



Dr. Gopaul Chunder Roy (1844–1887): An extraordinary life dedicated to the cause of medical science

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Abstract

Dr. Gopaul Chunder Roy (1844–1887), MD, FRCS, IMS, was one of the most important and prominent medical scientists of the nineteenth century India, who was a renowned surgeon and made valuable contributions to the understanding of the epidemic ‘Burdwan Fever’ that devastated the lower districts of Bengal province during the latter half of the nineteenth century. A product of the iconic Calcutta Medical College, he obtained an MD from the Glasgow Medical College and became the first native Indian to be awarded an FRCS (by exam) from the Royal College of Surgeons, London. In 1872, he joined the Indian Medical Service and later worked in various districts of Bengal Presidency. Dr. Roy was prolific in scientific publications and between 1866 and 1887, he published more than 70 valuable scientific papers on surgery, cholera, leprosy, filaria, snake venoms etc., but most importantly on Burdwan Fever, a kind of deadly malarial fever. His book on Burdwan Fever (1874, 1876), written based on his extensive personal experience, is still available in print in Europe and the USA. During the epidemic days, Dr. Roy worked tirelessly in Burdwan division and gained important scientific insight about the epidemic. His reputation as a doctor and his contribution to medical sciences were highly appreciated not only in India, but also in Great Britain, the USA and Australia during his lifetime. Unfortunately, Dr. Roy died early at an age of only 43 and today, his name is hardly known outside the academic circle and his contributions are nearly forgotten. Dr. Roy’s name has, of course, frequently featured in contemporary literature on Burdwan Fever, but beyond this, his contributions have hardly been discussed, and no comprehensive biography of Dr. Roy has so far been written. This article is an attempt to explore the importance of the medical works of Dr. Roy in the historical context and to document and compile a comprehensive scientific biography of this important scientific pioneer of the nineteenth century India, lest his contribution fades away from the history of science.

Keywords Gopaul Chunder Roy · Burdwan Fever · Calcutta Medical College · Glasgow Medical College · FRCS · Indian Medical Service

1 Bengal Renaissance and the rise of modern medical culture in colonial Bengal

The nineteenth century Bengal Renaissance, a modernist movement, revolutionized the intellectual life in Bengal by introducing modern education and spreading the modern science in the society. ‘Calcutta boasted a native intelligentsia conversant with events in Europe, aware of its own historical heritage, and progressively alert about its own future in the

modern world’ (Kopf, 1969, p. 4). English language became the medium of higher education from 1835 onwards and modern institutions (set up both by the Indians as well as by the British) became the nurseries of higher learning and research in modern sciences.

As Arnold (2004, p. 57) has explained, for various reasons medicine became the first discipline of modern science that was institutionally taught in India during the colonial era. ‘Medicine occupied a central place in Western scientific thought and activity in nineteenth-century India’ (Arnold, 2004, p. 57). With the establishment of a vernacular medical school (NMI or Native Medical Institute) in Kolkata in 1822, by the East India Company, systematic medical education was introduced to Bengal. Its aim was to provide medical training to Indians (Kumar, 1998, p. 19). It was a short-lived

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Fig. 1 Portrait of Dr. Gopaul Chunder Roy (1844–1887), with his autograph. (Courtesy: *Medical Reporter*, September 1, 1895, artist not mentioned)

institution that finally gave way to Calcutta Medical College (1835) or CMC, the first of its kind in Asia. Thus, CMC became one of the earliest institutions that promoted higher learning in Medical Sciences (Sanyal, 2022, pp. 152–53). Mentored by the stalwart English doctors, the College produced a galaxy of medical practitioners such as S.G. Chuckerbutty, Mahendralal Sircar, Kanny Lall Dey, Chunilal Bose, Kadambini Ganguly, Kailash Chandra Bose, Upendranath Brahmachari, Jyoti Prakash Bose, Bidhan Chandra Ray to name a few. The most exceptional among them was, no doubt, Gopaul Chunder Roy, who earned global recognition during his lifetime for his contribution to the medical science (Fig. 1).

In course of time, it became a pioneer in Medical Research too in India. Among the early researchers were Dr. William Brooke O’Shaughnessy and Dr. Henry Goodeve. The other important researchers were Dr. Soorjacomar Goodeve (SG) Chuckerbutty, who made significant contributions to *Materia medica*, Sir Leonard Rogers, who made important contributions to the treatment of Cholera, Sir U.N. Brahmachari, who conducted pioneering research on Kala-azar, Sir Richard Havelock Charles, who invented the ‘Charles Operation’ for filariasis and

Dr. Chunilal Bose,¹ whose major contributions were in food science and toxicology (Panja & Ghosh, 1989, pp. 244–248; Sanyal, 2022, p. 153).

The nineteenth century also witnessed a qualitatively new kind of medical culture in the Colonial Bengal. The East India Company had a sizeable army of its own and for rendering medical services to the troops and servants of the Company, a medical department was established in Bengal in 1764. Later, the Company organised Medical Services in three Presidencies in 1785, which subsequently also assumed civilian functions (Crawford, 1914). In 1795, Presidency General Hospital was established in Kolkata.

The establishment of Native Medical Institute (1822) and Calcutta Medical College (1835) were landmark events for higher learning in science and medicine in India. The Medical College Hospital at CMC was established in 1852 for treating common public (Panja & Ghosh, 1989, pp. 244–248).

However, the Company initially had very little concern for public health measures and ‘Until the 1860s and 1870s, Western medicine knew correspondingly little about the health of the majority of the Indian population, particularly about non-epidemic disease. Until the last third of the century the European medical ‘gaze’ was confined in the barracks and the prisons and such statistics as were compiled relating to the health of the indigenous population were largely drawn from these sources’ (Arnold, 1985, p. 170). Despite this fact, charitable dispensaries (mostly with funding from native philanthropists and rich people) began to appear from late eighteenth century in Bengal. These dispensaries were important for common public for receiving modern medical treatment and European medicine. Mukharji (2007, pp. 82–84) traces the growth of charitable dispensaries as ‘The first public dispensary in Bengal was opened on Chitpur Road in Calcutta in 1792, on the initiative of Mr. Wilson, a member of the Medical Board, and certain other eminent gentlemen of both European and Indian origin. In 1794, it was moved to Dharmatala Street and attracted a mere 216 patients in the year 1794–1795. Subsequently, two subordinate dispensaries were established at Park Street and Garanhata. In 1841, a third was opened once again at Chitpur. In 1803–1804, liberal subscription combined with government aid allowed dispensaries to be opened in Murshidabad and Dhaka. Soon afterwards, others were opened in Patna, Bareilly, and Banaras. These dispensaries remained ad hoc institutions and were not thought of as a unified ‘system’ or ‘network.’ The first attempts to form them into a recognisable system commenced with the calls for half yearly reports from 1842 onwards. By 1842, six dispensaries had been

¹ For a detail on Chunilal Bose’s contributions, please see Sanyal (2022).



established in Bengal. In the following decades their number increased rapidly, to reach a total of 255 by the end of 1879.' Hochmuth (2006, pp. 57–58) indicated that, 'In the early years they were mostly initiated and funded by the government. It was only starting in the 1850s that some wealthy indigenous landholders showed an interest in setting up dispensaries and supporting them to the degree that the government could restrict itself to the supplying of instruments and European medicines. A further source of support was private subscriptions from both European and indigenous individuals.' Commenting on the dispensaries, a European Doctor, Lt. Col. Sykes (1847, p. 1) wrote in 1847, '...in a letter, dated 27th April, 1838, ... the Government of India sanctioned the establishment of dispensaries in some of the large towns in the Bengal Presidency. They were to be under the Civil Assistant Surgeon of the station, who was to be allowed fifty rupees per mensem, including his vaccination duties. An educated young man from the Medical College at Calcutta, on a salary varying from 40 to 100 rupees, but latterly fixed at 100 rupees, was to be placed in charge of the dispensary. A small number of beds for extreme cases and for surgical operations were attached to each dispensary, and the appointment of boys, as apprentices, for vaccine objects was suggested. It was proposed to limit the monthly charge for each institution to 250 or 300 rupees. The dispensary was to be furnished with medicines and surgical instruments from the Government stores, and instruction was to be given to any youths who might desire to attend. The native assistant might practise privately.'

Quoting 'Bengal dispensary reports' of 1867 and 1900, Harrison (1994, p. 89), reports that after 1870, number of dispensaries in Bengal increased considerably: from 61 in 1867 with 17,000 in-patients and 318,895 out patients to 500 in 1900 with more than 50,000 in-patients and 2,296,617 out-patients.

At the beginning of the nineteenth century, indigenous medicines prescribed by Kavirajs and Hakims were the only antidotes against disease and sickness for the common public. The advent of a new medical culture and particularly the closure of NMI which also taught indigenous medical systems, dealt a massive blow to the indigenous systems of medicines and gradually with the establishment of dispensaries or hospitals across Bengal, what Bhattacharya (2014, pp. 231–264, 2015, pp. 95–124) termed as 'Hospital Medicines' supported by a 'New Medical Epistemology' were introduced.

