

# Kripa Shankar Shukla (1918–2007): Veteran Historian of Hindu Astronomy and Mathematics



Kripa Shankar Shukla's birth took place at Lucknow on July 10, 1918. From the very early years, he was a brilliant student of Mathematics and Sanskrit. He passed the High School Examination of U.P. Board in 1934 in First Division with Distinction in Mathematics and Sanskrit and the Intermediate Examination of that Board again in First Division with Distinction in Mathematics.

He had his higher education at Allahabad, passing the B. A. examination in the second division from Allahabad University in 1938. From the same University, he obtained his Master of Arts degree in Mathematics in the first division in 1941. During his M. A. studies in Allahabad, Paṇḍit Devi Datta Shukla (editor of the Hindi monthly *Sarasvati*) greatly helped K. S. Shukla like his own son and taught him the full *pūja-paddhati* (ritual worship) of Śrī Bālā Devī.



Professor Kripa Shankar Shukla (1918–2007)

Dr. Avadhesh Narain (or Narayan) Singh (1905–1954), a student of Prof. Ganesh Prasad, was quite enthusiastic about the study of history of mathematics and was associated with Dr. B. B. Datta (1888–1958) in that field. The *History of Hindu Mathematics*, part II, by Datta and Singh, was published in 1938 from Lahore (then

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in India). Dr. Singh, although still a Lecturer in the Department of Mathematics and Astronomy, Lucknow University, was very sincerely interested in promoting the study of history of Indian mathematics. In 1939 he started a Scheme of Research in Hindu Mathematics in the Department. Dr. Oudh (i.e. Avadha) Upadhyaya (1894–1941) who had just returned from France with a D.Sc. (Math.) was appointed in the Scheme (see P. D. Shukla's note on Upadhyaya in *Proc. Benaras Math. Soc, N.S.*, III, 95–98).

Dr. K. S. Shukla joined the Department and the Scheme in 1941, and his whole-hearted devotion in the field of study and research in ancient Indian astronomy and mathematics proved very fruitful. His very first research paper on “The Eviction and Deficit of Moon's Equation of Centre” (1945) showed his talent. He concentrated more in studying the works of Bhāskara I, a follower (but not a direct pupil) of Āryabhaṭa I (born AD 476). As early as in 1950, Dr. Shukla studied Bhāskara I's commentary (AD 629) on the *Āryabhaṭīya* and prepared a full Hindi translation of it (see Introduction, p. cxiii, in Shukla's 1976 edition of the commentary).

Dr. Shukla investigated thoroughly the works of Bhāskara I and studied other relevant primary and secondary materials. Under the supervision of Dr. A. N. Singh, Shukla prepared a thesis on “Astronomy in the Seventh Century India: Bhāskara I and His Works”. But Dr. Singh died before the Lucknow University awarded the D.Litt. degree on the thesis to Dr. Shukla in 1955. Perhaps by divine plan Singh's death occurred on July 10 which is the date of Shukla's birth in Gregorian Calendar.

Shukla's doctoral thesis was in four parts:

- (i) Introduction;
- (ii) Edition and Translation of the *Mahābhāskarīya*;
- (iii) Edition and Translation of the *Laghu-Bhāskarīya*; and
- (iv) Bhāskara I's commentary on the *Āryabhaṭīya* with English Translation of *Āryabhaṭīya*.

The significance of the Thesis lies not only in providing a genuine additional source for the history of early Indian exact sciences but also in bringing to light many new historical and methodological facts. By now most of the material from the thesis has been published in various forms.

In fact, Dr. Shukla proved to be a worthy successor in carrying on the study and research in the field of Hindu astronomy and mathematics. With the help of research assistants like Markandeya Mishra, Dr. Shukla brought out the editions of several Sanskrit texts which were published under the “Hindu Astronomical and Mathematical Texts Series” (= *HAMTS*) of the Department of Mathematics and Astronomy of Lucknow University. Dr. Shukla supervised the research work of a number of theses. Under his guidance the following scholars got their doctoral degree.

- (i) Usha Asthana, *Ācārya Śrīdhara and His Trīśatikā* (Lucknow University, 1960) (She started her research under A.N. Singh's guidance).
- (ii) Mukut Bihari Lal Agrawal, *Contribution of Jaina Ācāryas in the development of mathematics and astronomy (in Hindi)* (Agra Univ. 1973).

- (iii) Paramanand Singh, *A Critical Study of the Contributions of Nārāyaṇa Paṇḍita to Hindu Mathematics* (Bihar Univ. 1978).
- (iv) Loknath Sharma, *A study of Vedāṅga-jyotiṣa* (L. N. Mithila Univ. 1984).
- (v) Yukio Ohashi, *A History of Astronomical Instruments in India* (Lucknow Univ. 1992).

