

'The History of Hindu Chemistry' A Critical Review

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ABSTRACT

'The History of Hindu Chemistry' is one of the rare, important books published in twentieth century. Sir Prafulla Chandra Ray, the author of this book, who was a chemist by profession, has contributed greatly to the field of Rasashastra in his own style. The book in two volumes is in English and has achieved international recognition. The work became the cause of enlightening people specially, the Westerners about Indian Alchemy which, they were till then unaware of. In a way, 'globalization' of the concepts of Rasashastra has its starting point in the works of Sir P.C.Ray. The author has touched almost every area of Rasashastra of course, from the standpoint of modern Chemistry. A critical analysis of his contributions, the narration of the contents of the book are detailed in the paper.

Introduction:

The History of Hindu Chemistry authored by Sir Prafulla Chandra Ray (P.C.Ray) is probably the first of its kind. The book written in English in two volumes is thought to be of greatest standards. It is also credited with the fame of getting international recognition to Ayurveda in general and Rasashastra in particular.

The author P.C.Ray was an eminent personality in the field of Chemistry and was working as a professor of Chemistry in the Presidency College, Calcutta, when he was called upon by another stalwart in Chemistry, Mr. M.Berthelot in 1897 for furnishing the information about the Chemistry of Ancient Hindus, an incident, which dragged him to the field of Indian Alchemy. Following his personal appeal, Ray submitted to him, a short monograph of Indian Chemistry based mainly on Rasendra Sara Sangraha in 1898. This left the author with a strong desire of studying Hindu Chemistry in much detail and present the world, with a masterpiece.

The author then started a research for finding the facts of Hindu Chemistry with the help of Sri Ram Pundit Navakant Kavibhushana for reading and understanding the contents of manuscripts. He undertook a systematic examination from the Chemical standpoint, of the Charaka, the Susruta and the various standard works of the Ayurvedic and Iatro-chemical periods, which had escaped the ravages of time. He took to writing with an intention of presenting all the information in a short, small book. But, as he started realizing the vastness of the subject, he curtailed the scope of his study and presented the first volume of his book in 1902.

Considering the exceedingly favorable reception accorded to the first volume, it was brought out with second edition in 1904, much before the second volume could be published.

The second volume of the book was published in 1909, by which Mr. M. Berthelot had passed away. And the author, acting true to his sincerity, dedicated the second volume of the work to the memory of the former. During the preparation of the second volume, the author felt that his work would be incomplete which did not deal with the constitution of matter and the various hypotheses in regard to it. So, he sought the help of Mr. Brajendra Natha Seal, Principal, Victoria College, Cooch Behar who, kindly responded to his request and supplemented the work with his essay on the Mechanical, Physical and Chemical theories of the Ancient Hindus.

Unfortunately, the book is out of print today and the necessity of reprinting if not editing it is not being felt by anybody. The copies of the book are hard to find in the libraries of the present day. The library of the Government College of Indian Medicine, Mysore, which is counted as one of the oriental libraries of the country, was found to have a few copies of this book. One such copy of the book was brought from that library with the kind permission of Dr. Ashok D Satpute, the then Professor and Head of the department of Rasashastra, G.C.I.M., Mysore for the purpose of this study.

Material of the book (contents)

Volume 1

Preface to the first edition

Written by P.C.Ray on the first of May 1902

Preface to the second edition

Written by P.C.Ray on the first of January 1904

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Chapter 6: Indebtedness of the Arabians to India

The Ayurvedic period

(From Pre-Buddhistic Era to circa 800 A.D.)

Chapter 1: The constitution and properties of Matter; The Atomic Theory

Chapter 2: Chemistry in the Charaka and the Susruta

Chapter 3: Chemistry in the Bower Mss.

Chapter 4: Chemistry in the Vagbhata

The Transitional period

(From 800 A.D. to circa 1100 A.D.)

Chapter 1: Chemistry in the Siddhayoga of Vrinda (circa 900 A.D.)

Chapter 2: Chemistry in Chakrapani (circa 1060 A.D.)

The Tantric period

(From 1100 A.D. to circa 1300 A.D.)

Chapter 1: Chemistry in Rasarnava

The Iatro-chemical period

(From 1300 A.D. to circa 1550 A.D.)

Chapter 1: Chemistry in Rasaratna Samucchaya

Notes

Alum and Green Vitriol

Metals and Metallurgy

Zinc

Calamine the Vitriols Blue Vitriol

Gun powder, Saltpeter and the Mineral Acids

Knowledge of technical arts and decline of scientific spirit

The wastage of Gold during the course of preparing

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Volume 2

Preface

Written by P.C.Ray on the first of June 1909

Preface

Written by B.N.Seal on the twenty third of May 1909

Introduction

Chapter 1: On the age of Nagarjuna and Buddhist

Alchemical Tantras

Chapter 2: Further cultivation of Alchemy

Chapter 3: Circa 1350 A.D.