One of the major concerns for the public health infrastructure developed under the Company, and later under the Crown, in India during the nineteenth century, was to tackle the epidemics namely cholera, malaria, kala-azar, typhoid, small pox, plague etc. that surfaced and resurfaced throughout the nineteenth century (Harrison, 1994; Samanta, 2017). A large portion of the present article will

deal upon this issue as the subject, Dr. Gopaul Chunder Roy, is primarily known for his work on Burdwan Fever.²

The East India Company's rule also opened the door of the higher education in Europe to the Indian students. Slowly but steadily, brilliant Indian students flocked to the Colleges and Universities in Europe, particularly in the Great Britain, for higher studies. Medical students were also no exceptions. But education in Europe was expensive. According to Mukherjee (in Banglapedia), 'Many luminaries of Calcutta including Dwarkanath Tagore³ and Ram Comul Sen⁴ enthusiastically supported medical education at the CMC by instituting scholarships and prizes for brilliant students. Four students of the College were sent to England through the financial help of Dwarkanath Tagore, Professor Goodeve and partly of the government. Three of them, including Dwaraka Nath Bose, Bhola Nath Bose, and Gopal Chunder Seal passed the examination for Member of the Royal College of Surgeons (MRCS) in 1846 and returned to India to join the uncovenanted Medical Service. Surjee Coomar Chuckerbutty remained there, obtained the MD degree of the University College of London, and became the first Indian to pass the examination for the Indian Medical Service and join the covenanted Medical Service. He also became a distinguished professor of the Medical College holding the Chair of *Materia Medica* from 1864 till his death in 1874.'

'This educational sojourn in England is important for its three-fold effect. First, it showed in a dramatic and conclusive manner that Indians could master science and medicine on a level with Europeans. Second, after these students received their degrees from the University of London and their diplomas from the Royal College of Surgeons and returned to India, they served as disseminators of modern science and became role models for future Indian scientists. Lastly, their example set the stage for a veritable flood of Indian students to England for study in all fields, a movement which continues to this day' (Gorman, 1988, p. 290).

The success of these students changed the British perception about the academic competence of Indian students. 'Most Englishmen would not have expected these Indians from a

² A type of deadly Malaria caused havoc in the Bengal districts, particularly in the Burdwan division, hence it came to be known as Burdwan Fever. The epidemic is said to have been caused, *inter alia*, by the construction of embankment for the railways which led to stagnation of rainwater and breeding of mosquitoes.

³ Dwarkanath Tagore (1794–1846) was a prominent industrialist, banker, and philanthropist. He was the first Indian industrialist to form a partnership enterprise with the British. A friend of Raja Ram-mohun Roy, Dwarkanath was the founder of Jorasanko branch of Tagore family. Dwarkanath also happened to be the grandfather of poet Rabindranath Tagore.

⁴ Ram Comul Sen (1783–1844) was a noted educationist, social reformer, philanthropist, and banker. He was associated with the establishment of Hindu College, Kolkata, became Principal of Sanskrit College, Secretary of the Asiatic Society and member of the Medical Commission set up by Lord Bentinck. A notable author, Ram Comul was the first Indian to publish a scientific paper in a journal. He is widely regarded as one of the pioneers of Bengal Renaissance.



disease-ridden, superstitious frontier outpost to have the slightest chance of success. Even one acquainted with the faculty, curriculum, and standards of the Calcutta Medical College would have been satisfied to have these students pass with average records at University College. They were far from home without social support from family or friends and they were studying in a foreign language. They could easily have been overwhelmed by the accomplishments of their classmates and the prestige of the faculty, but results proved that any such negative expectations were groundless. They not only passed, but did so with distinction, winning gold and silver medals and certificates of honour in various subjects from anatomy, botany, and chemistry to zoology. Their academic exploits were noted in the press. Various official reports of University College and the East India Company gave them the highest possible praise' (Gorman, 1988, p. 290).

With the rise of research activities in medicine around CMC, English language medical journals started appearing in print from Kolkata. Notable among them were *The Transactions of Medical and Physical Society of Calcutta* (1825), *Indian Journal of Medical Science* (1834), *Indian Annals of Medical Science* (1853), *Indian Medical Gazette* (1866), *Calcutta Journal of Medicine* (1868), *Calcutta Medical Journal* (1906) etc. Bengali authors also published in the *Lancet*, the *British Medical Journal*, *Pharmaceutical Journal*, *Glasgow Medical Journal*, the *Proceedings of the Royal Asiatic Society*, and others. Among the Bengali medical practitioners and science enthusiasts who regularly published in these journals were S.G. Chuckerbutty, Rajendralal Mitra, Mahendralal Sircar, Uday Chandra Dutt, Rajmohan Banerjee, Kalidas Nandi, Radha Nauth Roy, Deno Bundoo Dutt, K P Gupta, Kanny Lall Dey, Koilas Chunder Bose, S C Chatterjee, A Mitra, Chunilal Bose, B.C. Sen, Baman Das Basu, U N Brahmachari and others (Sanyal, 2022, pp. 153–154). We shall discuss the publications of Dr. Gopaul Chunder Roy separately.

Another important landmark event was the introduction of Vernacular Medical Classes in Bengali⁵ at CMC in the

⁵ 'To meet the rising demand for native doctors, the Government introduced a Bengali class at the Calcutta Medical College in 1851. Proficiency in Bengali was an essential prerequisite for admission to this class. The theoretical and practical courses were almost the same as in the Hindustani class. 21 students admitted in this class was examined in 1853. Qualified students filled the ranks of the Subordinate Medical Services as Hospital Apprentices or Vernacular Licentiate in Medicine and Surgery (VLMS) or found employment under Deputy Magistrate attached to Charitable Dispensary or in Jail Hospitals. In 1856–1857, the class had 88 students and the number went on increasing till it touched the figure of 635 in 1872. The students mostly belonged to Brāhmin, Kāyastha and Baidya castes. In 1864, the Bengali class was divided into two sections, the Native Apothecary Section, which trained students for government employment and the Vernacular Licentiate Section which gave instructions in medicine and surgery, in order to enable the students to practise among the less affluent sections of Indians....' (Sujata Mukherjee, *Banglapedia*, https://en.banglapedia.org/index.php/Calcutta_Medical_College).

year 1851. This prompted the necessity of large numbers of Bengali language text and reference books in medical and related sciences and in response to this, several authors wrote vernacular text books (Sanyal, 2022, pp. 152–153), which were extensively used in medical schools.⁶

Bengali periodicals in the nineteenth century too regularly published science articles (Sanyal, 2022, pp. 162–164). A few periodicals like *Bāmābodhinī Patrikā*, with a target readership among women, published informative articles on general health and hygiene, women's health issues, child bearing and child rearing etc. Dedicated Bengali journals on medical sciences, namely *Cikitsā Sammilanī*, *Cikitsāka*, *Cikitsāka o Samālocaka*, *Cikitsā Prakāś*, *Swāsthya*, *Swāsthya Samācāra*, *Cikitsā Darśan*, *Viṣak Darśan* etc. appeared during this time. Noted doctors as well as Āyurvedic practitioners were regular contributors. Interestingly, vernacular texts on remittent fever was also written by Bengali authors e.g., Jadunath Mukhopadhyay's '*Sarala Jwara Cikitsā*,' (Curing Fevers, Kolkata, 1878).

Thus, the nineteenth century Bengal offered an ideal platform for the cultivation and dissemination of modern medical sciences and as we shall see in the following sections that Dr. Gopaul Chunder Roy was an important role player on this stage. With this background, we shall study the life and works of Dr. Roy.

2 Studying the life of Dr. Gopaul Chunder Roy in the context of the nineteenth century Bengal

On many counts, Dr. Gopaul Chunder Roy was a glaring exception from other medical practitioners and researchers in the Colonial Bengal, as we shall try to elaborate in the following sections of the article. Dr. Roy earned a national and global recognition during his lifetime for his contributions to the medical sciences. His name has frequently featured in the literature on Burdwan Fever from his lifetime down to the twenty-first century. Dr. Roy's academic and professional career was distinguished; his views on the epidemic was different; his seminal book on Burdwan Fever still remains the most influential work on the topic and his vocal concern for his countrymen as well as for the plight of fellow medical practitioners, bordering the political tone of the nascent nationalism of a colony, was very courageous for an IMS Surgeon of British India; yet neither

⁶ 'In the last quarter of the nineteenth century, it was realized that medical education of university standard could not provide a sufficient number of doctors to meet the people's needs, and medical schools, giving a shorter course of training than medical colleges, were accordingly set up in association with civil hospitals. The medical practitioners so produced were known as Licentiate.' (World Directory of Medical Schools, WHO, Geneva, 1957, p. 129).



his overall contributions to the medical sciences have ever been compiled nor any contemporary author has attempted to write a scientific biography of this extraordinary doctor and scientist. The absence of a complete biography of Dr. Roy is somewhat surprising, judging by the importance of a stalwart like him in the nineteenth century context. Crawford's 'A History of Indian Medical Service (1600–1913)' has no mention of Dr. Roy, *Indian Medical Gazette*, where Dr. Roy published more than 50 research articles, did not bother to publish an obituary upon his untimely death, the renowned Bengali biographical dictionary 'Saṅsad Bāṅglā Caritāvidhān' failed to provide an entry against his name and two online encyclopedias like Wikipedia and Banglapedia chose to ignore him. The international conference on "Epidemics in South Asian History" organized in Bardhaman in 2006 by the Wellcome Trust Centre for the History of Medicine at University College, London, in association with Burdwan University, had many valuable papers presented on Burdwan Fever, but not a single paper on Dr Gopaul Chunder Roy (to the best of my knowledge). This is unfortunate and the present author sincerely feels that writing a comprehensive scientific biography of Dr. Roy is the need of the hour, if one intends to follow the course of the intellectual development in the nineteenth century that was an integral part of the Bengal Renaissance.

