Encyclopedia
of
Exact Sciences from Antiquity to 1947
Part I
Primary (and other)Indic Sources

Kosla Vepa

List of Significant Savants and texts (where authorship remains anonymous)

Apastambha
Aryabhata I (author of Aryabhata siddhanta)
Aryabhata II (author of Aryabhattiyum)
Aryabhata III (author of Mahasiddhanta,950 CE)
Bakshali Manuscript
Baudhayana
Bhadrabahu
Bhartrihari
Bhaskara I
Bhaskara II (Bhaskaracharya)
Bhutivesnu
Bose
Brahmadeva
Brahmagupta

The Daivajna Family –

The Bernoullis of India
Ganesha Daivajna (1505 CE)
Kesava Daivajna
Krishna Daivajna
Visvanatha Daivajna
Narasimha Daivajna
Lakshmidasa Daivajna

Gangadhara
Gaargeya
Ghatigopa
Govinda Bhatta
Govindasvami
Harish-Chandra
Haridatta (circa 850 CE)
Hemchandra Jagannatha Pandit
Jyesthadeva
Maharajah Sawai Jai Singh
Kamalakara (1616)
Katyayana
Kodandarama
Krisnadesa
Kumararajiva
Lagadha
Lalla
Latadeva
Lokavibhaga (Jaina text)
Madhava (son of Virupaksha)
Mahavira
Mahendra Suri (1349 CE)
Manava
Narayana
Nilakantha Somayaji
Nisanku Padmanabha
Pandurangaswami
Panini
Paramesvara (1360-1455 CE)
Patodi
Pingala
Pillai
Prabhakara
Prthudakasvami
Putumuna Somayaji (18th century CE)
Raghunath Raj
Rajagopal
Ramanujam
Ramanujan
Sankara
Saamanta Chandrasekhar Simha
Somaswara
Sridharacharya
Sripati
Suryadeva Yajwa
Varahamihira Venkatesh Ketkar
Vijayanandi
Virasena Acharya
Yaajnavalkya
Yallaiya
Yaska
Yativrsabha
Yatavrisham Acharya
Yavanesvara

Number	Name	Primary Sources Books, and Articles
1.	Abbreviations	• AIAM Ancient Indian Astronomy and Mathematics • INSA –Indian National Science Academy • IJHS – Indian Journal of History of science • CSIR – Council of Scientific and Industrial Research • ABORI - Annals of the Bhandakar oriental research institute
2.	Collection printed catalogues in England	*Catalogue of the Sanskrit manuscripts in the British Museum.* Bendall, C. London, 1902. *Catalogue of Sanskrit and Prakrit manuscripts in the British Museum vol. II.* Losty, J . Unpublished typescript. Classed inventory Manuscript register in 2 vols kept in OIOC Reading Room at Or Gen MSS 15 *Catalogue of the Sanskrit and Prakrit manuscripts in the Library of the India Office.* Eggeling, J., Keith, AB, and Thomas, FW. London, 1887-1935. 2 vols. *Catalogue of two collections of Sanskrit manuscripts preserved in the India Office Library.* Tawney, CH, and Thomas, FW. London, 1903. *Catalogue of the Nevill Collection.* Nevill, H. Unpublished manuscript. 4 vols. *List of Pali, Sinhalese, Sanskrit and other manuscripts, formerly in the possession of Hugh Nevill Esq.* Barnett, L.D. 1909. Unpublished manuscript. *Catalogue of the Hugh Nevill Collection of Sinhalese manuscripts in the British Library.* Somadasa, K.D. London, 1987-95. 7 vols.

		Catalogue of the Pali printed books in the India Office Library. **Raper, T.C.H., ed., and O'Keefe, M.J.C., rev.** **London, 1983 .** ***Ancient Buddhist Scrolls from Gandhara: the British Library Kharosthi fragments.*** **Salomon, R.** **London/Seattle, 1999.** ***Preliminary list of manuscripts in languages of Central Asia and Sanskrit, from the collections made by Sir Marc Aurel Stein, KCIE.*** **Barnett, L.D.** **Unpublished typescript (n,d,).** ***Indian charters on copper plates.*** **Gaur, A.** **London, 1975.** ***Catalogue of Sanskrit, Pali and Prakrit Printed Books in the British Museum.*** **Haas, E., Bendall, C., and Barnett, L.D.** **London, 1876-1928.** **4 vols.** ***Catalogue of the Library of the India Office, vol. 2, part 1: Sanskrit books.*** **Natha, P., Chaudhuri, J.B. and Napier, C.F.** **London, 1938-57.** **4 vols.** ***Bibliography of South Asian periodicals: a union-list of periodicals in South Asian languages.*** **Shaw, G.W. and Quraishi, S.** **Brighton, 1982.**
3.	**Bodlean Library**	**Has one of the largest collections of Sanskrit texts outside of India**
4.	**Resources in France**	**The École française d'Extrême-Orient (EFEO) is a French institute dedicated to the study of Asian societies. Translated into English, it approximately means the French School of the Far East. It was founded in 1900 to study the civilization of Saigon (now Ho Chi Minh City) in what was then French Indochina. Its headquarters are now in Paris. Its main fields of research are archaeology and the study of modern Asian societies. The School has a branch in Pondichery.**