After serving the Lucknow University department with distinction for 38 years, Professor Shukla retired formally under rules on June 30, 1979. But he continued his outstanding and creative works actively in his cherished field for many more years, and scholars still continue to get ideas, suggestions and encouragement from him. One of the tasks he completed after retirement was to bring out a revised edition of the manuscript of Part III of Datta and Singh's *History of Hindu Mathematics*. The manuscript was lying with Dr. Shukla since long (see *Gaṇita Bhāratī*, Vol. 10, 1988, pp. 8–9) but now he found time to publish it in the form of a series of eight articles on Geometry, Trigonometry, Calculus, Magic Squares, Permutations and Combinations, Series, Surds and Approximate Values of Surds in the *IJHS*, Vols. 15 (1980), 121–188; 18 (1983), 39–108; 19 (1984), 95–104; 27 (1992), 51–120; 231–249; and 28 (1993), 103–129; 253–264; 265–275, respectively. It is unfortunate that parts I and II of *HHM* were reprinted (Bombay, 1962) without any revision. Anyway, there is an urgent national need to bring out a consolidated edition of all the three parts possibly after making them up to date, and also to take up the writing of a national history of mathematics in India as team work.

Working wholeheartedly with single minded devotion for more than half a century, Dr. Shukla's contribution in the field of history of ancient and medieval Indian mathematics forms a pioneer work which will continue to motivate future research and investigations. He gave new interpretations of many obscure Sanskrit passages and corrected misinterpretations and other errors committed by others. He has worked diligently and is proud of India's scientific heritage. He has been working silently without caring for publicity. Yet he is greatly reputed for his in depth research among the scholars, and the merit of his work is widely recognised as shown by various citations.

Dr. Shukla was awarded the Banerji Research Prize of the Lucknow University. He was associated with the editorial work of the Journal *Gaṇita* of the Bhārata Gaṇita Paṇḍit Saṁgha (formerly the Benaras Mathematical Society) for many years. He was elected Fellow of the National Academy of History of Science, Paris, in 1988. He Served as a member of several national and international committees.

As a student of the Lucknow University, the writer of the present article (*RCG*) attended B.Sc. and M.Sc. courses in the Department of Mathematics and Astronomy during 1953–1957; and Dr. Shukla taught him the subject of a paper in M.Sc. Part I. But there was no course available in History of Mathematics or Hindu Mathematics then (and even now). It is a tragedy that our educational set-up is deficient in this respect. A course in the history (in wide sense) of any subject should form a part of postgraduate curriculum to justify the award of “Master's” title in that subject. It is also hoped that the glorious tradition of study and research in the field of ancient

Indian Mathematics and Astronomy will be maintained in the concerned Lucknow University Department.

A Preliminary note on Dr. Shukla's work appeared in "Two Great Scholars", *Gaṇita Bhārati*, 12 (1990), 39–44 and Dr. Yukio Ohashi discussed "Prof. Shukla's contribution to the study of history of Hindu astronomy", in the same journal, Vol. 17 (1997, 29–44). The present article is a humble tribute and felicitation on the occasion of the 80th birth-anniversary of respected Shuklaji. May God grant him best health, happiness and long life.

## Dr. K. S. SHUKLA'S PUBLICATIONS

### (I) Edited, Translated and Other Books:

1. *Hindu Gaṇita-Śāstra kā Itihāsa* being a Hindi translation of B. B. Datta and A. N. Singh's *History of Hindu Mathematics Part I* (Lahore 1935), Hindi Samiti, Lucknow, 1956. Reprinted many times.
2. *The Sūrya-siddhānta with the commentary of Parameśvara* (1431). Edited with an introduction in English. *HAMTS* No. 1 Lucknow, 1957.
3. *Pāṭīgaṇita* of Śrīdharācārya edited with an ancient commentary, introduction, and English translation. *HAMTS* No. 2, Lucknow, 1959.
4. *Mahābhāskarīya* (of Bhāskara I) edited with introduction and translation. *HAMTS* No. 3, Lucknow, 1960.
5. *Laghubhāskarīya* (of Bhāskara I) edited with introduction and translation. *HAMTS* No. 4, Lucknow, 1963.
6. *Dhīkoīda-karaṇa* (of Śrīpati) edited with introduction and translation. Akhila Bharatiya Sanskrit Parishad, Lucknow, 1969.
7. *Bījagaṇitāvataṃsa* (of Nārāyaṇa Paṇḍita) edited with introduction. Akhila Bharatiya Sanskrit Parishad, Lucknow, 1970.
8. *Āryabhaṭa, Indian Astronomer and Mathematician* (fifth century). INSA, New Delhi, 1976.
9. *Āryabhaṭīya* of Āryabhaṭa I edited (in collaboration with K. V. Sarma) with introduction and translation. INSA, New Delhi, 1976.
10. *The Āryabhaṭīya* with the commentary of Bhāskara I (629 AD) and Someśvara, edited with introduction and appendices. INSA, New Delhi, 1976.
11. *Karaṇa-ratna of Devācārya* (689 AD) edited with introduction and translation, *HAMTS* No. 5, Lucknow, 1979.
12. Late Bina Chatterjee's edition and translation of *Lalla's Śiṣyadhī-vṛddhidātāntara* completed and edited. Two volumes, INSA, New Delhi, 1981 (Chatterjee's edition contains the commentary of Mallikārjuna Sūri in Vol. 1 and 17 appendices after the translation in Vol. 2).
13. *Vāteśvara-siddhānta and Gola* edited with introduction and translation. Part I (text) and Part II (translation), INSA, New Delhi, 1985–1986.