Literature (primary sources) on Dr. Gopaul Chunder Roy's biography or personal details are only 2 or 3 in number: this includes one book by Peary Chand Mitra, noted nineteenth century writer (Mitra, 1957 reprint, p. 2, pp. 117–118) which essentially gives the family background of Dr. Roy, though it did not and could not mention Roy explicitly; a one-paragraph obituary of Dr. Roy, published in the *Lancet* (1887, p. 789) 8 months after Dr. Roy's sudden and untimely death, is the first available information source about Roy's personal and professional life; and a one-and-half page article by Dr. Baman Das Basu, a Major in the Indian Medical Service (IMS) in *Medical Reporter* (1895, pp. 139–140) as a part of the series of medical biographies he had been writing. Dr. Basu's article provides much personal details. The obituary published in *Lancet* is the earliest resource for writing Roy's biography, but interestingly it did not indicate the date of Dr. Roy's death. Dr. Basu's account, though written 8 years after Dr. Roy had passed away, provides some minute details about his academic and professional life, but almost nothing about his scientific pursuit. The personal details recorded in the present article are wholly based on these articles. However, neither the obituary in *Lancet* (written anonymously) nor Dr. Basu's article cited the primary sources of information.

In addition to the above, some issues of *Indian Medical Gazette* (1867a, pp. 206–207), *British Medical Journal* (1870a, p. 400, 1870b, p. 452, 1870c, p. 646, 1870d, p. 633), *Lancet* (1872a, p. 283, 1872b, p. 346), *London*

Gazette (1872, p. 3807), and websites of Glasgow Medical College and Royal College of Surgeons of England provide authentic and valuable information about Dr. Roy's stay and education in Glasgow and London and his entry into Indian Medical Service. Crawford's 2-volume 'A History of Indian Medical Service, 1600–1913' (1914) provides us with important information about IMS cadre.

Dr. Roy's scientific papers and letters to the editors were published during 1866–1887 in numerous issues of *Indian Medical Gazette* (58 Nos), *Calcutta Journal of Medicine* (5 Nos), *Lancet* (6 Nos), *Glasgow Medical Journal* (1 Nos), *Medical Times and Gazette* (1 No.) etc. and Dr. Roy's seminal work on Burdwan Fever gives us a first-hand knowledge of Dr. Roy's scientific thoughts. Sykes (1847) traces the development of the government charitable dispensaries in Bengal; Dr. Roy worked primarily in such dispensaries.

Large numbers of Dr. Roy's publications were on surgery and Burdwan fever (including malaria), but several others were on cholera, leprosy, typhoid, snake venom, nephrology, gynaecology etc. These articles are excellent examples of case studies and certainly qualify for valuable study materials for medical researchers and medical students.

Reviews of Dr. Roy's works published in *Indian Medical Gazette*, *Calcutta Journal of Medicine*, *Lancet*, *British Medical Journal*, *Glasgow Medical Journal*, *Australian Medical Journal*, *British Foreign Medico-Chirurgical Review*, *Quarterly Compendium of Medical Science* etc. and letters to the editors written by eminent doctors, provide us with the response of the contemporary medical community to Dr. Roy's works. The reviews, in many cases, were not favourable, rather caustic. However, this could not dampen the spirit of Dr. Roy; he defended his standpoints and views and reengaged in his profession with missionary zeal.

In recent years, several authors have discussed the history of Burdwan Fever of the nineteenth century, and in passing, some of them made interesting observations and comments on Dr. Gopaul Chunder Roy's contribution. Important works on Burdwan Fever include Arnold (2004), Deb Roy (2008, 2017), Dutta (2017), Klein (1972), Mukharji (2007, 2017, 2018), Mukherjee (2008), Samanta (2017), and Sarkar (2010). While Klein (1972) has discussed Malaria and Mortality, others have discussed Burdwan Fever in detail with occasional references to Dr. Roy. Only Mukharji (2018) has analysed the works of Roy in detail in the light of what he termed as 'Political Medicine'. Other important works related to the present work are Bhattacharya (2014, 2015), Gorman (1988), Harrison (1994), Hochmuth (2006), and others whose primary concerns were public health and new medical culture. None of these works attempted to compile



a biography of Dr. Roy. Unfortunately, Kumar (1998) is also silent on Dr. Roy.

Gopaul Chunder Roy was born (May 16th, 1844) in a family in the nineteenth century Kolkata, which was upper-caste (Roy's family belonged to *Vaidya* caste), elite and English educated, belonging to the class which spearheaded the modernist movement in Bengal. His father, Babu Loke Nath Roy, was a son-in-law of Ram Dhun Sen of the famous Sen family of Colootollah (in central Kolkata). Ram Dhun was the brother of Ram Comul Sen, noted educationist, scholar, and grandfather of famous Brahma Samaj leader and social reformer Keshub Chandra Sen. Thus, Roy was a cousin of Keshub Chandra and they were close friends all throughout (Basu, 1895, p. 139; Lancet, 1887, p. 789; Mitra, 1957 reprint, p. 2, pp. 117–118). The family played an important role in the spread of education and religious reform in the nineteenth century.

Despite this advantage of the family background, Roy faced severe hardships at a very tender age when his father suddenly died of galloping diabetes, leaving behind a helpless widow with eight young children; Roy was only 5-year-old. The family was taken care of by Roy's maternal uncle, Madhub Chandra Sen. After spending some time in a free primary school, Roy enrolled in the fifth class of the 'Pāthśāla' (school) section of the iconic Hindu College.⁷ Here, he performed superbly and with two double promotions, appeared at the Entrance Examination very early, passed out with First Division and earned scholarship. At an early age, Roy was spotted by teachers and relatives as a talent of superior quality (Basu, 1895, p. 139).

In the colonial Bengal, the preferred professions of the English educated, middle class was either Law or Medicine. Roy opted for the latter and joined the Calcutta Medical College (CMC) for medical studies. During his college career, he obtained prizes and certificates for proficiency in chemistry, medicine, surgery, and anatomy, and held the senior scholarship for 2 years. He passed out from CMC in 1865 with a 5-year medical diploma of Licentiate in Medicine & Surgery (L.M&S), instead of more common MB (Bachelor of Medicine).⁸ In 1860, while he was only 16 and in the 1st year of the Medical College, Roy got married (Basu, 1895, p. 139; Lancet, 1887, p. 789).

⁷ In 1855, when Hindu College became Presidency College, this 'Pāthśāla' section became Hindu School, now a prominent govt. school in central Kolkata.

⁸ In 1857, University of Calcutta was established and Calcutta Medical College got affiliated by the University. As a part of the modernization of syllabus and curriculum, MB (Bachelor of Medicine) course was introduced in 1860. The LM&S course continued parallelly until 1906, when it was discontinued.

His first appointment was as a House Surgeon to the First Surgeon's ward, Medical College Hospital, Kolkata, under Dr. Fayerer. At that time, he was also a teacher of the Vernacular classes in the College. It was a tenure appointment, and on expiry of the term of office, Dr. Roy was recommended by his immediate superiors for the post of a teacher of Nagpur Medical School, in central India. Dr. Roy moved to Nagpur in 1867 and taught there for 2 years, but nurtured a desire to travel to England for higher studies in medicine, as he probably felt that with just an LM&S degree, he had little career prospect in India. Consequently, in 1869 Dr. Roy proceeded to Europe with an aim to enter the Indian Medical Service (IMS)⁹ (Basu, 1895, p. 139; Lancet, 1887, p. 789).

We have already discussed the successful journey of four Bengali students to England in 1846 for higher education in medicine. Thus, the ground was already prepared for Dr. Roy and it was no wonder that he would follow suit. The higher education in the Great Britain provided the much-needed quantum jump to his academic career and the name and fame he acquired through his academic brilliance, from which his career never looked back.

In 1870, Roy appeared for the FRCS examination at the Royal College of Surgeons of England, London, and on April 11 of that year he cleared the primary examinations in anatomy and physiology, at a meeting of the Court of Examiners, and became eligible to be admitted to the pass examination (*British Medical Journal*, 1870a, p. 400). On May 04, 1870, he was awarded a Member of the Royal College of Surgeons (MRCS). *British Medical Journal* (1870b, p. 482) informs us that

'Royal College of Surgeons of England -The following gentlemen, having undergone the necessary examinations for the diploma, were admitted members of the College at a meeting of the Court of Examiners, on (May 4th)- ... Roy, Gopaul Chunder (Calcutta School) ...'

On December 08, 1870, he was admitted a Fellow of the Royal College of Surgeons (FRCS), London. Quoting a notification of the College, the *British Medical Journal* (1870c, p. 646) reported that

'The following members of this institution having undergone the necessary examinations for the fellowship on the 23rd, 24th, and 25th ultimo, were reported to have acquitted themselves to the satisfaction of the Court of Examiners; and, at a meeting of the Council

⁹ The Indian Medical Service (IMS) was a military medical service in British India, which also had some civilian functions. The first native Indian to join the service was Soorjo Coomar Goodeve Chuckerbutty (1855). IMS began in 1763 as Bengal Medical Service. After 1857, the Medical Services of Bengal, Bombay and Madras Presidencies merged to form the Indian Medical Service (IMS).



contest, though, had his health permitted, there was very little doubt of his success. He was also one of the Acting Physicians to the Birmingham Children's Hospital.

