

## Historical Note

# Dr. Radhikaram Dhekial Phookan: A Chemist from Assam

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### Abstract

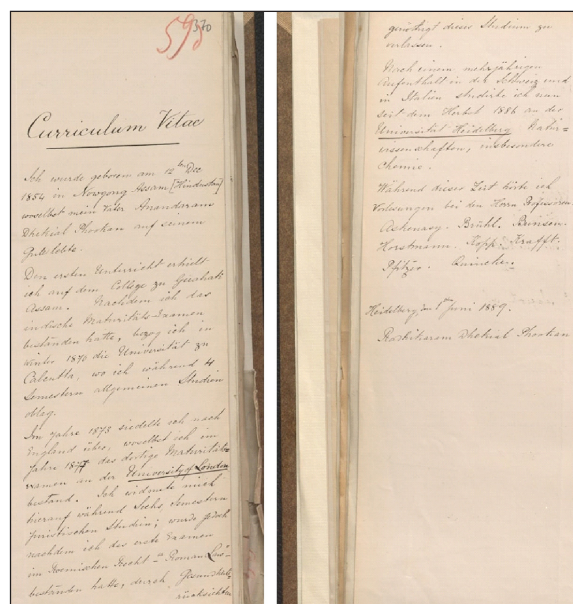
Radhikaram Dhekial Phookan (RDP) was the first PhD in Chemistry from Assam and probably in India. RDP's nine year hiatus at the Institute of Chemistry in the University of Heidelberg, Germany, and his publications are recorded for the first time. The faculty that taught RDP at Heidelberg, along with his mentors Robert Bunsen and Victor Meyer, presented a rare window of opportunity for a non-European to be a part of this pre-eminent centre of modern chemistry. RDP made full use of this opportunity by securing his PhD and subsequently working towards his habilitation. His work available as three publications in peer reviewed journals have been summarised in this paper. Unlike his contemporaries Acharya Sir Prafulla Chandra Ray and Sir Jagdish Chandra Bose, RDP's early demise, robbed him of the chance to play a seminal role, just when Indians were able to claim some of the limelight in natural sciences. This documentation has also cleared misconceptions related to his doctorate and its validity.

**Key words:** Radhikaram Dhekial Phookan, Heidelberg University, Matilda Emily Sale Phookan, History of Chemistry and Science in India.

## 1. FAMILY BACKGROUND

While many documents pertaining to RDP seem to have got lost, fortunately one document, written by RDP presenting curriculum vitae (CV) in German (Fig. 1) has stood the ravages of time. According to that document he was born at Nagaon in Assam on the 12<sup>th</sup> December, 1854. On the other hand, his father's biographer, (Barua, 1971, p.127) recorded it as 9<sup>th</sup> December, 1854. The details in his CV are related to academic pursuits and contain little personal information.

Born into an illustrious family in Assam, RDP was the third child and eldest son of Anandaram Dhekial Phookan (1829–1859) and Mahindri Devi Phukanani (1833–?). Two elder sisters Raseswari (1849–1852) and Padmavati Devi (1853–1927),



**Fig. 1.** RDP's CV in German

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a younger brother Anandaram (1857–?) and the youngest sister Chandraprabha (1859–?) completed his immediate family (Barua, 1971, p.154). His father was a renowned litterateur synonymous with the *Orunodai* period of Assamese Renaissance and an administrator with the East India Company (Goswami, 2009, pp, 791, 794 & 798; Sharma, 2011, p.56). His family were well established landholders; with the title ‘Dhekial Phookan’ given to his grandfather Haliram (1802–1838) and that of ‘Kharghoria Phukan’ to his grand uncle Juggoram (1805–1838), by the Ahom King Chandrakanta Singha, (Barua, 1971, p.18). RDP’s mother, Mahindri Devi Phukanani (1833– ?), came from a well-placed family in Jorhat, Assam, where his maternal grandfather Pashupati Phukan held the title of ‘Raj Guru’ or the religious mentor to the King (Barua, 1971, p. 54).<sup>1</sup>