Chapter 4: Modern Period (1500 A.D. to 1600 A.D.)

Chapter 5: Indigenous origin of Indian Alchemy

Chapter 6: Some noted Indian Alchemists and their works

The Tantric period

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Chemistry in Rasaratnakara of Nagarjuna to Chemistry in Swarnatantra (14 texts)

- Knowledge of Gems
- Note on method of preparing Caustic Alkali
- The Tantrists, the Rosicrucians and the seekers after Truth
- The Metals and their Loss in Weight after Calcination
- Antimony

- The preparation known as Swarna Sindura or Makaradhwaja
- Identification of Metals by their colouration of flames
- The age of Bhikshu Govinda, the author of Rasahridaya

The mechanical, physical and chemical theories of the ancient hindus

(By Principal B.N.Seal)

- The Sankhya Patanjali System
- Chemistry in the medical schools of ancient India
- Weights and Measures
- Vedantic System
- The Atomic theory of the Buddhists
- The Atomic theory of the Jains
- The Nyaya Vaisheshika chemical theory
- Conception of Molecular motion

The date of rasaratna samucchaya

(By P.C.Ray quoting an extract from the article of Mr.T.G.Kala, editor of Marathi journal 'Samalochaka' which contained a critical notice of Rasaratna Samucchaya)

The weight of air

(By Principal B.N.Seal)

Appendix

The Hindu doctrine of scientific method (By Principal B.N.Seal)

Addenda

Empirical recipes of Chemical Technology (By Principal B.N.Seal)

Errata

Sanskrit texts

Extracts from fourteen texts namely, Rasaratnakara, Rasahridaya, Kakachandishwari Tantra, Rasendra Chudamani, Rasaprakasha Sudhakara, Rasendra Chintamani, Rasakalpa, Rasarajalakshmi, Rasanakshatra Malika, Rasaratnakara of Nityanatha, Dhaturatnamala, Rasapradipa, Dhaturakriya and Swarnatantra.

Indices

Index 1: Proper Names

Index 2: Subjects

Style of presentation

The author has used the classical Royal English for presentation of the matter. The usage of standard poetic English might be the order of that day, but it fails to be understood comprehensively by a student of the present day. The notion about the use of language has changed considerably with the course of time. It would not be a false statement to say that the books having a language close to the spoken language become popular within a short time now a days.

The author has, on many occasions quoted the passages from writings of eminent authors like Berthelot, Bloomfield, Colebrook, Goblet, etc. This is of valuable help for the reader to get the cross references directly. However, the reader may be put under serious inconvenience if he is not familiar with French and Greek languages as the passages are not translated.

At times, the author is seemed to be bold enough in making strong remarks, though he was writing the book under the auspices of a British rule such as, "It is curious to reflect that the upholders of the 'Greek culture' are often found ready, though unconsciously, to twist and torture facts and conclusions to serve their own purpose, and reserve to themselves the benefit of doubt as regards date; but whenever the priority of the Hindus is unquestionable, an appeal is made to the theory of common origin and independent parallelism of growth". It seems that the author is eager to convey about the biased approach of the Europeans in studying the sciences of the Ancient Hindus. But, it can also be seen that the author was not completely out of the influence of European writers.

Also, the author does not hesitate to clearly point out the mistakes done by earlier writers; let them be Indian or Western. e.g; Translation of a passage of Sarvadarsana Sangraha as done by Cowell and Gough, who have completely misread the verse. (page 76, Volume 1, Chapter IV, The Tantric Period of Introduction) Further, he strongly criticizes the false statements like "Not only Sanskrit literature but also Sanskrit language was a forgery made by the crafty Brahmins on the model of Greek after Alexander's conquest" (By Dugald Stewart, page 45, Volume 1, Chapter IV, The Tantric Period of Introduction).

Often, the author tries to stress on the fact that the Alchemical ideas of Hindus had been very early spread far and wide. In one such attempt, he quotes an extract from Yule's 'Macro Polo' "There is another class of people called 'chugi'(yogi), who were indeed properly Abraiman, but they form a religious order devoted to the idols. They are extremely long-lived, every one of them living to 150 or 200 years_____ they eat very little_____ and these people make use of a strange beverage, for they make a potion of sulphur and quicksilver mixed together, and this they drink twice every month. This, they say, gives them long life; it is a potion they are used to take from their childhood".

The author, here and there makes appeal in front of readers like, "Rasarnava must be regarded as a valuable national legacy".