Dr. Earle was a member of the Council of the Obstetrical Society of London, and a member of the Medical Societies of Birmingham, and for some years acted as Honorary Secretary of the Midland Medical Society. He was the author of several valuable monographs on obstetric subjects, and the inventor and improver of several midwifery instruments. Among the improvements which he made in obstetric instruments may be mentioned, "a new pelvimeter," and "an uterine sound with a moveable head;" and at the time of his death he was engaged in perfecting an obstetric case which would have proved a very valuable addition to the *armamentarium* of the accoucheur. Among his contributions to the literature of obstetric medicine may be mentioned his book on *Flooding after Delivery and its Scientific Treatment*, and *A new method of Inducing Premature Labour*, which, with other papers, led to his being placed on the Council of the Obstetrical Society. Dr. Earle's enthusiasm for his special department of his profession was great, and his manners were singularly quiet and unobtrusive. By his industry, kindness of heart, and honourable conduct, he had earned the respect and esteem of his professional brethren. His loss will be felt deeply by his private patients, his hospital patients, and by his many friends, to whom he was always ready lend a helping hand.

His fatal illness commenced with a severe and most unexpected attack of pulmonary hæmorrhage, followed by great febrile reaction and depression of the vital power. This occurring, with his constitution already weakened by overwork, rapidly proved fatal, and he died after an illness of little more than three weeks. His remains were followed to their resting-place, in the old cemetery at Birmingham, by many of his former colleagues and friends.

MEDICAL NEWS.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—On December 6th, the following gentleman passed the first professional examination. Moore, John Bartholomew Giles Gidley, St. George's Hospital

ROYAL COLLEGE OF SURGEONS.—The following members of this institution having undergone the necessary examinations for the fellowship on the 23rd, 24th, and 25th ultimo, were reported to have acquitted themselves to the satisfaction of the Court of Examiners; and, at a meeting of the Council yesterday, the 8th instant, were admitted Fellows of the College.

Messrs. Edward Mason Wrench, L.S.A., Baslow, Derbyshire, diploma of membership dated July 17th, 1854 (of St. Thomas's Hospital); Frederic Edward Manley, L.S.A., King Street, Wolverhampton, January 23rd, 1866 (of Guy's Hospital); William Stanger, L.S.A., Nottingham, January 23rd, 1867 (of Guy's Hospital); William Bartlett Dalby, M.B. Cantab., Sackville Street, Piccadilly, May 22nd, 1867 (of Paris, Cambridge, and St. George's Hospitals); James Ryall Roush, L.R.C.P., and L.S.A. Lond., Norfolk Street, Strand, May 1th, 1868 (of St. Bartholomew's Hospital); Edward Nettleship, L.S.A., Finsbury Pavement, November 17th, 1868 (of King's College); and Gopaul Chunder Roy, L.M. & S. Calcutta, Grosvenor Park, Camberwell, May 4th, 1870 (of the University of Calcutta).

Four candidates out of the eleven examined failed to acquit themselves to the satisfaction of the Court, and were therefore referred to their hospital studies for twelve months.

College of Surgeons having undergone the necessary examinations, were admitted licentiates in midwifery at a meeting of the Board on the 7th instant.

John Desborough Robinson, Syston, Leicestershire, diploma of membership dated July 27th, 1870 (of the Charing Cross Hospital); Samuel Tilcott Huggins, L.S.A., Banbury, Oxon., November 17th, 1870 (of St. Bartholomew's Hospital); and Barrington Syer White, L.S.A., Lavenham, Suffolk, November 18th, 1870 (of King's College).

Three other candidates having failed to acquit themselves to the satisfaction of the Board, were referred to their obstetrical studies for three months.

UNIVERSITY OF LONDON.—M.D. Examination, 1870. (*Obtained the number of marks qualifying for the Medal.)

- Allen, Bryan Holme, University College
- *Baxter, Evan Buchanan, King's College
- De Liefde, John, Guy's Hospital
- Dessé, Ethelred, University College
- Gowers, William Richard (Gold Medal), University College
- Grimes, John, B.Sc., King's College
- Hooper, John Harward, M.S., St. Thomas's Hospital
- Parsons, Henry Franklin, St. Mary's Hospital.
- Rayner, Edwin, B.A., Paris, and University College

*Roberts, Frederick Thomas, B.Sc., University College Taylor, Frederick, Guy's Hospital
 Logic and Moral Philosophy only.
 Haynes, Frederick Harry, St. Bartholomew's Hospital
 Snow, Herbert Lumley, Queen's College, Birmingham, and University College
 Taylor, George Christopher, St. Bartholomew's Hospital
 B.Sc. Examination.

First Division.
 Carter, Charles Henry, B.A., University College
 Parker, Rushton, University College
 Stocker, James Reginald, Guy's Hospital

UNIVERSITY OF CAMBRIDGE.—Second M.B. Examination. The following have been examined and approved.

- Galabin, A. L., M.A., Trinity
- Humphreys, H., M.A., John's
- Ralfe, C. H., M.A., Caius

APOTHECARIES' HALL.—The following gentlemen passed their examination in the science and practice of medicine, and received their certificates to practise, on Thursday, December 1st, 1870.

- Claridge, William, 51, Brook Street, W.
- Duke, Bernard Little Hampton
- Newton, Charles John, Alconbury Hill
- Smith, Samuel, Clifton, Bristol

The following gentlemen also on the same day passed their first professional examination.

- Langdale, Henry Marmaduke, Guy's Hospital
- Power, George Edward, Guy's Hospital

MEDICAL VACANCIES.

THE following vacancies are announced:—

- BALLYCASTLE UNION, co. Antrim—Medical Officer for the Cushendall Dispensary District: applications, 14th.
- BIRMINGHAM AND MIDLAND FREE HOSPITAL FOR SICK CHILDREN—Hospital and House of Recovery: applications, 27th.
- BIRMINGHAM GENERAL DISPENSARY—Resident-Surgeon: applications, 28th.
- CASTLEBAR UNION, co. Mayo—Medical Officer, Public Vaccinator, and Registrar of Births, etc. for the North Division (No. 2) of the Castlebar Dispensary District: 17th.
- CHESTERFIELD UNION, Derbyshire—Medical Officer for the Bolsover District. CORK NORTH CHARITABLE INFIRMARY—House-Surgeon and Resident Apothecary: 12th.
- COUNTY DOWN INFIRMARY, Downpatrick—Resident Surgeon's Assistant and Registrar: election, Jan. 10th.
- EVESHAM UNION—Medical Officers and Public Vaccinators for District No. 3, and the Parish of Peabworth: applications, 12th; duties, 26th.

Temporary Physician: applications, Jan. 4th.
 GUISBOROUGH UNION, Yorkshire—Medical Officer for the Danby District: 14th.

HACKNEY UNION—Dispenser at the Workhouse, Homerton: applications, 14th.
 LONDON SCHOOL OF DENTAL SURGERY, Soho Square—Lecturer on Dental Anatomy and Physiology: applications, 14th.

MANCHESTER ROYAL INFIRMARY—House-Surgeon; Two Physician's Assistants: applications, 10th; election, 10th.

MANCHESTER TOWNSHIP—Assistant Medical Officer at the new Workhouse. MEDWAY UNION, Kent—Medical Officer for the Workhouse and District No. 2: applications, 14th; election, 14th.

METROPOLITAN FREE HOSPITAL, Devonshire Square—Surgeon: applications, 12th.
 NEWCASTLE SPONTYNE BOROUGH LUNATIC ASYLUM—Resident Medical Superintendent.

PERSHORE UNION, Worcestershire—Medical Officer for the Upper Snodsbury District: election, 12th; duties, Christmas. Medical Officer for the Eckington District: election, 12th; duties, Christmas.

PRESTON AND COUNTY OF LANCASTER ROYAL INFIRMARY—House-Surgeon: applications, Jan. 2nd.
 ST. MARYLEBONE, Parish of—Public Vaccinator: applications, 16th.

ST. PANCRAS—Medical Officers for Districts 1, 2, 3, 4, 5, 6, 7, 8: applications, 12th; election, 12th.
 SCOTTISH NATIONAL INSTITUTION FOR IMBECILE CHILDREN, Larbert, Stirlingshire—Superintendent: applications, 12th.

SHEPHERD, DILLING, AND NORTHMAVINE PARISHES—Medical Officer: applications, 12th.
 STAMFORD AND RUTLAND GENERAL INFIRMARY—Apothecary and Secretary: applications, 31st; election, Jan. 31st.

STRANORLAR UNION, co. Donegal—Medical Officer for the Workhouse: applications, 16th; election, 26th.
 WATERFORD UNION—Medical Officer, Public Vaccinator, and Registrar of Births, etc. for the Tramore Dispensary District.

WIGAN DISPENSARY—Surgeon.

MEDICAL APPOINTMENTS.