When Anandaram died on June 16, 1859, the immediate and extended family supported his young family. Besides, Padmavati and her husband Nandeswar Barua (1843–1895), an uncle Gunabhiram Barua (1834–1894), sent half his salary, every month to the family; and subsequently supported RDP’s first decade abroad (Bhuyan, 198, p. 241). Even ritual like RDP’s sacred thread ceremony, was performed by his uncle Balaram Phukan, who was Anandaram’s cousin and son of Juggoram Kharghoria Phukan (Barua, 1971, p.175). Since RDP had no children, it is through his sister Padmavati, grand uncle Juggoram Kharghoria Phukan and uncle Gunabhiram Barua, we can trace links to the other members of the family. On the ancestry sites available online,

RDP’s presence is recorded only through links to his wife’s family<sup>2</sup>.

## 2. RADHIKARAM’S EDUCATION

### 2.1 Early Education in India

RDP’s school, the Gowhatty Collegiate School, continues to date as a fully functional institution, the Cotton Collegiate Government Higher Secondary School in Guwahati. This was an institution that RDP’s family was well connected with as patrons and alumni (Goswami, 1971, pp. 793–794; Sharma, 2011, p.150). From Gunabhiram Barua’s narrative we learn that RDP left for London on June 17, 1873 to study law (Barua, 1971, p.175), probably without completing his graduation from Calcutta University<sup>3</sup>.

### 2.2 Radhikaram in London (1873–1886)

RDP’s next step sets him apart from his prevailing family tradition; he became the first member of his family to go abroad to England. Not even his *bon vivant*, liberal, westernized uncle Juggoram Kharghoria Phukan had travelled abroad (Goswami, 1998, p.603). ‘Personal Intelligence’ in the *Journal of the National Indian Association* (1873, p. 427), marked the arrival in England of, ‘R. Phookan from Assam, intending to compete for the Civil Service’. Unfortunately, we have no further information on the fate of RDP’s Civil Service aspirations; but like many other Indians and his own contemporary Anundoram Barooah, we find him listed among the South Asians at the Inns of Court: Middle Inn (Strugess II, 589)<sup>4</sup>. RDP then joined the University

<sup>1</sup> Further, a note on the various forms of surnames in Assam is relevant at this point; Dhekial/Dhekiyal are alternative forms of the same name; as are Phukan /Phookan; and similarly, Barua/Baruah/Barooah; Bora/Borah/Borra; it must be said, that RDP’s use of the less than common Phookan spelling has made our search into RDP’s past easier.

<sup>2</sup> <https://www.ancestry.com/family-tree/person/tree/15526439/person/20483161170/facts>

<sup>3</sup> Again, this was not an uncommon practice at the time; both Sir Jagdish Chandra Bose & Acharya Sir Prafulla Chandra Ray left for Britain without completing their course at Calcutta University.

<sup>4</sup> An entry dated January 13, 1874 tells us “Radhikaram Phookan, of Gowhatty, Assam (19), eldest son of Anandaram, Landholder, decd.”

**CERTIFIED COPY OF AN ENTRY OF MARRIAGE**

GIVEN AT THE GENERAL REGISTER OFFICE

Application Number 8440046-1

1803. Marriage solemnized at the Register Office in the Suburb of Kensington in the County of Middlesex								
No.	When Married.	Name and Surname	Age	Condition.	Rank or Profession.	Residence at the time of Marriage	Father's Name and Surname.	Rank or Profession of Father.
108	Second February 1883	Radhakaram Dhekial Phookan	27	Bachelor	Phookan	57 Elgin Crescent Kensington	Anandaram Dhekial Phookan	Woburn
		Matilda Emily Sale Gresham	28	Widow		57 Elgin Crescent Kensington	James Smyth	Farmer
Married in the Register Office according to the Rites and Ceremonies of the								
by Licentiate before			by me,					
A. J. Clarke Phookan			A. E. Baker			C. W. Barnes Licentiate		
Mc E. J. Gresham			John Henry Mansfield			John Harrison Deputy Superintendent Registrar		

CERTIFIED to be a true copy of an entry in the certified copy of a register of Marriages in the Registration District of Kensington  
Given at the GENERAL REGISTER OFFICE, under the Seal of the said Office, the 24th day of July 2017

MXH 134793

CAUTION: THERE ARE OFFENCES RELATING TO FALSIFYING OR ALTERING A CERTIFICATE AND USING OR POSSESSING A FALSE CERTIFICATE. © CROWN COPYRIGHT

WARNING: A CERTIFICATE IS NOT EVIDENCE OF IDENTITY.

