, *Sushaanti*, *Shibi*, *Vibhu*, *Manojav*, *Purandar*,

Bali, Adbhut, Shanti, Vish, Ritudhaama, Devaspati, and Suchi. Purandar is the present *Indra*. [32]

Tithi is used to denote fifteen numbers. There are fifteen *Tithis*. The time it takes for the longitudinal angle between the Moon and the Sun to increase by 12° or A *Tithi* is a time duration between the consecutive epochs that correspond to when the longitudinal angle between the Sun and the Moon is an integer multiple of 12°. *Tithi* begins at varying times of day and varies in duration, approximately from 19 to 26 hours. [33] Every day of a lunar month is called *Tithi*. *Prathama/Padyami, Switiya/Vidiya, Tritiya/Thadiya, Chaviti, Panchami, Shashthi, Saptami, Ashtami, Navami, Dashami, Ekadasi, Dvadasi, Trayodasi, Chaturdasi, Amavasya* (new moon) or *Purnima* (full moon), namely.

While explaining the therapeutic dose of purified arsenic (*Shuddha Somala*) in 11th Chapter author explains that one *Gunja* (125mg) of *Shuddha Somala* should be triturated with *Tithi Mashaka* i.e. 15 Masha (15 gm) of Black paper powder (*Piper longum*) and *Ardraka Swarasa* (Juice of *Zingiber officinalis*); triturated for three days, and prepared tablet (*Vatika*) of one *Ratti* (125 gm) each.

5. CONCLUSION: Rasatarangini is among the most referred, and utilized texts of Rasashastra, authored by Sadanand Sharma. Detailed scrutiny discovered one hundred and eighteen references of *Bhutasamkhyas* enumerated in the entire text, composed of Twenty-four *Tarangas*. Showcasing the rampant use of terms like *Kala, Pad, Turiya, Bhanu, Turiya Tapan, Rudra* etc. There are specific terms utilized for specific proportions while elaborating the manufacturing procedure,

measuring dosage, defining terminologies, measuring the length and breadth of the instrument, and explaining instruments development mainly. The interpretation of *Bhutasamkhyas* utilized knowledge of Hindu history, Puranas, and Vedas. More than forty plus different terms have been used to explain different proportions by S. Sharma throughout the text. The importance of *Bhutasamkhyas* and their systematic usage stands as unique examples of intellectual utilization of history-specific numerals to both elaborate and protect the secrets of Ayurvedic Pharmaceutical Sciences from unnecessary exposure.

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