Names marked with an asterisk are those of Members of the Association.
 *Goss, Tregenna Riddulph, Esq., appointed Medical Officer to the Post Office, Bath.
 HARDING, T. H. G., Esq., appointed Surgeon to the Dental Hospital of London.
 HUGHES, N., Esq., appointed Honorary Consulting Surgeon to the Staffordshire General Infirmary.

*LOMAN, H. T., Esq., appointed Surgeon to the Staffordshire General Infirmary.
 *MOORE, John W., M.B., Ch.M. Dub., L.K.Q.C.P.I., elected Physician to the Melroeux Asylum for Blind Females, Dublin, vice M. D. Moore, M.D. Dub. et Cantab., resigned.

Fig. 2 Report on Dr. Roy's admission to the Fellowship of the Royal College of Surgeons of England. (Courtesy British Medical Journal, December 10, 1870, p. 646)

yesterday, the 8th instant, were admitted Fellows of the College.' The list had seven names, of which the last was, 'Gopaul Chunder Roy, L.M. & S. Calcutta, Grosvenor Park, Camberwell, May 4th, 1870 (of the University of Calcutta).'

Roy also happened to be the only Indian in the list for 1870 (Fig. 2).

Roy's admission to FRCS excited the *British Medical Journal* (1870d, p. 633). In the same issue in which it

published the result, it also published a news which reads as below:

'An Indian Student

The examination for the Fellowship of the Royal College of Surgeons which has just taken place exhibits a feature of unusual interest, it having afforded the first instance of a native Indian gentleman being admitted to the Fellowship. The gentleman alluded to, Mr. Gopaul Chunder Roy, is the cousin of Baboo (Keshub)



Dec. 10, 1870.]

THE BRITISH MEDICAL JOURNAL.

633

PROFESSOR BLOXAM has been appointed to the Chair of Chemistry at King's College, rendered vacant by the death of Professor Miller.

WE are glad to hear that the whole edition of the *Manchester Medical and Surgical Reports* was sold off within five weeks.

MR. LAWSON TAIT having withdrawn from his candidature for the office of Assistant-Surgeon at the Birmingham General Hospital, Dr. Jolly was the only candidate, and was unanimously elected.

THE next Medical Club Dinner will be held on Tuesday, December 20th, at seven o'clock, on which occasion the chair will be taken by Dr. Lory Marsh.

DR. DOBELL has in the press a second volume of his *Reports on the Progress of Practical and Scientific Medicine in Different Parts of the World* (for the year 1870).

A CONFERENCE of gentlemen interested in scientific education was held in the Royal Institution, Liverpool, on Tuesday night, and passed unanimously a resolution declaring the advisability of establishing a Science College in that town, the cost of which was estimated at about £50,000; and a committee was appointed to take steps with the view of carrying out the object.

THE FEVER HOSPITAL AT STOCKWELL.

WE are glad to hear that the Metropolitan Asylums' Board have unanimously elected Dr. Barbour Resident Medical Officer to the Stockwell Fever Hospital. Dr. Barbour's long experience and able administration at the London Fever Hospital well entitle him to the confidence of the Managers.

AN INDIAN STUDENT.

THE examination for the Fellowship of the Royal College of Surgeons which has just taken place exhibits a feature of unusual interest, it having afforded the first instance of a native Indian gentleman being admitted to the Fellowship. The gentleman alluded to, Mr. Gopaul Chunder Roy, is the cousin of Baboo Gopaul Chunder Sen, who has recently become well known here in relation to the new religious doctrines of which he has been the exponent.

UNIVERSITY DEGREES WITHOUT RESIDENCE.

DR. RICHARDSON, in speaking of the future of the University of St. Andrew's at the Graduates' Dinner this week, referred to the present restriction limiting to ten the number of degrees conferred upon practitioners by examination without residence, and intimated that there was a probability that this restriction would soon be relaxed. The Chancellor, the Duke of Argyll, who had ever shown a deep interest in the University, had assented to a change in this respect; and the change had always been considered logical by their member, Dr. Lyon Playfair. "They had now, therefore, a hope of seeing their honoured University free again." Its own graduates are the best judges of the interests of the University; but we are fain to think, that if the University of St. Andrew's had in the past been less free with its degrees they would now be more honoured; and as the said restriction has decidedly raised their prospective, and even present, estimate, no doubt the graduates will take care that this relaxation shall be accompanied with safeguards, in the way of very complete and adequate examinations, of which they will be particularly well fitted to estimate the importance.

THE GOVERNMENT AND MEDICAL REFORM.

At the annual dinner of the St. Andrew's Graduates' Association, Dr. Lyon Playfair was present, and, in responding for the House of Commons, mentioned the great difficulty under which private members laboured in passing Bills through the House of Commons. More than one Bill having for its object the promotion of medical reforms had failed from the fact that they were not in the hands of the Government. One Bill of last session—that to effect a reform in the General Medical Council of the United Kingdom—had been shipwrecked; and he regretted that the offer of the Government to have the subject inquired into by a Select Committee had not been accepted, as it was not unlikely that the Government would have taken the matter up with a view to give effect to the recommendations of the Committee. He had within the last few days, he was glad to say, ascertained that the Government did not make such objections to the bringing in of a Bill as he had anticipated.—Dr. Seaton inquired who would have had to pay the expense of the inquiry before the Select Committee, had it been proposed. Dr. Lyon Playfair said that the expense would have

Fig. 3 *British Medical Journal's* special comments on the Dr. Roy's admission to the Fellowship of the Royal College of Surgeons of England. Please note the printing mistake. (Courtesy *British Medical Journal*, December 10, 1870, p. 633)

Chunder Sen, who has recently become well known here in relation to the new religious doctrines of which he has been the exponent.'

Thus, Dr. Roy was the first Indian to become FRCS! (Fig. 3).

In 1871, he obtained an MD degree from the University of Glasgow as its 'first Indian student to graduate with an MD degree' (University of Glasgow website). His choice of Glasgow for higher studies is noteworthy, as Gorman (1988, p. 296) explains, 'In Britain, the medical schools of Scotland were much superior to those in England. Although Edinburgh's premier position had been supplanted by French schools, it was by no means a second-rate institution, and its M.D. was highly prized. The same is true of other Scottish schools. About half of the Calcutta faculty, both basic science and clinical teachers, took their medical degrees in Scotland.'

On completing studies in Glasgow, Dr. Roy started preparation for IMS entrance, but as reported by Crawford (1914, Vol 2, p. 295), 'In 1870, admission to the Service

was again closed for 2 years, no new commissions being granted between 1st April, 1870, and 30th March, 1872'. As no vacancy was advertised for 1871 till the end of the year; a frustrated Roy came back to India towards the end of 1871. On reaching Bombay port, he received a telegram from a friend informing that, forty vacancies had just been announced for the prestigious Indian Medical Service (IMS) for 1872. He returned to England within 1 month. In 1872, he successfully qualified for the IMS. *Lancet* (1872a, p. 283) reported that 'Gopaul Chunder Roy (of Glasgow and Calcutta)' was 'successful at the competitive examinations held at London in February and at Netley in August 1872 after having passed through a course at the Army Medical School in Netley.' Roy secured overall 8th place among 40 successful candidates securing 4790 marks. He improved his position by two places since the first examination held at Burlington (London) on February 12 earlier that year (*Lancet*, 1872b, p. 346). He also ranked first among 5 native Indians who qualified for IMS in 1872. Basu (1895, pp. 139–140) indicated that Dr. Roy's entry into IMS was about to be



blocked as he failed to clear the medical test in the first attempt as he had a certain degree of myopia and wore spectacles. However, he cleared it in the second attempt and had to obtain permission from the Secretary of State to appear for the written test.

London Gazette (1872, p. 3807), quoting a source at the India Office (dated August 24, 1872) reported that on March 30, 1872, ‘HER Majesty has been pleased to approve of the following appointments to Her Majesty’s Indian Medical Service ...’. Dr. Roy’s name was seventh in the list of Assistant Surgeons recruited for Bengal.¹⁰ Dr. Roy received his IMS commission on May 15, 1872.

After successfully clearing the entrance examination for Indian Medical Service, Dr. Roy returned to India towards the end of 1872, and preferred to join Govt. service. Hochmuth (2006, pp. 53–57) comments, ‘There were four career possibilities for medical graduates of the CMC: (Note: Dr. Roy, though had an LM&S degree from CMC, subsequently acquired an MD from Glasgow, and FRCS from London and hence had higher qualifications—author). They could take service under the government and practice as a sub assistant surgeon. They could set up a private practice. They could teach at the medical college. And finally, they could work for private companies, which were increasingly demanding their services... the ostensible goal of colonial medical education was to disseminate scientific medicine in Bengal and to have a sufficient number of practitioners to man dispensaries, hospitals, and military detachments. Of the graduates, those from the primary class—because they received the longest and most costly education—were intended to practice independently, and hence they were employed in dispensaries. Government service brought with it the advantage of a fixed and reliable source of income; also, the graduates were able to work in cooperation with a European surgeon or medical officer who would show them how to perform difficult operations.’ As an Indian Medical Service officer, Dr. Roy joined the Bengal Army, and on joining, was appointed Inspecting Medical Officer in the Burdwan district, the hotbed of the notorious epidemic fever that devastated the lower Bengal during 1860s and 1870s. Many European doctors failed to withstand the notoriety of the epidemic. The colonial Govt. assigned this challenging task to Dr. Roy in lieu of usual Military service and Dr. Roy was proved to be a very successful doctor in that situation. It was at this time Dr. Roy received the special thanks from the Government of India for the eminently satisfactory way in which he had discharged his arduous duties. Dr. Roy then successively held the appointments of superintendent of prison camp at Dehri, Civil Surgeon of Serampore, Superintendent of

Vaccination, Ranchi circle, and the Civil Surgeon of the latter place for a time, in addition to his other duties (Basu, 1895, pp. 139–140; *Lancet*, 1887, p. 789).