LBA

Fig. 2. Marriage Certificate of RDP issued in Kensington, England

of London in 1877 and pursued law for six semesters<sup>5</sup>. RDP cleared the first examination on Roman Law (The Weekly Notes, 1880, p. 531). Rather unfortunately, RDP tells us in his CV that he did not give the rest of his examinations due to health considerations. The London University phase therefore, brings us to almost the end of 1880. Further records that we have been able to source, point to a longer stay and / or periodical return to England till 1882<sup>6</sup> (Hyndman, 1882; Banerji, 1883). Finally, his marriage certificate records, 57, Elgin Crescent, Kensington as the place of residence, when he married Matilda Emily Sale Gresham (1832-1913) on 2<sup>nd</sup> February, 1883 (Fig. 2). The academic pursuits of this phase suggest that RDP was fairly serious in attempting to become at least a solicitor, if not a barrister (Bhuyan, 198, p. 238). His other reason for coming

to England i.e., to qualify for the Indian Civil Services did not seem to have progressed at all. If he had qualified, RDP would have been the second person in Assam, after Anundoram Barooah, to have done so.

### 2.3 The Stimulus to Study Chemistry?

There is nothing further as yet, apart RDP's own statement in his CV, to substantiate the fact in the fashion of time, RDP travelled in Europe, spending time in Italy and Switzerland possibly to recoup and to round off his education. One is tempted to extrapolate that he met Robert Bunsen and Henry Roscoe, who loved to holiday together in Switzerland (Roscoe, 1900, p.535); or that RDP heard the latter lecture in England and was encouraged to study chemistry at Heidelberg. Therefore, as of now, it would be safer to err on

<sup>5</sup> University of London, General Register, Part 1, p. 135. He was perhaps attempting to secure a Graduate Diploma in Law.

<sup>6</sup> In July 1880, a memorial was, 'presented to Lord Harington at the India Office Library by a deputation of English and Indian gentlemen' to give the people of India a greater role in administration, RDP is listed as among those present ; and again in the November, 28th 1882, meeting of the East India Association.

the side of caution. However, this interim period is definitive as it stimulated the change of RDP's field of academic interest from law to chemistry. In addition, it was possibly a time when he learnt German, in preparation for Heidelberg, a guess that may not be very far off the mark. RDP's cousin, Jnanadabhiram Barooah writes that RDP was a multi-linguist, who knew English, French, Italian, German, and could even sing in these languages, apart from Assamese and Bengali (Bhuyan, 1981, pp. 239–240). So, 'this son of Anandaram Dhekial Phookan and grandson of Haliram Dhekial Phookan, finally chose Chemistry and joined the Institute of Chemistry at the University of Heidelberg, on October 21, 1886' (Deka & Maitra, 2016, p.4).

### 3. RADHIKARAM IN HEIDELBERG (1886–1895)

This is the most interesting phase from the history of science perspective and seemingly the most productive. It is also, academically, the best documented; thanks to the implacable German record keeping, and the bonus of the only document (so far) written by RDP himself, in German, in a neat, well-formed handwriting (Fig. 1), again sourced from Germany.

RDP emerges after a hiatus of apparently 6 years, if we date it from his last examination in 1880; or 3 years if dated from his marriage in 1883. He now wanted to study 'natural sciences, especially chemistry' (Fig.1). Whatever, his aforementioned linguistic abilities were, RDP must have had a working, if not good knowledge of German to have enrolled and studied natural science in Heidelberg. The Institute of Chemistry at the University of Heidelberg (now known as the Institute of Inorganic Chemistry) seems to have been obviously a famous destination, if not well thought out choice. It's 19<sup>th</sup> century fame is still a proud part of Heidelberg's profile:

During the 19<sup>th</sup> century, Heidelberg was widely celebrated for its high level of research, its liberality and commitment to democratic ideals and its openness to new ideas. This combination attracted a large number of foreign students. This second flowering was marked by extraordinary research efforts across all faculties and was punctuated by such names as Robert Bunsen, Hermann Helmholtz, Gustav Kirchhoff and Max Weber<sup>7</sup>.