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5.	**Primary Sources**	**Acaryabhaskara : Bhaskaracarya, eka adhyayana / *Author:* Misra, Ramajanma, *Publisher:* Varanasi : Caukhambha Oriyantaliya, *Date:* [pref. 1979]** ***Aryabhatlya* of Aryabhata I - (1) Critical Edition and trans. with notes by K.S. Shukla and K.V. Sarma, (2) With Nilakantha Somasutvan's commentary., edited and published (in 3 parts) by K.Sambasiva Sastri, Trivandrum, 1977 (Reprint). *Bhaskarivabhasya* by Govindasvàmin (c. 830 CE) Billard (1971), p.81 Commentary on the *Aryabhatiya* by Bhâskara (629 CE) [K. S. Shukia and K. V. Sarma (1976)1 *Bjaganitam* of Bhaskara II - Edited by Sudhakara Dvivedi, BenaraS Sanskrit Senes, 1927; with commentary. *Navhkura* by Krshna Daivajna, Anandashrama Sanskrit Series, Poona, 1920. *Brahmasphuta Siddhnta* of Brahmagupta, 628 CE, — Edited with Vaasana Commentary. By(1) Ram Swarup Sharma, 4 vols., Indian Institute of Astronomical and Sanskrit Research, New Delhi, 1966. (2)Sudhakar Dvivedi 1902 *Brhat-Samhitä* of Varahamihira- Eng. Translated and Notes by M. Rama krishna Bhat, Motilal Banarsidas, Delhi, 1981.** ***Chandrachayaganitam,* Computation concerning the shadow of a moon, , VVRI, Hoshiarpur, , Kerala University Book Number KR B9x I431526** ***DrgganItam* of *Paramesvara-Critical* Edition 1431 CE by K.V. Sarma,**

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18.	**Mahaavir- aacharya**	
19.	**Parameswara**	
20.	**Mahendra Suri**	**The first Indian astronomer in the Arab experimental mould was Mahendra Suri who in AD 1370 culled a small 32-star catalogue from Ptolemy's catalogue, and wrote a treatise on astrolabe, or yantraraja 3. (Kochhar,**
21.	**Lallacharya**	
22.	**Nilakanta Somayaji (1443-1543)**	
23.	**Putumuna Somayaji**	

Vateswara	
Kamalakara	**Siddhanta-tattva-viveka**
Chaturveda PrthUdakasvami	
Maharaja Jaisingh I (died in 1667	
The Daivajna family of astronomers	
The Jaina mathematicians	

Maharaja Sawai JaiSingh II1686-1734)	**In 1719, he was witness to a noisy discussion in the court of Mughal emperor Muhammad Shah Rangeela. The heated debate regarded how to make astronomical calculations to determine an auspicious date when the emperor could start a journey. This discussion led Jai Singh to think that the nation needed to be educated on the subject of astronomy. It is surprising that in the midst of local wars, foreign invasions, and consequent turmoil, Sawai Jai Singh found time and energy to build astronomical observatories!** **No less than five massive structures were built at Delhi, Mathura (in his Agra province), Benares, Ujjain (capital of his Malwa province), and his own capital of Jaipur. Relying primarily on Hindu science but also consulting Islamic and European knowledge, these buildings were used to accurately predict eclipses and other astronomical events. Termed as the Jantar Mantar they consisted of the *Ram Yantra* (a cylindrical building with an open top and a pillar in its center), the *Jai Prakash* (a concave hemisphere), the *Samrat Yantra* (a huge equinoctial dial), the *Digamsha Yantra* (a pillar surrounded by two circular walls), and the *Narivalaya Yantra* (a cylindrical dial).** **In the early 18th century Raja Jai Singh set out to update the tables Ulugh Beg (1394- 1449) had prepared 300 years previously, in 1436. He built huge immovable masonry instruments which he himself had designed, on the pattern of brass instruments of the Arab-Persian school. Jai Singh built five observatories3,4: in 1724 at Delhi; in 1734 at his newly founded capital Jaipur; and later smaller ones at Mathura; Ujjain; and Varanasi (1737).** **Before building these structures Jai Singh did experiment with brass instruments, but decided against them for a number of reasons: they were faulty, because of their mobility and size; the axes became worn and the instruments untrue; the graduations were too small for fine measurements, etc.** **Obviously Jai Singh had no idea about the theory of errors, nor did he realize that small instruments have the great asset that they can be improved upon in the light of the user's experience. In addition, unlike the case of France and England, there were no compelling reasons for him to use his not inconsiderable influence to develop technology to achieve the desired accuracy in metal. He then decided to build his observatories in the famous Indian tradition of palaces and temples. The very fact that** **he headed the observatory himself rather than offer full-time appointment to his 'assistant' Jagannath shows that for him it was a case of what we may call vijnan vilas (science as a royal pastime or diversion). To** **appreciate the term it must be remembered that it was customary for Rajas and Maharajas to give names like Raj vilas, Jai vilas or Lakshmi vilas to their palaces.** **Ironically, Jai Singh's instruments are less accurate than Ulugh Beg's. Jai Singh's two quadrants (in samrat yantra, i.e., equal-hour sun dial) are of radius 49.5 ft(at Delhi) and 49 ft 10 in. (at Jaipur) whereas Ulugh Beg's sextant had a radius of 132 ft. Ulugh Beg could achieve a**

precision of 2-4 arcseconds, whereas Jai Singh's accuracy is of the order of a couple of arC minutes3,4 Thus with all his enthusiasm and personal efforts Jai Singh remains a historical anachronism. Intellectually he belonged to the long-past medieval astronomical tradition even though chronologically he lived in the modern age of astronomy." Kochhar

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