In 1878, Dr. Roy was transferred to Sooree (Suri) Charitable Dispensary (Hospital) in Birbhum district and was appointed permanent Civil Surgeon of Birbhum. During 1885 and 1886, for brief periods, he also officiated as the Civil Surgeon of Burdwan (Basu, 1895, pp. 139–140; *Lancet*, 1887, p. 789).

In charitable dispensaries, Dr. Roy encountered and treated thousands of patients with varied complications that gave him a valuable exposure to different dimensions of medical sciences; and the case studies of the patients he treated in such dispensaries and elsewhere formed the core contents of his scientific publications.

3 A distinguished career in medical research

Unlike many doctors of then and now, Dr. Roy did not bog down fully to medical practice; instead, following the tradition of his predecessors from CMC, e.g., S. G. Chuckerbutty, side by side with his medical practice, he engaged himself dedicatedly to medical research. Between 1866 and 1887 (the year in which he expired untimely), Dr. Roy published more than 70 research articles, letters to the editors and a book on Burdwan Fever.

In Burdwan and Suri, Dr. Roy was at the peak of his career reporting and analysing valuable case studies one after another. Dr. Roy was a surgeon by training and he recorded his interesting and curious experiences in surgery in the pages of medical journals in order to disseminate the professional knowledge to his peers and to enrich the corpus of medical knowledge for the posterity.

However, it is interesting to note the versatility of Dr. Roy as a physician and a medical scientist; despite his background as a surgeon, he published important works on cholera, leprosy, filaria, snake venom, malaria—particularly on Burdwan fever and many more—covering almost all major health hazards common to a tropical country like India—drawing liberally from his vast and first-hand experience in Dispensaries.

Dr. Roy’s first publication appeared in 1866, while he was still a House Surgeon at Calcutta Medical College, when his paper ‘Tertiary amputation in a case of gunshot wound of the forearm; recovery’ was published in the *Indian Medical Gazette*.¹¹ Next year, from the Medical College, he published three more papers on Surgery,

¹⁰ In 1872, out of 40 posts under IMS, Bengal got 28 and Madras 12. There was no vacancy in Bombay (Crawford, 1914, p. 295).

¹¹ The *Indian Medical Gazette* was an Indian medical journal established in 1866 in Kolkata (stopped publishing in 1955). In its early days, it was closely associated with the Indian Medical Service. The first editor was David Smith. Dr. Gopaul Chunder Roy published about 60 research papers in this journal.



namely, ‘A case of depressed fracture of the skull, in which a portion of the cerebral substance escaped; recovery;’ ‘Case of ruptured liver, spleen, and kidney, with fracture of one arm, &c.,’ and ‘Two cases of fracture of skull, extravasation of blood and laceration of cerebral substance, having different symptoms in each’.

During this time, Dr. Roy got involved in the activities of the Bengal Branch of the British Medical Association. Here, his close contacts with stalwarts like Dr. Mahendralal Sircar, Dr. S. G. Chuckerbutty and others probably inspired him to take up a career in medical research. The proceedings of the monthly meeting of the Association held on May 14, 1867 shows that Dr. Roy not only seconded the proposal for admission of Baboo Lall Madhub Mookerjee as a member, but also asked some pertinent questions on the claim of Dr. Soorjacomar Goodeve Chuckerbutty, the President of the Association, in a paper published by Dr. Chuckerbutty that aneurism¹² could be cured by the application of the iodide of potassium where he also cited four cases. The proceedings then recorded, ‘Baboo Gopal Chunder Roy wished to learn what was the modus operandi of iodide of potassium in these cases. Both iodine and potassium were per se powerful liquifacients of the blood; how could they, when combined, promote coagulation?’ (*Indian Medical Gazette*, 1867a, pp. 206–207).

While in Nagpur Medical School, along with teaching, he continued to nurture his passion for research. His first paper from Nagpur, ‘A disputed case of obstinate costiveness’ was published in the *Indian Medical Gazette*. A month later, Roy published his next paper from Nagpur, ‘A case of extensive injuries of the hands and a successful case of rhinoplastic operation’ in *Calcutta Journal of Medicine*. In August 1869, he published another article titled ‘Remarks on the etiology and treatment of cholera’.

In Britain, Dr. Roy stayed for about 3 years and cleared the prestigious FRCS, MD, and IMS. The pressure of study, however, could not tell upon much on Roy’s passion for medical research. In 1871, he wrote two papers, namely, ‘Two cases of injuries of the liver, with remarks’, in *Lancet* and ‘On the (therapeutical) action of quinine on malaria’, in *Medical Times and Gazette*, reproduced later in *Lancet*.¹³

Roy also presented another paper titled ‘On the solvent action of papaya juice on the nitrogenous articles of food’ before the Glasgow Medico-Chirurgical Society, which was later published in the *Calcutta Journal of Medicine* and then in *Glasgow Medical Journal*. The paper in *Calcutta Journal*

of Medicine received a favourable review by *Indian Medical Gazette* as, ‘Assistant-Surgeon Gopaul Chunder Roy has written an interesting paper on this subject in the *Calcutta Journal of Medicine*. The power of the papaya tree and its juice to render meat tender is a popular belief in India. Dr. Roy’s experiments confirm the truth of it. They were conducted at Netley under Dr. Parkes’ notice and are detailed at length in the paper referred to. The juice, or a solution of it, undoubtedly softens, digests, or dissolves meat, albumen and gluten. Dr. Roy compares the action to that of a ferment, and suggests the administration of a few grains of the dried juice after meals in cases of indigestion, depending on a deficient secretion of gastric juice.’ (*Indian Medical Gazette*, 1873, p. 192).

In Glasgow, Dr. Roy became an important member of the Glasgow Medico-Chirurgical Society and his opinions were published in the *Transactions of the Medico-Chirurgical Society* with due importance. While debating upon the benefit of revaccination in a meeting of the Society held on April 7, 1871, *Glasgow Medical Journal* (1871c, pp. 426–427) reported that,

‘Dr. Gopaul Chunder Roy was of opinion that too little weight had been allowed to the second of the two grounds for revaccination enunciated by Dr. Gairdner. He believed that the vaccine virus must, by the laws which governed the human constitution, tend to wear out of the system. It could not be denied that vaccine virus was, relatively to the human economy, an extraneous substance; its action may be compared with that of the syphilitic virus. It is certain that there is in the system an antagonistic power which endeavours to throw off the effects of the venereal poison as a morbid matter; and just in proportion as the system is strong and vigorous will the poison be eliminated from the body. In the same way, when vaccine is introduced, the constitution endeavours to throw it off as a foreign agent, and will succeed in doing so in proportion to its inherent vigour. He might mention that in India, his native country, vaccination had made great progress, and that it had now entirely superseded the system of inoculation formerly in vogue. He did not remember to have seen any injurious effects in a single instance. The system, there, was arm to arm vaccination; and when this plan was adopted these alleged bad effects would be reduced to a minimum.’

It again shows that like a true scientist of modern era, Roy did not work in isolation, instead, he maintained close contact with the medical community to keep himself updated of the latest developments in the medical sciences.

In Burdwan, Dr. Roy conducted the valuable research and published the most influential work on ‘Burdwan Fever,’ for which he is still remembered. We shall discuss

¹² An aneurism refers to a weakening of an artery wall that creates a bulge, or distention, of the artery. (<https://www.medicalnewstoday.com/articles/156993>).

¹³ In the original version in *Medical Times and Gazette*, the title of the paper was ‘On the Action of Quinine on Malaria’. In the version published in the *Lancet*, the word ‘Therapeutical’ was inserted.



Dr. Roy's work on Burdwan Fever separately. During 1873–1878, Dr. Roy worked in various districts of the western part of Bengal. His publications ranged from Burdwan fever to his specialization, i.e., surgery, but he also wrote on varied subjects including cholera (which also resurfaced in Bengal as an epidemic during that period), namely, 'Observations on the nature of cholera poison', 'Report on cholera in the Jehanabad subdivision of Burdwan', 'The rational treatment of cholera; with chemical and pathological remarks', and 'On the rational treatment of cholera and remarks on the outbreak at Ranchee'; on poisons & toxicology, namely, 'Dr. Fayer on cobra poison', 'Two cases of poisoning by opium successfully treated by subcutaneous injection of atropine', 'Experiments with cobra poison', and 'Remarks on the action of snake poison on the blood'; on leprosy, namely, 'Remarks on the Gurjan oil treatment of leprosy at Port Blair'; and on miscellaneous topics such as 'Hysteric epilepsy', but he continued to publish papers on his specialization, i.e. surgery, namely, 'Surgery in the malarious district of Jehanabad', 'On the treatment of fractures by position', and 'Treatment of liver abscess by aspiration'.