The book is filled with the indigenous ideas as, "_____ its (Rasarnava) author, who ever he may be, now and then blurts out hints, which clearly prove it to have been compiled from pre-existing works".

The author, though working in the field of Rasashastra, the latent chemist in him seems to have a constant influence on him. He has analyzed the things from the standpoint of Chemistry, most of the times. That is how, he makes out a point that the author of Rasarnava had mistaken copper for gold at a particular instance. (Rasarnava 7/31-32)

The Sanskrit terms have been simply translated in to English to suit the Western readers. This often poses problems in understanding the subject properly.

The second volume of the book has incorporated papers by Principal Brajendra Natha Seal on the mechanical, physical

and chemical theories of the Ancient Hindus. His style of presentation is no different than that of P.C.Ray as far as the language is concerned. These writings are extracts from his elaborated book 'The Positive Sciences of the Hindus' or, it is quite a possibility that the book was written later elaborately.

The depth of knowledge of the author

The knowledge of the author in the field of Chemistry seems to be flawless probably because of which the celebrated personality in that field went on to the extent of making a personal appeal to the former to furnish the details of Hindu Chemistry.

Further, in the present work, the author has tried to chemically explain the facts. His efforts are of invaluable help to the present day's student of Rasashastra. His indigenous notes on various points such as the combustibility of diamond, notes on *vaikranta*, *makshika*, iron pyrites, *sasyaka*, *gairika*, *kamkushta*, alum and green vitriol, discussions on gun powder, saltpeter and mineral acids, a detailed note on the wastage of gold in the course of preparation of jewelry in Bengal, notes on the salts, the killing of metals, the Hindu method of manufacturing calomel and comparison between the Hindu and Japanese methods and chemical analyses of preparations like *kajjali*, *parpati tamram*, *rasa karpura* and *mandura* still remain unsurpassed by any means.

Moving on to the field of History, the author seems to have been carried away by the opinions of earlier writers, to some extent. This is evident from the fact that the author has completely missed the chronology. Even in some places where the author himself tries to fix the antiquity of some books and authors, he hasn't done full justice to the task. Fixing Rasahridaya Tantra to the eleventh century A.D. and regarding Govinda Bhagavat as a Buddhist are only a few examples.

The author was not much familiar with the concepts of Ayurveda and he was sincere enough to remember the valuable assistance he got from scholars of that field. But he should have been more generous in making remarks on Ayurvedic topics. Once he criticizes Charaka as "the author indulges in random, hap-hazard and irrelevant discourses, which make the reader often lose the thread of the main narrative" (page 16, Volume 1, Chapter - II The Ayurvedic Period of Introduction) which implies the author's limited knowledge in understanding the text, which has followed a clear rule of narration as *uddeshya* (statement in brief), *nirdesha* (detailed discussion on the statement made earlier) and *lakshana* (definition).

Areas covered

Almost all areas of Rasashastra have been touched by the author. Special importance has been given to topics which have a definite scope for discussion from the point of view of Chemistry viz; caustic and mild alkalies, precious stones, gun powder, mineral acids, etc. Some of the topics left out are, arsenic and arsenic compounds, *mahavisas* and *upavisas*.

Importance of the work in the present day

After going through the book, a student of the present day may not feel its importance. But one should be fair enough to remember the efforts of P.C.Ray in bringing to the limelight an almost lost science. Eventually, he emerged as the trendsetter and almost all the present texts of Rasashastra are written on the lines of the History of Hindu Chemistry.

More than that, one should be very much grateful to Sir P.C.Ray for his painstaking efforts to find rare manuscripts because of which one can find many texts of Rasashastra in the published state today.

The analytical approach found in the text is definite to provide a momentum for the present day researchers. The supplementary part of the book written by Principal B.N.Seal on the basic principles and philosophic concepts is of great help not only to the student of Rasashastra but, to the student of Ayurveda as well.

Summary and conclusion

The History of Hindu Chemistry is a book authored by Sir P.C.Ray, a chemist by profession. Though he was brought to the field of Rasashastra accidentally, he worked with sincerity so as to make full justice to the field. Covering almost all the areas of the subject, he brought out his book in two volumes over a span of 12 years. The book is rich with rational thoughts, scientific analyses and indigenous ideas. The pictures of eight yantras given in the appendix of the first volume have their own significance. As the book was written in English, it was welcomed by all sets of people which made the book popular within a short span of time. By this, P.C.Ray was able to get the attention of the world towards Rasashastra. It would not be an exaggeration if it is inferred that globalization of the concepts of Rasashastra started from this point in the present era. The book has retained its importance even to this date though it is almost a century old. People should think in terms of getting the book reprinted so as to make it available freely to the present day students.