

The Boyhood of Birbal Sahni

Taking to Science in 19th Century Panjab

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Introduction

The rise of a scientist to eminence is better understood when viewed in the backdrop of events unfolding during that time and this is especially true of Birbal Sahni and his father, Ruchi Ram, who was one of the first science educationists of Panjab. Schooling and education in nineteenth century Panjab was quite different from what it is today. Liberal school education as known now, did not exist. In its place were traditional educational systems that had remained unchanged for several centuries: elitist schools catered only to the ruling class to help them learn the graces and manners of their times, and the ability to manage their land holdings. For the priestly class, there were special schools to teach the scriptures. For merchants, who held sway over the economy, all that was needed to get by was the use of simple arithmetic. For the common man it was difficult to get a good education. Here, I have tried to give the reader some background of the life and times of late nineteenth century Panjab and what it was like for an ordinary family, lacking in means, to develop a love for science and a rationalistic attitude in an environment where superstition and myth reigned supreme.

In the specific context of Birbal Sahni's childhood and youth, I would like to highlight the contribution made by his father, Ruchi Ram, strong willed and largely self-educated, who succeeded in making science a profession to serve himself, his children and society. Born in 1863 in a small town, nestling under the shadows of the Salt Range, now in Pakistan, he defied most of the accepted norms and traditions of his age. By the time he was 50 years old, he had the distinction of working with some of the greatest names in physics such as E Rutherford, J J Thompson and Niels Bohr in the field of nuclear physics at the

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University of Manchester where he published two papers (in 1915 and 1917), perhaps the first by an Indian in that discipline [1, 2, 3]. Later, he became a founder member of the Indian Academy of Sciences, Bangalore, along with two of his sons – Birbal was one of them!

Life and times in 19th Century Panjab: Opening of the First Government School in 1851

Under imperial rule, the very act of learning or having special knowledge was fraught with danger. The ruling class wished to control education and use it to their benefit, and the notion of equality or freedom for a citizen to choose science as a profession was not easily given. In keeping with the tradition of the subcontinent established through many centuries, knowledge of specific dates of rites and rituals and appropriate stellar configurations was confined to the priestly class and an unreasoned belief in the supernatural pervaded contemporary society. Religious shrines of local hindu and muslim saints and pirs, supposedly possessing magical powers of cure for various ills, dotted the landscape. Amulets and charms were supposed to guard the believer from diseases like epilepsy and natural hazards such as floods and earthquakes. For an agrarian population, largely uneducated and comprising of nearly 87% of the population living in villages (according to the 1881 census), miracle cures were to be relied upon more than rational explanations of physical, chemical and biological phenomena. A scientific approach to common problems was lacking.

In Panjab, the first government school opened in 1851 at Amritsar, and by the end of another 5 years there were only about 35 schools in the whole state! Schooling was at a premium, specially for those children living far away from the main urban centres. The first Government College was established at Lahore in 1864 where, for the first time, admissions were made on merit and not based on the patronage of an influential landlord. Birbal's father was one of the early students in this institution. In his autobiography, *Self Revelations of an Octagenarian*, Ruchi

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Ram Sahni remembers the excitement of reading his textbook of English literature. Each new treasure gleaned, whether poetry or prose, was highly prized and each sentence and paragraph was dissected minutely and discussed threadbare by small groups of students [4,5]. Amidst the din and tumult of colonial India [6], the era of a knowledge-based society had begun. The time of scientific rationalism was not far behind.

Another major factor in making the middle class more aware of their surroundings and of the world, was the advent of printing technology which for the first time provided cheap and easily available books, and exposed Indians to the wide spectra of literature and science and especially to European thought [4]. As Ruchi Ram has himself stated, it was for the first time that educated people in Panjab realized the power of science in explaining natural phenomena and gained the opportunity of better understanding their society, man's place therein and finally of course the universe itself. Clearly, science held the potential for the upliftment of the masses as well as for the exploration of the natural world and explanation of its hidden mysteries. Birbal Sahni grew up in this environment.

Birbal idolized his father and his pragmatic attitude to life. For him, his father was the symbol of a non-conformist movement, one that was able to balance the high standards of British education while still retaining pride in the spirit of Indian nationalism. It was this background that made Birbal wear a khaddar sherwani and discard his three piece suits!