In Suri (Birbhum district), Roy had a busy time reporting valuable case studies one after another. Dr. Roy was a surgeon by training. Among his case studies in Surgery were 'Compound dislocation of left humerus at the elbow; Reduction, arthritis, excision of elbow joint; recovery' (Under the treatment of Dr. G. C. Roy. Reported by Civil Hospital Assistant Hurry Mohun Bhuttacharjee of Sooree (Suri) Charitable Dispensary), 'A case of wound of axillary artery; ligature of the vessel above and below the seat of injury; death', 'A case of accidental suffocation', 'A case of ainhum', 'A case of placenta previa treated by partial separation of placenta and ergot; recovery', 'A case of croup: tracheotomy: Death', 'A case of rupture of spleen', 'Cases of laryngotomy and tracheotomy' (Treated by Dr. G. C. Roy in the Sooree Charitable Dispensary. Reported by Assistant-Surgeon Apurba Krisna Chaudhuri), 'A case of encysted peritoneal effusion; operation; Recovery', 'Fibrinous coagula in the heart', 'On a modified method of using the aspirator', 'A case of hepatic abscess treated by Dr. G C Roy; Recovered after free opening and drainage' (Reported by Civil Hospital Assistant Huri Mohan Bhattacharjee), 'Retention of menses from absence of vagina: operation: peritonitis: death', 'A curious case of malposition of tooth' (Under Dr. Gopaul Chunder Roy, reported from Sooree (Suri) Charitable Dispensary), 'Treatment of erysipelas with external application of white lead paint' (Letter to the Editor), 'Case of liver abscess treated with free incision and drainage; recovery', (Under the care of Dr. G. C. Roy, reported from Sooree Charitable Dispensary), 'A case of imperforate anus and prepuce' (under the care of Dr. G. C. Roy, reported from Sooree Charitable Dispensary), 'A case of kidney disease inducing hypertrophy of heart and haemorrhage into the

brain', 'Fracture of skull; Extensive extravasation of blood on dura matter producing compression of brain; Trephining; Partial relief of symptoms; Death' (Under the care of Dr. G. C. Roy, reported by Sooree Charitable Dispensary), and 'Two cases of atrophy of liver'.

Among his other papers from Suri were 'Some remarks on the relation of filaria sanguinis hominis to chyluria and other lymphoid diseases' 'A case of intravenous injection of milk', 'Some remarks on leprosy', 'Papaya juice' (Letter to the Editor), 'Delirium tremens as a complication in acute diseases', 'A case of chyluria treated with benzoic acid', 'Microorganisms or granules of bizzozero in the blood' (Letter to the Editor), 'Filaria sanguinis hominis', 'Notes on a case of puerperal fever', 'A case of cobra bite, with remarks', 'Is quarantine effective in cholera', 'Birbhum Dispensary—A case of catheter fever, (under the treatment of Dr. G. C. Roy. Reported by Civil Hospital Assistant Huri Mohun Bhattacharjee), 'The rational method of treatment of hydrophobia,' and 'Some remarks on the specific origin of disease'. His last publication was 'On the relative digestive value of Fairchild's peptonizing powders, pepsin and papaya juice on milk.'

By this time Dr. Roy was already an internationally reputed doctor and medical scientist, and his name and fame crossed the Atlantic too. The prestigious American journal the *Quarterly Compendium of Medical Science* (1884, p. 6) published a synopsis of Roy's paper 'A curious malposition of tooth' which had earlier been published in *Lancet* as

'Nogendra, a Hindoo lad, aged fourteen years, presented himself for treatment for what he considered to be a tumour growing within the nasal cavity. He noticed a foul smell in his breath about four months before, attended with catarrh and sometimes a bloody discharge from the left nostril. For the previous two months the growth had been observed to occupy the left cavity, where it seemed to be attached to its wall at its upper part; its free end was looking downwards in the shape of a truncated cone. Arrangements having been made for plugging the posterior nares, in the event of uncontrollable hæmorrhage, the tumour was seized with dressing forceps and extracted. It proved to be a tooth of the shape of a canine. There was very little bleeding after extraction, and this was stopped by alum lotion. The free extremity was covered by enamel, which stopped short at its junction with the root. The root was deeply embedded in the side and upper part of the antrum. The boy had got his set of permanent teeth, with the incisors and canines en tire on either side. There was no deformity of the jaw and no swelling or cystic formation. It was clearly a case of extra-follicular development and eruption of a tooth in a wrong place, the peculiarity being that whilst in reported cases of like nature the crown of the



tooth shows itself at the floor of the nasal cavity from below upwards, in the present instance, by some freak of nature, the dental follicle was transposed, and the eruption was from above downwards.’

Like a professional scientist with high career goal, Dr. Roy was tireless and prolific in publishing his research outcomes. In fact, he was the most prolific among Bengali medical scientists of the colonial period. Excluding his works on Burdwan Fever, Dr. Roy’s research publications numbered more than 50. Compared to that, Legendary Dr. SG Chuckerbutty (1826–1874) published around 15 papers only (Sengupta, 1970, pp. 183–191) while another legend, Dr. Chunilal Bose’s (1861–1930) scientific papers (excluding semi-technical and popular publications) number around 30 (Sanyal, 2022, pp. 155–157). Others including Kanny Lall Dey, Radha Gobinda Kar, A Mitra, Kailas Chunder Bose, KP Gupta, BD Basu, or UN Brahmachari published much less.

4 Dr. Roy’s works on Burdwan Fever

During 1860s and 1870s, districts of lower Bengal, particularly the Burdwan Division, was devastated by a peculiar kind of epidemic fever, popularly known as the ‘Burdwan Fever’. As Dr. GC Roy is well known for his works on Burdwan Fever, the topic deserves a special attention.

Reports and research works published by doctors on Burdwan Fever during the 19th as well as in the early 20th century are numerous; however, there is a clear lack of unanimity among the experts in respect of the nature and remedy for this epidemic fever. This has created more confusion and distinctive views of Dr. Roy on the epidemic, therefore, assumed special importance.

Malarial fever was not new to Bengal, the earliest report being in 1814 from the Murshidabad district, but it never appeared as an epidemic before the mid-nineteenth century. Cholera and Malaria epidemic surfaced and resurfaced throughout the nineteenth century, but the Burdwan Fever epidemic was the most horrific, causing thousands of deaths in Nadia, Burdwan, Hooghly, Birbhum, Bankura, Medinipur districts and adjacent areas of Bengal between 1860 and 1880. Although it was malarial in nature, its severity was beyond the imagination of the physicians. The first report of the fever was, however, from Mohummadepore in Jessore district in 1824 and resurfaced in various places in South Bengal every 5–6 years travelling slowly from eastern to western districts.

Important works on Burdwan Fever by Elliot, Sutherland, Lyons, French, Jackson, Deegumber Mitter, KP Gupta, UN Sen, Verchere, Meredith, Radha Nauth Roy, Moore, Fayer, Rogers, Brahmachari, Peterson and Bentley along with

many anonymous editorials in the *Indian Medical Gazette* and Roy’s own works including the book on Burdwan Fever are the primary resources. The cause of the epidemic has been variously attributed to peculiar climatic conditions including severe rain, hot and humid climate and lack of drainage and sanitation, water logging etc. or a combination of one or more factors; the doctors have analysed the case studies, compared them with other epidemics and suggested remedies. The multitude of opinions offers an interesting subject for discussion.

Dr. J Elliot’s ‘Report on epidemic remittent and intermitent fever occurring in parts of Burdwan and Nuddea divisions’ (Elliot, 1863) is the first important work on Burdwan Fever. Published originally as a supplement to the *Calcutta Gazette* for June 1863, in this short report (33 pages of running text), Elliot began with the history of the spread of Burdwan Fever in South Bengal districts and the ferocity with which it struck villages after villages; Elliot informed that since 1824, fever has periodically broken out as an epidemic in the Jessore, Baraset and Hooghly districts. Elliot next identified the principal causes as sites of the villages, nature of the soil, want of cultivation of land, position and overcrowding of houses, excess of vegetation and bamboo cultivation in the vicinity of houses, bad water and state of tanks, drainage in villages and proximity of burial grounds to the dwelling houses. Among the causes influencing the disease among the people, Elliot blames unhygienic food, dirty clothing, unhygienic habits of people, habit of sleeping on floor and peculiarities of season. Among the immediate causes, he attributed the outbreak to heavy rainfall in particular years and then spread of the disease from the sick to the healthy persons in badly affected areas. According to Elliot (1863, p. 11), ‘one of the principal causes of this epidemic is the want of cultivation of lands adjoining houses and villages and the harbouring near them of thick deciduous jungle and vegetation.’ Elliot noticed that this malarial fever was different from common fever in the way that it was ‘congestive remittent type.’ Enlargement of spleen and damage of liver were among the principal symptoms. Elliot also recorded the sequel of fever. Finally, he recommended a major sanitary reform as the most important remedy to stop this epidemic.