14. *History of Astronomy in India* edited by S. N. Sen and K. S. Shukla, INSA, New Delhi, 1985 (also issued as *IJHS* Vol. 20).
15. *History of Oriental Astronomy* edited by G. Swarup, A. K. Bag and K. S. Shukla, Cambridge Univ. Press, Cambridge, 1987 (The book constitute Proceeding of IAU Colloquium No. 91, New Delhi, 1985).
16. *A Critical Study of Laghumānasa of Mañjula* (with edition and translation of the text). INSA, New Delhi, 1990. (It was issued as supplement to *IJHS*, Vol. 25).
17. *A Text book on Algebra* (for B.A. and B.Sc.) by K. S. Shukla and R. P. Agarwal, Kanpur, 1959.
18. \* *A Text book on Trigonometry* (for B.A. and B.Sc.) by Shukla and R. S. Verma, Allahabad, 1951.
19. *Avakalan Gaṇita* (in Hindi) by M. D. Upadhyay, revised by Shukla, Hindi Sansthan, Lucknow, 1980.

## (II) Research Papers and Other Articles:

1. "The evection and the deficit of the equation of the centre of the Moon in Hindu Astronomy". *Proc. Benaras Math. Soc. (N. S.)*, 7(2) (1945), 9–28.
2. "On Śrīdhara's rational solution of  $Nx^2 + 1 = y^2$ ". *Gaṇita*, I(2) (1950), 1–12.
3. "Chronology of Hindu Achievements in Astronomy". *Proc. National Inst. Sci. India*, 18(4) (July–Aug. 1952), 336–337 (Summary of a 1950 symposium paper).
4. "The *Pāṭīgaṇita* of Śrīdharaċārya" (in Hindi). *Jñānaśikhā* (Lucknow), 2(1) (Oct. 1951), 21–38.
5. "Ācārya Jayadeva, the mathematician", *Gaṇita*, 5(1) (1954), 1–20.
6. "On the three stanzas from the *Pañca-siddhāntikā* of Varāhamihira," *Gaṇita*, 5(2) (1954), 129–136.
7. "A note on the *Rājamṛgāṅka* of Bhoja published by the Adyar Library," *Ibid.*, 149–151.
8. "Indian Geometry" (in Hindi). *Svatantra-Bhārata* (Lucknow), dated 24 Nov. 1957, pp. 1 and 11.
9. "Hindu methods of finding factors or divisors of number". *Gaṇita*, 17(2) (1966), 109–117.
10. "Ācārya Āryabhaṭa's *Ārdharātrika-Tantra*" (in Hindi) *C. B. Gupta Abhinandana Grantha*, New Delhi, 1966, 483–494.
11. "Āryabhaṭa I's astronomy with midnight day reckoning." *Gaṇita*, 18(1) (1967), 83–105.
12. "Early Hindu methods in spherical astronomy." *Ganita*, 19(2) (1968), 49–72.
13. "Astronomy in Ancient and Medieval India." *IJHS*, 4 (1969), 99–106. (cf. no. 15 below).
14. "Hindu mathematics in the seventh century AD as found in Bhāskara I's commentary on the *Āryabhaṭīya*." *Gaṇita*, 22(1) 1971, 115–130; 22(2) (1971), 61–78; 23(1) (1972), 57–79; and 23(2), 41–50.

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\*Information about text-books (serial No. 17, 18, 19) has been provided by Shri Ratan Shukla (Son of KSS).