Through the academic faculty that taught RDP (Appendix 1 & 2), we have a bird's eye view of 19<sup>th</sup> century scientists who became indelible parts of our laboratories and textbooks. The fact that many of their signatures are on RDP's documents from Heidelberg, makes the narrative all the more vivid. The emphasis on laboratory and practical work in all the subjects and the inclusion of microscopy, were part of the changing 19<sup>th</sup> century tradition of science education in general and Germany in particular.

#### 3.1 PhD Course & Award (1886–1890)

From the University of Heidelberg, at the Grand Duchy of Baden, the certificate of studies and conduct states that,

We hereby certify that Mr. Radhikaram Dh. Phookan born in Assam, India, son of the late count Phookan in said place, that he by virtue of sufficient papers of identity, has been matriculated at the 21<sup>st</sup> of October 1886 as Studiosus Philos., has stayed here till the end of winter-semester 1892/93.

Thus, RDP must have been present at the celebrations to mark the 500 years of the foundation of Heidelberg University, held in 1887, where Henry Roscoe was chief guest.

As per the then existing system at Heidelberg, RDP completed six semesters of course work (Appendix 1). In the Spring /Summer term of 1889, he was examined in Chemistry, Physics and Botany, and was awarded the PhD degree in Chemistry on July 26, 1890 (Fig. 3). Quoting Hugh Chisholm on Victor Meyer (Encyclopedia Britannica, 1911 p. 349), various sources underline

<sup>7</sup> 'A Short Survey' under History of Heidelberg University, available on its website .

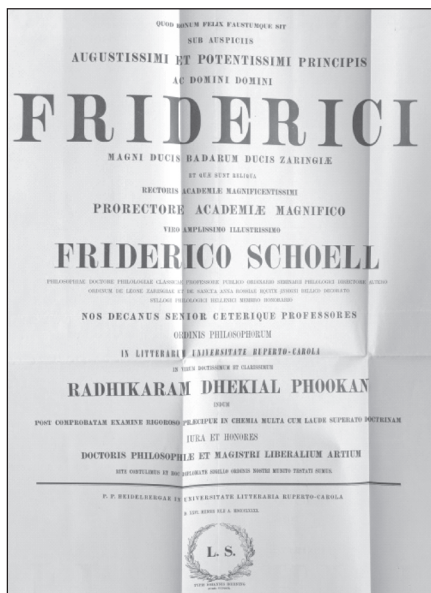


Fig. 3. PhD Award letter of RDP, 1890

the fact that Victor Meyer followed a similar course and was awarded PhD in 1867, subsequently citing Robert Bunsen and then Emil Erlenmeyer as Victor Meyer's doctoral advisers. Therefore it would not be out of place to name Robert Bunsen and Victor Meyer as RDP's doctoral advisers and mentors. A further similarity is that Meyer had his first publication in 1869 (Richardson, 1897, p. 918) and RDP had his in 1892, both two years after the award of their PhD. RDP's contemporary, Fritz Haber earned the same degree in 1891 from the University of Berlin, after being examined in Chemistry, Physics and Philosophy (Charles, 2005, pp. 19-20).

### 3.2 Habilitation Course, Dissertation and Publications (1889–1894)

The address book of the University for the winter semester of 1890/91 to the summer semester of 1895, records,

Dr. R D Phookan from London, England, studying Natural Sciences, living in 9 Sophien Street, in a house owned by Herr Krall (Univesitats Bibliothek Hiedelberg).

Thus, RDP post the award of the degree, continued for another seven semesters. The main difference in this phase would be the introduction of Mineralogy, and the replacement of Robert Bunsen by Victor Meyer, as the Head of the Institute. Infact in his last three semesters, RDP seems to have been taught only by Victory Meyer. The fact that RDP continued in Heidelberg for three years after his PhD and published three papers, indicates that he was possibly preparing for his habilitation which required original published work.