In addition, what may have to a great extent influenced Birbal Sahni's thought and attitude to life was his father's rejection of the more conservative religious traditions that had been so far followed by his family. His contact with the Bengali intellectuals of Lahore and ultimately his adoption of Brahm Samaj as a way of life and thought, led him away from his family's more conservative ideas. So much so, that his mother refused to have anything to do with him and never set foot in his home thereafter. For young Birbal, living and growing up in a community where his own father had been ostracized for becoming a Brahm Samaji, it must have been a traumatic experience. He idolized his father and his pragmatic attitude to life. For him, his father was the symbol of a non-conformist movement, one that was able to balance the high standards of British education while still retaining pride in the spirit of Indian nationalism. It was this background that made Birbal wear a khaddar sherwani and





Figure 1 (left). A suited Birbal at Cambridge.

Figure 2 (right). With his wife Savitri in characteristic khaddar sherwani, ca 1947.

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Ruchi Ram Sahni and Family background

Birbal Sahni's father, Ruchi Ram, was born into a family of traders on 5th April 1863 in the small town of Bhera in a mohalla or street called Toiyanwala passa ("the pot-holed street!"). This merchant family suffered a severe blow with the sinking of its merchandise-laden ships in the late 1870's in a severe storm on the River Indus, and the fortunes of the family turned for the worse. Ruchi Ram was then about 12 years old and it was to him that his family looked up to fend for them. In spite of all odds, he educated himself taking all major decisions on his own.

Ruchi Ram's education started at the tender age of 5 or 6 and this consisted in his own words [4] of 'learning from a 'pandah' who was paid the princely sum of 4 annas for every multiplication table that little Ruchi Ram learned. In a short time Ruchi Ram had learned multiplication tables up to 20×35 along with the fractional tables, spending 8 hours everyday with the pandah. In his own words, Ruchi Ram says that his efforts in learning the tables were amply repaid later.

He received formal school education at the Church Mission Branch school at Dera Ismail Khan, located adjacent to the

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Topanwala Darwaza. Later, he topped the middle school examination in 1878 standing first class first. He passed high school, taking the Calcutta Board Examination of 1880 at Lahore standing 6th or 7th in the merit list in the state with distinctions in English and mathematics. He appeared in the BA examination in Government College, Lahore in 1884, again standing first class first.

His conviction and courage took him to Kolkata, then considered to be the intellectual capital of the country. He obtained his Masters degree in chemistry from Presidency College around 1885. In fact, distinct from the conservative traditions of his times, while still a student and assisting his teacher, Professor Sir Alexander Pedler, as an analyst to the Kolkata municipality, Ruchi Ram acquired expertise in tasting wines and preparation of scientific reports. It is at this time that he came in contact with the great rational thinkers of that age: Asutosh Mukherjee, Jagadish Chandra Bose¹ and Prafulla Chandra Ray².

In 1885, Ruchi Ram returned to Panjab and set up his own institute called the 'Panjab Science Institute' to popularize science, along with his Government College colleague Prof. J C Oman. So great was the demand of the general public, traders, students and the population at large to hear lectures on topics such as soap bubbles, electricity, magnetism, smokes: poisonous and non-poisonous, and, how does the telegraph wire speak, that audiences drawn from mainly the rural areas and the lay public readily gave the princely sum of one anna to two annas to hear the talks and filled the lecture halls to see the magic lantern presentations!

Birbal Sahni: Love for Natural Sciences

Birbal Sahni was born on 14th November 1891 at Bhera, the second son of his parents. From the beginning, he showed that he had an adventurous spirit. M R Sahni has recorded this one incident which stresses his love for nature. In 1905, when Birbal was about 14 years old, he quietly took his younger sister 6 years

¹ *Resonance*, Vol.3, No.2, 1998.

² *Resonance*, Vol.6, No.1, 2001.

Birbal's love for adventure and the natural sciences was in part derived from long treks that his father and brothers used to take to the remotest part of the Himalaya.



his junior and his younger brother then aged 6, asking them to collect a few handkerchiefs and tins as they quietly slipped out of their home in the hill station of Murree, now in Pakistan [7]. They descended down a steep 'nala' north of the town. Soon it got dark and Birbal was faced with the daunting task of helping his younger brother and sister up the steep gradients and across huge boulders and steep cliffs. By the time they reached home it was night time and the whole house was in turmoil looking for them. As Mulk Raj Sahni has put it

" We reached home at last, tired, hungry with bleeding feet, not to speak of the unrestrained stream of tears rolling down our cheeks, with the best prospect of receiving a good talking to".