15. “Ancient and Medieval Hindu Astronomy” (in Hindi) *Jyotish-Kalp* (Lucknow), 3(6) (March 1972), 32–37. (cf. no. 13).
16. “Characteristic features of the six Indian seasons as described by astronomer Vateśvara”. *Jyotish-Kalp*, 3(11) (Aug. 1972) 65–74.
17. “Hindu astronomer Vateśvara and his works”. *Ganita*, 23(2) (1972), 65–74.
18. “Use of hypotenuse in the computations of the equation of the centre under the epicyclic theory in the school of Āryabhaṭa”. *IJHS*, 8 (1973), 43–57.
19. “The *Pañca-siddhāntikā* of Varāhamihira (I)”. *Ganita*, 24(1) (1973), 59–73; also same in *IJHS*, 8 (1974), 62–76. (cf. no. 22 below).
20. “Āryabhaṭa”. In *Cultural Leaders of India: Scientists* (edited by V. Raghavan), Ministry of Information and Broadcasting, Delhi, 1976, reprinted 1981, pp. 83–99.
21. “Astronomy in India before Āryabhaṭa”. Paper read at the Symposium on Hindu Astronomy, Lucknow, 1976, 11 pages (cyclostyled).
22. “The *Pañca-siddhāntikā* of Varāhamihira (II)”. *Ganita*, 28 (1977), 99–116. (cf. no. 19).
23. “Glimpses from the *Āryabhaṭa-siddhānta*”. *IJHS*, 12 (1977), 181–186.
24. “Series with Fractional Number of Terms” *Bhāratī Bhavanam* (K. V. Sarma Felicitation Volume) = *Vishveshvaranand Indolog. Jour.* 18 (1980), 475–481.
25. “Astronomy in ancient India”. In *Bhāratīya Saṃskṛiti*, Bharatīya Saṃskṛiti Saṃsad, Calcutta, 1982, pp. 440–453.
26. “A note on R. P. Mercier’s review of *Karaṇaratna of Devācārya*.” *Ganita Bhāratī*, 6 (1984), 25–28.
27. “Phases of the Moon, Rising and Setting of Planets and Stars and Their Conjunctions”. *IJHS*, 20 (1985), 212–251.
28. “Main characteristics and Achievements of Ancient Indian Astronomy in Historical Perspective” In *History of Oriental Astronomy* (edited by G. Swarup *et al*), Cambridge 1987, 7–22.
29. “The Yuga of the *Yavana-jātaka*: David Pingree’s Text and Translation Reviewed”. *IJHS*. 24 (1989), 211–223.
30. “Vedic Mathematics the illusive title of Swamiji’s book”. *Mathematical Education* 5(3) (1989), 129–133. (cf. next item).
31. “*Vedic Mathematics*: The Deceptive Title of Swamiji’s book”. Pages 31–39 in *Issues in Vedic Mathematics* (edited by H. C. Khare), Delhi, 1991.
32. “Graphic Methods and Astronomical Instruments” being translation (with notes) of Chapter XIV of the *Pañcasiddhāntikā* of Varāhamihira. Pages 261–281 in K. V. Sarma’s edition of *Pañcasiddhāntikā with Translation of T. S. Kuppanna Sastry*, Madras 1993.

### (III) Book Reviews:

1. Review of the *Pañcasiddhāntikā* of Varāhamihira (ed. by O. Neugebauer and D. Pingree, Two Parts, Copenhagen), 1970–1971 *Journal of the American Oriental Society* Vo. 93 (?), 1973, pp.?
2. Review of *Census of Exact Sciences in Sanskriti Series A*, Vol. 3. (by D. Pingree, Philadelphia, 1976) *IJHS*, 13, (1978), 72–73.

3. Review of *Candracchayagaṇitam* of Nīlakaṇṭha Somayājī, (edited by K. V. Sarma, Hosiarpur, 1976) *IJHS*, 13, (1978), p. 73.
4. Review of *Siddhānta-darpaṇam* of Nīlakaṇṭha Somayājī, (edited by K. V. Sarma, Hosiarpur, 1976), *IJHS*, 13 (1978), p. 73–74.
5. Review of *Rāśīgolasphuṭānūṭh* of Acyuta Piṣarati, (in Hindi) ed. by K. V. Sarma, Hosiarpur, 1977, *IJHS*, p. 74.
6. Review of A. K. Bag, *Mathematics in Ancient and Medieval India* (Varanasi, 1979), *Gaṇita Bhāratī*, 3 (1981), 107–108.
7. Review of R. C. Pandeya (editor), *Grahalāghavaṃ Karaṇam* (Parts 1 and 2, Jammu, 1976 and 1977), *Ibid.* 108–109.
8. Review of *Census of Exact Sciences in Sanskrit Series*, A. Vol. 4, (by D. Pingree, Philadelphia, 1981). *Jour. Hist. Astron.* Vol-13 (1982), 225–226. Also *IJHS*, 18 (1983), 221–222.
9. Review of 'Prāchīn Bhārat Mein Vijñān' (in Hindi) (by S. L. Dhani, Panchkula, 1982). *IJHS*, 19 (1984) 86–87.
10. Review of Rahman, A. et. al, *Science and Technology in Medieval India—A Bibliography of Source Materials in Sanskrit. Arabic and Persian* (INSA, New Delhi, 1982). *IJHS*, 19 (1984), 412–413.