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Book Reviews

A Selected Works of Gurugovinda Chakravarti on Ancient and Medieval Indian Mathematics

Pradip Kumar Majumdar and Rajib Chakravarty (compiled and edited), Vivekananda Book Centre, Bankim Chatterjee Street, Kolkata-700073, 2014, 214 pages, Price: Rs. 240/-.

The book contains reprints of seven articles of Gurugovinda Chakravarti, Editor's views & additional supplements of original verses with notes (References), and Bibliography. Gurugovinda Chakravarti (1905-1938) appears to be originally from Chittagong and was born in the same year when Bengal was partitioned by the British Colonial Regime, and the national movement against this partition was at its peak. In his short span of life of 33 years, Gurugovinda showed a tremendous national spirit not only as a successful advocate of Calcutta High Court after his graduation from St. Xaviars College, and Law degree from Calcutta, but also by his persistent zeal to bring-forth the achievements of early Indian mathematics in his spare time. He even submitted a thesis for the Griffith Memorial Prize of the Calcutta University on Relation of Hindu and Chinese Mathematics, which still remains unknown and unpublished. He prepared articles based on his studies of early Sanskrit sources and published them in journals like *Bulletin of the Calcutta Mathematical Society, Bhandarkar Oriental Research Institute, Journal of the Department of Letters* (Calcutta University). The articles are very informative, exhaustive & original in nature, and show his scholarship in both archaic Sanskrit language and Mathematics besides other areas.

The articles are mainly based on Sanskrit sources and maintain a period coverage roughly from antiquity to 12th century AD. The first three articles discuss on the progressive series, terms for area, and geometrical methods of quadrature appearing in the *Śulbasūtras*, giving an idea mainly of A.P., G.P., their types, gradual evolution along with the rules for summation, including use of technical terms, and how the values of √2, and √10 are obtained by quadrature method. The fourth and fifth articles are on Surds and Fractions with details of their algebraic operations on addition, subtraction multiplication, division, and analysis of different methods of approximations. The sixth deals with the methods of permutation and combination, with application of ${}^{n}C_{r} = \frac{n!}{r!(n-r)!}$; ${}^{n}C_{r} + {}^{n}C_{r+1} = {}^{n+1}C_{r+1}$; ${}^{n}P_{r} = \frac{n!}{(n-r)!}$. The last article on 'Typical Problems' is equally interesting, for it identifies more than fifteen mathematical problems from Sanskrit sources and found their parallels in other countries like Greece, China and Latin Europe. The solutions of these problems involve summation of progressions, quadratic equations, solution of indeterminate equations which have however not been discussed. The Vedic *Saṃhitās*, *Śulbasūtras*, Jaina, Buddhist sources, besides the works of Āryabhaṭa, Bhāskara I, Brahmagupta, Bakhshāli Ms, Mahāvīra, Śrīpati, Bhāskara II were used in general. On the problems of series, surd, permutations and combination, further extension has been made by Datta, as

revised by Shukla (*IJHS*, 27.3-4, 1992-1993). Some of the rules of the Indian works found similarities with those of al-Khwarizmi, al Bīrūnī, Fibonacci (1202 AD) and others have also been hinted indicating the possibility of transmission of knowledge.

The section on references, containing the original quotations (both in Devnagari and Roman scripts) with English translation wherever necessary, is supplied by the editors to support the merit and authenticity of the statements made in the original. The editors have done a marvelous job and must be thanked for adding this supplement. The notes added by the editors with quotations, and even diagrams with additional material in the form of rational have made the notes quite interesting. Editors's view on the papers are short and equally meaningful.

There is a great need for similar such books having compilations of earlier well known contributors. A few other Bengali scholars made great names for their active contributions on ancient Indian sciences before and during Gurugovinda Chakravarti's life time, they are: Acharya P.C. Ray (1861-1944) on chemical sciences; Sir Brojendranath Seal (1864-1938) on positive sciences; Prabodh Chandra Sengupta (1876-1962), Sukumar Ranjan Das, Sarada Kanta Ganguli, Jyotish Chandra Ray, on astronomy; Bibhuti Bhushan Datta (1888-1958), and N.K. Mazumdar on mathematics; and many others. The first two scholars have published books of their own. About 50 articles are published by Datta and Sengupta separately on their own fields, lists of which along with biographical details are already compiled and published by R.C. Gupta (*Gaṇita Bhārati*, 1, 1979, 31-35) and *Historia Mathematics*, 7, 1980, 126-133 respectively). What is urgently required is a similar such compilations/ volumes/website containing all the articles of Senguta, Datta and others. Similar such survey may be done for other areas. This will undoubtedly make a foundation in the studies of history of science, besides avoiding of repetitions of original materials again and again. This is important to encourage research in the field among younger generation of scholars and to search for new materials. Apart from this, it will also be of great help to train core groups engaged in early and medieval history of science engaged in different research centres and universities to build up and coordinate further studies in the field. This has been rightly emphasized by the editors.

The book has however failed to supply original verses from sources like *Bṛhaddevatā* (ed with Eng tr by Macdonell, Harvard, 1904), Jaina sources on *Kalpasūtra* (of Bhadrabāhu), *Antagada Dasāo* (ed by Barnett, 1907), Pṛthudaka's commentary on the *Brāhmasphuṭa-siddhānta* of Brahmagupta and so on. Some spelling mistakes also occur [*Āghana*, to be corrected as *Aghana* (non-cubic), p.7; 'theese', to be corrected as 'these', p. 67, line 9 from top; ${}^nC_4$ to be corrected as ${}^nC_r$, p. 94 and so on]. We would expect that those lacuna could be met in case a second edition is planned. In spite of these small drawbacks, this volume will be an asset to any individual researcher in the field or for any library interested on original sources on early Indian mathematics. The Publisher is also to be thanked to keep the printing font of the book quite attractive and the price quite low.

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