RDP's first paper was published in 1892 with F. Krafft, "Ueber einige Derivate der Sebacinsäure" (Krafft, 1892). The second and third papers had the same title, "Über Verdampfungsgeschwindigkeit von Körpern in verschiedenen Atmosphären" published two years apart in 1892 & 1894, as single author publications by RDP (Phookan, 1892, 1894). At the end of his second paper RDP concludes by thanking Prof. Victor Meyer for his advice and expresses his grateful thanks. Of real interest, is the note written by Meyer thereafter;

The above investigation had to be discontinued by the author because of illness: but I do not yet regard it as absent, and intend to have it continued<sup>8</sup>.

This is indicative of a treatise/ dissertation in progress. We learn from the August 31, 1893 announcement of the British Association Meeting that Dr. Phookan has promised a description of his recent researches on the "On the evaporation rate of bodies in different atmospheres." This is confirmed from the records of the 63<sup>rd</sup> meeting of BAAS held in Nottingham in September 1893 (Clowes, 1893). We are unable to discern if he travelled to England to present this paper and/or if it coincides with his discontinuation due to illness as detailed at the end of RDP's 1892 paper. Further confirmation of a habilitation in progress comes from the subtitle of the third paper "Abhandlung" meaning dissertation. Unfortunately,

<sup>8</sup> Victor Meyer's note appears on page 17 of the 1892 paper by RDP.

RDP was apparently in no position to complete it, and wrote “At the present time I am prevented by the circumstance from continuing to pursue the idea, and conclude this treatise by expressing my most grateful thanks to Prof. Meyer for his advice and lifelong support” (Phookan, 1894). One gets the impression that RDP would have liked to delve deeper into his subject before presenting it to the Habilitationsschrift Committee. RDP thus seemed unable to secure his habilitation by circumstances beyond his control. The work was however, received for publication in July 1893, and published in 1894.

### 3.3 Publications

The three publications of RDP reveal that he was working on the very latest trends of 19<sup>th</sup> century organic and physical chemistry.

His first paper dealt with stereochemistry, the spatial organization of atomic groupings. RDP with F Krafft (Phookan & Krafft, 1892) studied the derivatives of sebacic acid - aiming to observe ring closure or even-open carbon chains in high molecular weight compounds. Sebacic acid was first purified by vacuum distillation, then sequentially converted into ‘provisional decamethylenimine’. The question that he addressed was whether this compound was formed by a ‘combination of the two terminal carbon atoms by means of the imido group, or whether the imido group engages the fifth atom.’ He concluded by writing that the former was more likely to take place. A ring closure would also be observed in the latter case, but it would ‘simply put aside the formation of piperidine’.

The next two papers dealt with evaporation of substances in different atmospheres or gases, in

line with the work of Victor Meyer. In fact he writes, ‘at the instigation of Prof. V Meyer, I have made a number of such experiments’. Thus using naphthalene, he conducted experiments with ‘air, hydrogen, carbonic acid and nitric oxide using a modified version of the Victor Meyer apparatus. In his own words:

Since the rate of gas evolution was to be enjoyed, it was not recommended to let the gas bubbles escape from below into a gas flue, but the gas was introduced from above into a gas burette filled with water.

The experiments yielded an evaporation rate of 18 seconds in hydrogen, 31 seconds in air, and 36-37 seconds in carbonic and nitrous oxide. ‘This unambiguously indicates a dependence of velocity on the severity of the atmosphere forming gas, even if a simple numerical relationship was not expected. After all it can be stated that carbonic acid and nitric oxide, which have the same molecular weight 44, also give rise to quite the same evaporation time.’ He finally states ‘These results suggested a desire to use much heavier gases than atmosphere.’

