

Daibagya Balbhadra Joshi (1494 A.D.)
An Academic Relation between Nepal and India
With mathematics manuscript in Nepal

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Dedicated to Prof. Hari M. Srivastava on his 75th birth anniversary

Abstract:The Impact of teacher philosophy & pedagogical choice an emergent design intended for background, purposes and practice of mathematics through Bhashwati and Balbodhini. This relation is coin up not only between Bhashwati/Satananda & Balbodhini/Balbhadra; it extends the closed relation between Nepal and India. A tremendous influence on the interaction of learners and use of pedagogical devices are seen between Bhashwati and Balbodhini, influenced in practice of mathematics. Nepali astrologer Laxmipati Pande (1758-1831) had written commentary of Bhashwati in 1779. There Pande was used Nepali language. The writer of Bhashwati at Orissa and the writer of Balbodhini at Jumla showed the good academic relation between Nepal and India. The popularity of Bhashwati & Balbodhini in Nepal & India with the intimacy of both the scholars Satananda and Balbhadra together both countries is much closed good academic and friendship relation of two neighbors.

Key words: Bhashwati, Balbodhini, Balbhadra, Satananda.

Introduction

Balbhadra Joshi (1494 AD) was a residence of *Jumla* district who had written the commentary of '*Bhaswati*' in the name of '*BalBodhini*'. It was the 176 years ago than *Prithvinayrayan Shah* as the King of Nepal and it was 181 years ago than the time of the appointment of Royal astrologer in the Royal observatory at Greenwich. The original book of Bhashwati was written by Satananda in 1099 AD at *Jagannathpuri* of *Orissa* as the residence of him (Mahesh Raj, Dinesh Raj pant; 1973, *Poornima* 29: 31). It was the times of 576 years ago than to appointment of the Royal astrologer in the Royal observatory (Naya Raj Pant; 2007, *Sundial of Dhavagya Laxmipati Pande: xi*). Bhashwati and its commentary '*Balbodhini*'

were very popular books in India and Nepal. *Balabhadra Joshi* had been prepared a teaching manual for Mathematics. The *Bhashwati* was as a text book of Mathematics. Since *Bhashwati* had helped to count calendars (*Panchang*) and also to help teaching addition, subtraction, multiplication and division, etc., as basic Mathematics book (Pant, S.R.2004).

In Bhaskaracharya's *Lilavati*, there is each operation of addition, subtraction multiplication and division has a single example like; add $2/5/32/193/18/10/100$ and subtract it from 10000; multiply 135 by 12 and divide its value by 12. Only this example is not sufficient to any student either she/he is very intelligent or not. So for any students should be need other examples of mathematical operations or any mathematical treatment. For this we need a manual book which gives explanatory note or many examples to practice. In this context the *Balbodhini* commentary is the best explanatory book for practicing the mathematics from *Bhashwati*.

We know that in our ancient tradition the books were written in stanzas in condense form in short way to memorize and rote learning, then we need its elaborative form for understand the concept. Thus *Balbodhini* is one of the teaching and reading manual of mathematics on the basis of *Bhashwati*. Since we found that the *Bhashwati* had been as the first book of supplement Mathematics. At that time *Bhashwati* was very popular and useful book in practice in Nepal and India. Its evidences are found in the list of books in Royal library; *Birpustakalaya* and national library of Nepal. In the Malla period the eclipse was calculated by *Bhashwati*. *Nepali Royal astrologer Laxmipati Pande (1758-1831)* had also written commentary of *Bhashwati* in 1779. In his commentary *Pande* used *Nepali language*. He was born later 264 years than *Bhalabhadra*. This showed the glimpse of mathematical activities in Nepal very early period with the collaboration of India, i.e. South Asian Subcontinent. *Bhashwati* was used as the basic books for mathematics because of *Bhalabhadras'* commentary *Balbodhini* as the elaboration of *Bhashwati*.