However Birbal was quite composed, and when asked by his father what was the meaning of leaving home without permission and taking the younger children with him, Birbal replied that he had wanted to collect crabs! So taken aback was his father by the answer, that for a few moments he was speechless. But he said nothing more and the incident was soon forgotten!

Birbal's love for adventure and the natural sciences was in part derived from long treks that his father and brothers used to take to the remotest part of the Himalaya. Invariably he carried Hooker's *Flora Indica* with him. He devoted considerable time in identifying these plants, some of which are part of the Kew Herbarium collections. In one such incident while traversing the Zo Jila Pass, then almost inaccessible, Birbal collected some 'red snow' which proved to have been formed by a rare snow-inhabiting algae later studied by A C Seward. Between 1907 to 1911, the two brothers (Birbal and Mulk Raj) carried out numerous traverses in the Himalaya: Shimla to Chini on the Hindustan-Tibet Road; Manali to Rohtang; Narkanda to Rampur Bushahr taking the Buran Pass; Pathankot to Leh and several others in the Kumaun Himalaya. During these visits, Birbal made extensive collections of plants. M R Sahni states [7] (p.81):

" I accompanied him on most of these Himalayan excursions and recall the thrill that we experienced when a plant new to the collection or an

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orchid or a rare species of epiphyte was discovered; he climbed sometimes at some risk, or helped me with a perch to capture it. This passion for outdoor life and trekking was acquired from father, who, himself an inveterate hiker, carried out traverses on foot across the Himalayas and invariably took Birbal along with him”.

Birbal received his entire school education in India at the Mission and Central Model School, and then at Government College at Lahore, where his father was professor of chemistry. He gained many academic distinctions in high school standing first in Sanskrit, the love of which endured till the very end of his life. He graduated from Lahore in 1911 at the age of 20 and left to join Emmanuel College at Cambridge the same year. Although admission to Cambridge was restricted at that time and could only be obtained with the recommendation of a Government official, Birbal took the off chance and personally visited the University in the hope of gaining admission. After some initial failures he was admitted on his own merit. But soon after, Birbal felt homesick and began to miss his mother and his Lahore surroundings and associations. So he returned to London where his elder brother was studying medicine and professed that he had no intentions of going back to Cambridge! In the end, after a great deal of persuasion, he was asked by his elder brother to return to Cambridge and immerse himself in his work. He never looked back after that fateful day and graduated from Cambridge in 1914 (Figure 3). It is interesting to note that when Birbal's father was working in Ernest Rutherford's laboratory at Manchester in 1914, it was the young Birbal who helped him to take photographs [3] and do other incidental work during his summer vacations, although at the time Birbal himself was taking Part II of the Natural Science Tripos. Pandit Jawaharlal Nehru was then a classmate taking the natural science stream. Their love for fossils and palaeontology was common. In a personally signed letter to M R Sahni dated September 8th, 1956, Pandit Nehru states:

Figure 3. Peering through the microscope, Botany School, Cambridge.



“ Long ago when I was a student at Cambridge in England, I took up Geology as one of my subjects. I studied palaeontology and played



about with fossils and found them fascinating. Some part of this fascination has continued,... the long years have passed by, and I have almost felt as if I was a student again in that dim past before world wars came to plague mankind."

The friendship between Pandit Nehru and Birbal Sahni endured till the very end.

Birbal was awarded the DSc degree from London University in 1919, at the age of 28 for his work on fossil plants. In 1921, he returned to India and took charge of the newly opened department of Botany at Lucknow University where he later initiated the opening of the Geology Department as well. Birbal totally immersed himself in work. He had the habit of making rock and fossil sections by himself, always seeking perfection. He could be seen all day and night cutting, grinding and polishing thin sections of fossils. He literally lived and breathed science. When the two brothers Mulk Raj and Birbal got together the main source of conversation was geology and palaeobotany, liberally interspersed with games of chess to which Birbal was addicted [7] (p.75). He was elected Fellow of the Royal Society in 1930.

Birbal was also fond of sports and played hockey for his school and college and excelled in tennis, being a member of the victorious Cambridge Indian Majlis team over the Oxford Indian Majlis.

Concluding Remarks

Birbal Sahni's inclination for the natural sciences and his love and attitude to science was shaped in large measure by his early upbringing which stressed the importance of rational thought in day-to-day activities. He was very close to his father from whom he imbibed several traits apart from his love of adventure and joy of discovery; these were a strong addiction to work, a strong will and a genuine sympathy for those in need.

Suggested Reading

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