### 4. RETURN TO INDIA

Wilhelm Hübbe-Schleiden’s *Indisches Tagebuch 1894/1896*, helps us confirm RDP’s presence in Calcutta in 1895<sup>9</sup>. The same entry further states that “at 1-3 hour tiffin at Dr. Prasanna Kumar Ray with Leopold Salzer in Calcutta, he met another Indian who had spent 6 years in Germany at Heidelberg. Thanks to Frau Elizabeth Hunerlach at the Heidelberg University archives, the author was able to confirm that the said Indian student, RDP had studied in Heidelberg University from 1886 to 1893, having been admitted to the winter semester of 1886/7 on 21 October, 1886 to study to natural sciences and there on July 26, 1890

<sup>9</sup> As the entry is a part of *India Journey 1895: II* (January 11, 1895 – March 11, 1895) Madras: January, Calcutta; Darjeeling: February & Calcutta: February and March, [Hübbe-Schleiden, (1894/1896)]. The fact that RDP was present for a luncheon, with Dr. Prassana Kumar Ray (1849–1832), allows us to extrapolate, that RDP may have been renewing his acquaintance from his London days. Further support maybe drawn from the fact that between 1873-1878, while RDP was pursuing his course in Law at London, PK Ray was working towards his DSc; thus rendering a meeting between them highly probable. Herausgegeben, von Norbert Klatt, Göttingen 2009 (ISBN 978-3-928312-25-7)

<sup>10</sup> Dr. Prassana Kumar Ray would go on to become the first Indian principal of Presidency College, Kolkata.

was awarded the degree of Ph.D.” This account ties in perfectly with the records made available to us from the University of Heidelberg.

RDP’s meeting with Prassana Kumar Ray (1849–1832)<sup>10</sup>, becomes highly significant as RDP handed over a hand written book on his research in Chemistry at Heidelberg, to Prassana Kumar Ray for publication. It is very unfortunate that no trace of the book was subsequently found (Raichoudhury, 1935). This article also clearly states that RDP had secured a doctorate in Chemistry from Heidelberg. Simultaneously, RDP may have been exploring the possibility of a position in Presidency College, especially since Alexander Pedler, CIE FRS (1849–1918), a chemist, was the Principal of Presidency College in 1895–96<sup>11</sup>. RDP also met Sir Alfred Woodley Croft, the then Vice Chancellor of Calcutta University. Apparently, a position was offered to him for Rs. 250 a month, which was insufficient in RDP’s opinion to provide for a family (Bhuyan, 1981, p 239). Thus RDP may have finally visited his friend Raja Rampal Singh at Oudh, where he was offered /hoped to pick up a job at Kalakankar. Or more plausibly, RDP wanted to try his luck at the University of Allahabad set up in 1887, with one of the earliest Departments of Chemistry in India.

### 5. OBITUARY

Unfortunately, before any of this could materialize, RDP passed away in 1896 in Oudh. If there is an obituary for Radhikaram, it has to be the part dedicated to him in Sarat Chandra Mitra’s 1896 article, “Original Scientific Research in Bengal”. This article documented RDP’s PhD and research in Physical Chemistry and Stereochemistry from Heidelberg. Further it put on record that Victor Meyer, spoke highly of RDP’s attainments as a chemist. The final part states “Dr. Phookan came out to India in the beginning of the

year 1895, but, alas! he was not destined to live long and promote the cause of original scientific research in this country. It is with deep regret we have learnt that R D Phookan died about two months ago in Oudh. Possessed of high scientific attainments, he had a bright future before him, and, had he been spared, would have done much to enrich science by original contributions; but, by his untimely death, a career of great promise has been cut off in very prime of manhood” (Mitra, 1896, p. 351).

### 6. CONTROVERSY

In RDP’s home state of Assam, the paucity of documentation on RDP, generated a counter narrative on the authenticity and precedence in time of RDP’s PhD (Hazarika, 2016). It is rather unfortunate that the name of an eminent and respected scholar like M I Borah was made the centre of this controversy<sup>12</sup>. Therefore, the authors took it on themselves to publish articles in newspapers to put in perspective RDP’s academic status. These articles in the local print media, in both Assamese (Phukan & Deka, 2016) and English (Deka & Maitra, 2016, p.4) were based on documents from Heidelberg University. Dissimilarities in requirements for awarding a doctorate, cannot take away from the validity of either degree. Neither can it negate the subsequent accomplishments of both awardees.