The *Bhashwati* is prepared on the basis of *Surya Siddhanta*. In *Bhashwati* *Shatananda* had used decimal system instead of using *Rashi*, *Ansha*, *kala* and *bikala* which makes it is very easy, so it was very popular at that time with the supportive manual *Balbodhini*. It is one of the practical books for calculation of *Panchang*. In this book the writer had expressed that, "he should prepare a short book on the basis of *Panchasiddhantika* of *Varahmihira* as *Surya Siddhanta*" (*Mahesh Raj & Dinesh Raj, Poornima, p. 32*).

We have seen different commentaries like *Aniruddhas'* commentary *Shishubodhini* in 1496 as the first and *Madhvas'* commentary in 1526 as the second and *Balabhadras'* commentary *Balbodhini* in 1542 is as the third. *Henry Thomas Colebrooke (1766-1837)* who is considered as the very famous research-scholar and the

first great Sanskrit scholar of Europe was the son of Sir George Colebrooke. Henry Thomas is very famous for Indian Education system and another famous scholar Afrech also cited *Balbodhini* as a famous book. Henry Thomas Colebrooke expressed his view on *Balbodhini* when he was writing about *Bhashwati* in 1816. Henry Thomas Colebrooke writes as, the *scholiast Bhalabharda....* and ahead he writes, *his commentaries is dated 1465 of Vikramaditya; more than 400 years ago* (Mahesh Raj & Dinesh Raj, p. 35). The detailed investigation of the publishing date of *Balbodhini* is found in the article of Mahesh Raj Pant and Dinish Raj Pant in 29th issue of *Poornima* (pp.31-56) of *Samshodhan Mandal*.

In our investigation without any doubt we may say *Bhashwati* and *Balbodhini* are as the twins' book of *Shatananda* and *Bhalabhadra*. This approach does not announce only the academic relation between two countries but also friendship and family relation for educational development in this subcontinent.

There is a strong relationship between Mathematics and Astrology. So in old ages, people used to go to Jyoutisha teachers to learn Mathematics. Assignments from *Bhashwati* had helped them for complete calculation in *Panchang*. For more Mathematics knowledge, people used to read *Lilavati*. *Bhashwati* was so popular in different part of country that many of hand written in stanzas are found from *Bhashwati* at different places. These books *Bhashwati* and its commentary *Balbodhini* matched the relations of basic mathematics and Jyoutisha. The writer of *Bhashwati* at Orissa and the writer *Balbhadra Joshi* of the *Balbodhani*, a commentary of at *Jumla* showed the good academic relation between Nepal and India. The Indian popularity of the mathematics manual prepared by *Balbhadra Joshi* also shows the much closed relation between Nepal and India. This is the intimacy of both scholars *Satananda* and *Balabhadra Joshi*. Still now a day's *Jumla* is one of the remote district of Nepal. The time of more than 521 years ago *Jumla* was very remote even though mathematics scholars like *Balabhadra Joshi* were there. This focused that Nepal is one of the fertile lands of mathematics with the collaboration of neighbors'. This single evidence is as representative. There are so many evidences are found, such as *Naya Raj Pant* who has written so many commentaries of different books publishes from India like *Lilavati*, *Siddhantasiromani* of *Bhaskaracharya*, *Ganita Kaumudi* of *Narayana Pandita*, and so on. These evidences showed the glimpse of academic and neighbors' relations between two countries.

Next, now we expressed some manuscripts based evidences that join to neighbors academically. The original text of an author's work, handwritten or now usually typed, that is submitted to a publisher or any text not printed is known as manuscripts. In other words a book or documents written before the invention of

printing also recognized as manuscripts. Thus writing, as distinguished from print is the manuscripts of any documents. It is handwritten or typed, not professionally printed. It is lighter than a regular book, and easier to turn the pages. We saved that unpublished documents on them; we figured it would be accessible forever.

A manuscript is any document written by hand, as opposed to being printed or reproduced in some other way. Before the arrival of printing, all documents and books were manuscripts. In publishing and academic contexts, a manuscript is the text submitted to the publisher or printer in preparation for publication, regardless of the format. Until recently a typescript prepared on a typewriter was usual, but today a digital file with a printout, prepared in manuscript format is most common. Manuscripts are normally required by publishing companies before being published. The consequence is an extraordinary product—more a collection of notes than a polished manuscript. Here are a few tips for pitching manuscript that isn't found in the publishers' submission guidelines are given for evidences.

Manuscripts

A birch bark manuscript unearthed in 1881 in the *Bakshali* is a village and union council in Pakistan near Peshawar is now believed to date from the seventh century C.E. Different types of *Bakshali* are found that contains language, mathematics, customs and cultural activities, etc. The village is notable for being the location of what is now known as the *Bakshali* manuscript; this is an ancient mathematical work written on birch bark and is the oldest surviving document in South Asia of Indian mathematics.

The *Bakshali* manuscript was discovered in 1881 during British rule by a tenant of *Mian Un-Wan-Udin KakaKhel* a police inspector; the manuscript was discovered while the tenant was digging in an abandoned building. The, village also lends its name to the *Bakshali* approximation which is a method of finding an approximation to a square root that was described in the manuscript. Famous politician and former provincial minister *Ameer Zada Khan* of National Awami Party (NAP) is from *Bakshali*. The followings are notable persons remained in the history of *Bakshali*; *Bibi Abbay*, *Sahibzada Baba*, *Shaheed Baba*, *Mian Mohammad Shah Kakakhel* (*Mohammad bacha*), *Sahibzada Nageebullah bacha*, *Haji mehmood khan*, *Maulana Fakhruddin Babajalildin Baba*, *Bibi ko Mami*, *Wawa jee*, *Haji Qalardin*, *Maulvi Fazal Hadi*. *Maulana Ameer said*, *Maulana Arsh ullah*, *Colonel Shaddad Khan*, *Haji Karim shah* and *Israr ullah israr*. Renowned educationist and columnist *Mian Un-Wan-Udin Kakakhel* is also from *Bakshali*. Famous journalist *Syed Fakhar Kakakhel* also hails from *Bakshali*. *Bakhshali* remains always as a centre of provincial assembly seat but unfortunately after the death of *Ameer Zada Khan* this seat is never won by residents of it Bakhshali, but always won by

outsiders.

Evidences of manuscripts in Nepal

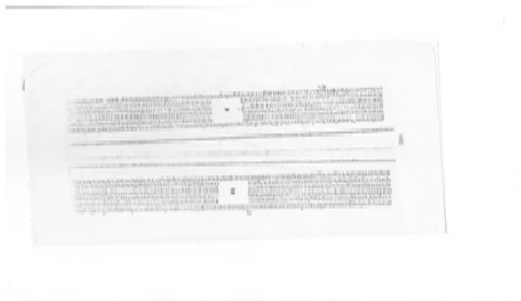
In context of Nepal very old hand written manuscripts are found. For example a leaf of manuscript of Bhaskaracharya's algebra found in Kaiser Library in Nepal is given as below.



Similarly a leaf of Sumati Siddhanta found in the same library is given here which is written in Kathmandu Valley.

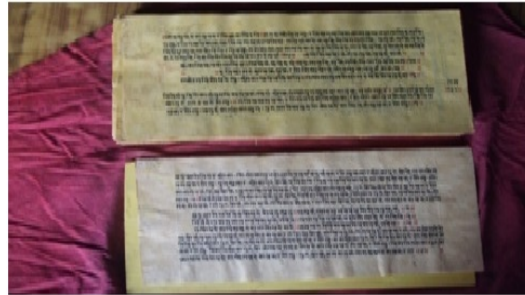


Kalchakra is an old manuscript in which calculation of time period and eclipse is illustrated. A leaf of *Kalchakra* part two is given below.



Astabakra Samhitako Sankhyakramadi Vyakhyan is a *Vedanta* which is written in *Nagari* lippie in a *Pako Kagat*. It consists 55 leafs. It is written in *Nagari* language

with Nepali *Bhasha Tika* in B.S 1912(?) *Ghusadi-1*, day-4. In its 50th page's mid stanzas' second Richa, there was given that, "*Akonbimshopadesyu: Shroakashpach-bimshati: Satyatmanubhawollasupadeshe chanudhesh ...!*". Seems that this '*Akonbimshopadesyu:*' this terminology indicates our counting system was based in 20.