Part of this controversy can be understood if we take into account, that unlike Germany, there was no established PhD awarding system in the UK till 1917 (Renate, 1983, p.1). Our documentation corrects current misconceptions and further indicates that RDP is to the best of our knowledge, the first PhD in Chemistry in India. This premise takes into account that the doyen of Chemistry in India, Acharya Sir Prafulla Chandra Ray (1861–1944) obtained a DSc in 1887 from

<sup>11</sup> RDP may have been aware that it was Prof. Alexander Pedler’s lectures in chemistry that stimulated PC Ray to pursue Chemistry [ Atmacarita, (1973) p 43].

<sup>12</sup> Dr. Moayyidul Islam Borah, was a very respected academician in Persian, taught at Dhaka University and is remembered in the many publications that he authored, including translation of the famous Baharistan-i-Ghayabi in 1936.

Edinburgh University. This was not preceded by a PhD as per the then prevailing norms; later, in 1908 Calcutta University honoured Acharya Sir PC Ray with a PhD. Thus, the D.Sc. awarded was not preceded by a PhD.

The controversy is partly fed by the unequal volume of records and partly by the volume of support garnered to support or contradict claims. The documentation and narrative in this paper has been able to validate RDP's academic position and put on record the bio-graphical details of RDP's hitherto unrecorded life.

## 7. DISCUSSION AND CONCLUSION

RDP's chemistry oeuvre has given his personal narrative a well-defined direction, and rendered insignificant his earlier incomplete attempts at becoming a civil servant or lawyer. It has carved a niche for RDP, in the cultural memory and narratives of the North Eastern Region of India in general and Assam in particular. The Heidelberg-Robert Bunsen-Victor Meyer motif, was recurrent and central to RDP's decade of chemistry from 1886–1896.

To state that RDP's early demise robbed him of an academic career and students to take his legacy forward is an understatement; especially against the background of his contemporaries who had sufficient longevity to build successful careers. Thus in addition to the aforementioned Acharya Sir Prafulla Chandra Ray (1861–1944); Sir Jagdish Chandra Bose (1858–1937), Robert Bunsen (1811–1899), Friedrich Krafft (1852–1923) and most of the faculty that taught him at Heidelberg, are contemporary success stories that spanned a long life time, with the exception Victor Meyer (1848–1896). It is interesting to note that they were all fostered by the 19<sup>th</sup> century centers of Science- London, Paris, Edinburgh, Berlin,

Heidelberg and even Calcutta. It robbed RDP of the chance to play a seminal role, just when Indians were able to claim some of the limelight in natural sciences for themselves, with the years 1892 and 1895–96 being especially relevant. Thus, J C Bose published six path breaking papers on Electromagnetic Radiation & Light from his work carried out at the Physical laboratory of the Presidency College, Calcutta. In particular, his paper, "On a New Electro-Polariscope published in the *Electrician* on 27<sup>th</sup> December, 1895, so impressed the University of Cambridge, that they conferred an Honorary MA, a first by an English University to an Indian graduate. He also received a grant in aid from the Parliamentary Grant Committee on the recommendation of the Royal Society (Mitra, 1896, pp. 336-344).

This paper while documenting the life of RDP highlights the main facets of his personal and academic life. In a family whose time line and achievements, stretches across the pre-colonial, colonial and post-colonial phases of the history of Assam (Goswami, 2009; pp. 792-795); RDP has now a distinct domain among the luminaries of the colonial phase of Assam history. He stands out for his contributions in Chemistry from a cardinal centre of European Science like Heidelberg. Consequently, it has also successfully addressed the context in which it first attracted public attention; of whether he was the first PhD in Chemistry from Assam and India. We hope that further documentation and availability of documents in the near future will bring visibility to parts of this narrative that are yet invisible<sup>13</sup>.

## ACKNOWLEDGEMENTS

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<sup>13</sup> In 2016, when we marked the birth anniversary of Dr. Radhikaram Dhekial Phookan, we had only just received the documents from Heidelberg. RDP's birth anniversary in 2018 will be marked by naming the seminar hall in the Department of Chemical Sciences, Tezpur University and a commemorative one day seminar. We hope by RDP's next birth anniversary in 2019, we will be able to bring out a book.