Manuscript section of Archeological Department, Kathmandu: This department has maintained library and micro film sections of classic manuscript. In both sections the classical mathematical documents and books are found, such as *Nepali Arithmetic* translated by Master *Khadgaman Malla*. In this book the Nepali measurement system of money and counting of numbers is given. Most of them related to Mathematics and *Jyotisha Ganita*. They are under investigation in modern concept. *Ganita Prabhakar* was written in 16th century and we should guess other documents were also near about the same time period.

Dhanabajracharya, in his book *Inscriptions of Lichchhavi Era*(1973 A.D) had given distinct inscriptions found in different regions of Nepal, as the ancient measurement system for land the unit '*Manika*'.... was used, similarly '*Kharika*', '*Draudrik*' etc, as units of land or corn. These records indicate the Nepalese have developed its own measurement systems. These documents had not been analyzed and take care in our mathematical system. Thus the protection and research of these valuable manuscripts and classical documents is needed. The scripts in some pages are in different language. We see that Mathematics of calendar in it. The black spots are seen in some pages. These spots may over hold to original contribution or to modify important dates, etc.

Aasha Sapukuthi situated at *Raktakali, Kathmandu* was established with the name of late *Āśā Man Kansakar* by the initiation of Late *Prem Bahadur Kansakar* (*Nepal Sambat*1037-1111). In *Nepal Sambat* 1105 on the day of Anlaga 30 Kansakar had handover the Archive with the name *Chsapasa* of the writers of *Nepalbhasha*. In these archives different classical mathematical documents and manuscript are preserved such as different types of inscriptions, books in different forms; like *Sumati Tantrum*, *Vichitra Ganit*. Other historical books and documents are also found

there. Most of these manuscripts were collected by *Prem Bahadur Kansakar* with the help of his friends. Now days it is popular by the name of the *Āsā Archives*. It was as publicly opened as Archives in Nepal Samvat 1107 Anlaga 2 (B.S.2044) by Prof. *Yujiro Hayasi* (the executive President of *Toyota Foundation, Japan*). These archives contained more than 7000 types documents related to different caste and communities (i.e., ethno Nepalese) of Nepal. It consist 1100 palm leafs of manuscripts. There are 7025 digital manuscripts. Among them so many documents are related to Mathematics.

National Library, *Hariharbhawan, Lalitpur*: It is a newly established library. It is also supporting to preserve classical records related to Mathematics and its' history. Similarly *Madan Puraskar Pustakalaya, Patan Dhoka, Lalitpur* also preserving few classical mathematical documents such as *Chandrakala dhanajanya's Shishubodhtarangini* and *Pandit Gopal Datt Pandey's Vyakta Chandrika*. This library provides reading room to the researcher.

Some mathematical symbols and Inscriptions found in *Changunarayan Temple* are illustrated in the following figures.



(Acharya, 2011 : Appendix A-G)

Conclusion

Daibagnya Balbhadra of *Jumla* district had written commentary of the *Bhaswati* that is '*Balbodhini*' (1542). It is a manual book of mathematics, gives explanatory note and examples to practice the mathematics from *Bhashwati*. The first commentary of *Bhashwati* is *Aniruddhas' Shishuboddini*' (1496), the second is *Madhvas' Shrutabodha*' (1520) and the third one is *Balabhadras' Balbodhini*. It was the time of 176 years ago than *Prithvinayrayan Shah* as the King of Nepal and 181 years ago than appointment of Royal astrologer in the Royal observatory at Greenwich. On the other hand *Satananda* (born 1068); probably the first gleaming trail-blazer astrologer cum astronomer in Bharatavarsa as residence of *Jagannathpuri of Orissa* had written the *Bhashwati Karana* (1099). This book is based in *Surya Siddhanta* & as a text book of Mathematics that helps to count *Panchanga* and practices

Mathematics. It was the time of 576 years ago than appointment of the Royal astrologer in Royal observatory at *Greenwich*.

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