## APPENDIX 1

**Table 1.** PhD Course Work (taken from RDP's Heidelberg University Certificate, dated 25<sup>th</sup> April 1893)

Semester	Subjects/Paper/course	Teacher	Main contribution
1. Winter semester/ term 1886/87	Experimental chemistry	Robert Wilhelm Bunsen (1811–1899)	Discovery of cacodyl radical, caesium & rubidium. Also known for gas analysis, spectrochemical analysis & Bunsen burner.
	Experimental physics	Georg Hermann Quincke (1834–1924)	Studies on capillary phenomena, modified disassociation hypothesis of Clausius & the apparatus Quincke's interference tube
2. Summer /Spring semester/term 1887	Experimental chemistry	R W Bunsen	Orchid morphology and taxonomy. Work on Diatoms and the Director of the Botanical Garden at Heidelberg from 1872-1906.
	Experimental physics	G H Quincke	
3. Winter semester/ term 1887/88	Chemical Laboratorial tutorial	R W Bunsen	Organic spectrochemistry, especially study of terpens.
	Botany (morphology and systematics)	Ernst Hugo Heinrich Pfitzer (1846–1906)	
4. Summer /Spring semester/term 1888	Botany (anatomy and physiology)	E H H Pfitzer	Morphological studies & physical basis of the water transport in plants, plant dyes, plant growth etc. Also published a Critique of the Darwinian doctrine.
	Experimental physics	G H Quincke	
5. Winter semester/ term 1888/89	Chemical Laboratorial	R.W. Bunsen	Boiling points, heat capacities, studies in the history of Chemistry.
	Introduction to organic chemistry	Friedrich Krafft (1852–1923)	
6. Summer /Spring semester/term 1889	Chemistry laboratorial tutorial	F Kraft	One of the founders of chemical thermodynamics.
	Botany(anatomy and physiology)	E H H Pfitzer	
	Theoretical chemistry	Hermann Franz Moritz Kopp (1817–1892)	
	Observations and calculations	H F M Kopp	
	Laboratorium	R W Bunsen	
	Beginners course	E H H Pfitzer	
	microscopy		
	Organic chemistry	F Kraft	
	Inorganic experimental chemistry	J W Brühl	
	Theoretical chemistry	August Friedrich Horstmann (1842–1929)	

## APPENDIX 2

**Table 2.** Habilitation Course work 1889–1893 (taken from RDP's Heidelberg University Certificate, dated 25<sup>th</sup> April 1893)

Winter semester/ term 1889/90	Inorganic chemistry	Victor Meyer (1848–1897)	Vapour densities, Victor Meyer apparatus, dissociation of Halogens, discovery of thiophen, coining terms stereochemistry & dipole, Victor Meyer esterification law.
	Chemical practice	F Krafft	
	Derivatives of Benzol	Ludwig Gattermann (1860–1920)	Gattermann-Koch reaction Gatterman reaction Analysed NCl <sub>3</sub>
Summer /Spring semester/term 1890	Physiology of nutrition in plants	Martin Möbius (1859–1946)	Publications on microscopic internships for systematic botany; Director of Botanical Gardens in Frankfurt.
Winter semester/ term 1890/91	General Mineralogy	Heinrich Rosenbusch (1836–1914)	Founded the Mineralogisches-Geologisches Institutes at UH; known for petrography.
	Laboratory course in Minerology	H Rosenbusch	
	Laboratory course in Physics	G H Quincke	
	Blowpipe analysis	Victor Mordechai Goldschmidt (1853–1933)	An ex UH alumnus; Founded the Institutue for Mineralogisches-Kristallographies in UH; Atlas of Kristallformen; HAW member.
	Laboratory course Chemistry	F Krafft	
Summer /Spring semester/term 1891	Laboratory course in Physics	G H Quincke	
	Laboratory course Chemistry	F Krafft	
Winter semester/ term 1891/92	Chemical laboratory	V Meyer	
Summer /Spring semester/term 1892	Chemical laboratory	V Meyer	
	Inorganic chemistry	V Meyer	
Winter semester/ term 1891/92	Chemical Practice	V Meyer	
	Inorganic chemistry	V Meyer	

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