In early 1864, Govt of Bengal appointed a ‘Special Commission of Enquiry’ to enquire about the Fever Epidemic. Though the Commission held the insanitary and unhygienic habits of Bengalis responsible for the epidemic along with environmental degradations, their report could not satisfy the Sanitary Commission of Bengal. Commenting on the Report of the Special Commission, the Sanitary Commission of Bengal (1864–1865) writes, ‘The Commission of Inquiry recorded its opinion that the main causes of the fatal fever which has prevailed are miasm, polluted drinking water, vitiated air and deficient ventilation,



excessive use of farinaceous food, and to a slight extent contagion. Although we are not prepared to agree altogether in these conclusions, believing, as we do, that it is far more probable that the disease has its origin in a certain specific poison propagated from men to men than that it is produced by sanitary conditions, however unfavourable, we have been unable to suggest any practical measures in addition to those which have been recommended by the Commission and adopted by the Government of Bengal' (Bengal Sanitary Commission, 1865, p. 79). Jackson's (1875) detail documentation of the epidemic in the 'Special Report of the Sanitary Commissioner of Bengal for 1873' is another important source as reported by the *Indian Medical Gazette*, 'Surgeon-Major C. J. Jackson, M.D., who, while filling the office of Sanitary Commissioner of Bengal, devoted most of his time to the study of the Burdwan fever and the supervision of relief agencies. Dr. Jackson, to that end, spent much time in the fever tracts and collected a large mass of information, which he has embodied in a special report printed as Part II. of the "Report of the Sanitary Commissioner for Bengal for the year 1873." This report embraces the 2 worst years of the fever (1871 and 1872), and is a very careful and detailed document, containing the author's observations and the conclusions which he felt justified in drawing from them'.

Sutherland (1870, pp. 1086–1091) squarely blamed the developmental work that caused serious ecological imbalance. In his words (Sutherland, 1870, p. 1087), 'Has not the railroad obstructed the natural drainage of the country, and converted some previously healthy localities into unhealthy and deadly hotbeds of Malarious fever? Have not our canals created, wherever the irrigation system has been carried out, a deadly miasmatic atmosphere, which has destroyed as many lives as would have been lost by the casual famines which swept over those districts? The answer to such statements must be, that there is much truth in them.' Beginning with October, 1871 issue on the *Indian Medical Gazette*, Lyons (1871a) wrote a series of articles where he traced the history of the Burdwan Fever, and in the next issue (Lyons, 1871b) cited several case studies and quoted experts to finally conclude that due to contradictory reports, it is a difficult task to diagnose the fevers. Writing in 1872, Lyons (1872a) showed that the nature of the disease to be contagious and quoting Dr. Mantell's article published in the *Englishman*, showed that the poor were the most affected. However, he criticized Dr. Mantell's ignorance of Deno Bundoo Dutt's accurate report on Burdwan Fever published in 1870. But in his important work titled, 'A treatise on relapsing or famine fever' (Lyons, 1872b), he rejected the malarious theory of the relapsing fever of Bengal.

In the first part of the book 'Endemic fever in lower Bengal' by Dr. J G French (French, 1874a), Dr. French surveyed the existing literature and compiled a district wise detail

history of the epidemic. He then discussed the symptoms of the disease and its causes (French generally attributed the causes to environmental issues). French concluded that the disease was a purely malarious fever, and that the fatal type (jwor-beekar) was a malignant remittent. The most important feature of the book is the detail record of several case studies, supplemented with charts and graphs; the book ends with a compilation of important statistics on the fever. Next year, French (1875) published a more elaborate book titled 'Endemic fever in lower Bengal, commonly called Burdwan Fever'. This version of the book by Dr French is more focussed on Burdwan Fever and he concluded that Burdwan Fever was not contagious, that it did not extend along roads or traffic lines and that it chiefly extended and was worst along rivers, khals, and nullahs. The book has extensively quoted Dr Jackson to counter his 'Typhus' theory of Burdwan fever and cited that though 'Dr. Jackson says it was Typho-malarial, Dr. A. Verchere said it was typhus, Dr. J. Greene that it was typhoid, and all other observers, as Dr. D. B. Smith, Dr. Payne, Dr. Elliott, Dr. Mantell, and all the Inspecting Medical Officers—as Dr. Robinson, Dr. Roy, Dr Dutt, Dr. B. B. Gupta, Dr. F. C. Ghose, and Dr. K. P. Gupta that it was (what we have always recognised by the name of) malarial or paludal fever.'

Deegumber Mitter was the only native Indian member of the Special Commission for the Inquiry on the Epidemic Fever (1864), constituted by the Lieutenant Governor of Bengal. His 1876 treatise 'The epidemic fever in Bengal' (Mitter, 1876), originally published in the *Hindoo Patriot* serially during 1873–1875, is an important source for many reasons. In this report, Mitter was the first to explicitly ascribe the primary cause to the blockade of natural water flow by the newly constructed roads, bunds and railroads resulting into waterlogging; the swamps and marshy lands thus created became a fertile breeding ground for mosquitos. He rejected the theory that the natural dampness of the soil and climate were responsible. Mitter quoted Lord Lawrence (Viceroy of India, 1864–1869) as, 'The only new cause suggested by the native member of the commission, Babu Deegumber Mitter, as probably increasing the dampness, which the commission considered to be the main source of the disease, was the obstruction to drainage by railways and roads and the shutting up of outlets into rivers' (Mitter, 1876, p. 4). He also recommended regular supervision of drainage to avoid undesirable blockade.

Sir Joseph Fayrer's, 1882 book 'Climate and fevers of India' (a collection of the Croonian Lectures delivered at the Royal Society of Physicians) (Fayrer, 1882) generally supported the typhus theory for remittent and relapsing fever. He also indicated that as per his own experience, Quinine failed as an antidote in acute cases of remittent fever. Rogers (1897) in his lengthy review article 'The lower Bengal (Burdwan) epidemic fever reviewed and compared with the



present Assam epidemic malarial fever (Kala-Azar)' published in the *Indian Medical Gazette*, November 1897 issue, generally concluded that Burdwan Fever was same as the Kala-Azar of Assam. This theory was something different from the previous ones and must have been emanated from Rogers' own experience in working in Assam. In another article Rogers (1901) discussed the effect of silting in a river in the Lower Bengal on the prevalence of malaria. In the same article, he also published the result of reduction of malaria in a population on introduction of filtered water.

Sub Assistant Surgeon Sen (1872) reported that from his vast experience in working in the fever-stricken districts (he claimed to have treated at least 10,000 patients and he himself fell sick) he concluded that neither the fever was contagious nor it could be completely cured by administering quinine. Surgeon Gupta (1873), primarily blamed the lack of drainage and insanitary habits of the people for the outbreak of the epidemic, but also indicated that poverty might be one reason why the poor peasants were incapable of resisting the maladies. Surgeon Major Verchere (1873), rejected the Malarious theory of the fever as, 'I thought, therefore, that the Burdwan fever must be something more than an aguish disease, and that there was something beside the 'Malarious' origin.' He also published several clinical records kept in his diaries. Greene (1874), Civil Medical Officer, Serampore, concluded from his experience in treating 2000 patients in the Hooghly district that the epidemic was caused by typhoid (complicatedly mixed with malaria) and the blockade of drainage due to the construction of railroads was the principal cause. Assistant Surgeon Roy (1874), concluded that, 'nothing else but to impeded defective drainage and vegetable decomposition as its chief source'. Meredith's (1873) two-part article 'Old notes on malarial fevers and cognate ailments' presents the author's experience in treating malaria patients in British Guiana. He noted three important points, such as, anaemia as a result of persistent attacks of intermittent fever, prevalence of the fever in unhygienic localities and malnourished people as easy targets. In a lengthy review article, Deputy Surgeon General Moore (1881), primarily blamed climatic condition for the epidemic and supported a fungal theory for malaria.

Among the early twentieth century publications, the article by Brahmachari (1911) is an important review article. Bentley (1925) opined that spread of agriculture and irrigation can prevent malaria. According to Brahmachari (1911, pp. 340–341),

'The consensus of medical opinion was in favour of the disease being of a Malarious nature. There was a number of cases regarding which a difference of opinion existed, namely, cases in which the pyrexia was more or less of a continued type. These cases constituted the *Jor Bikar*. Some observers thought that these were instances of true typhus (Verchere and

Jackson). Jackson subsequently believed the disease to be typhomalarial fever. Greene thought the disease to be typhoid in nature. Lyons thought it to be relapsing fever. Roy, French and Wilkie thought that they were cases of ague in which the apyretic intervals had disappeared. Quite recently, Major Rogers has pointed out that the Burdwan fever was precisely similar in nature to the epidemic of Kala-azar in Assam. He points out that a few cases terminating rapidly with coma, and doubtless due to cerebral malaria were naturally regarded as part of the epidemic. Lastly, Christophers and Bentley have doubted as to the Kala-azar nature of this epidemic.'

Though majority opinion was in favour of malaria, the epidemic fever showed much peculiarities from place to place, and is therefore, given a distinct name.

In an editorial, *Indian Medical Gazette* (1873, pp. 68–70) quotes the report of the Inspector General of Hospitals as, '(the fever) which has been attracting so much attention since the year 1861, which, arising in Nuddea and Jessore, has gradually but very slowly spread westward, occupied successively the area of the Nuddea and Jessore districts, the Barasat subdivision, the Hooghly and Burdwan districts and is now apparently invading Beerbhoom, Bancoorah and Midnapore.'

The editorial further states that, 'Nowhere did the disease exhibit the intensity and fatality which it acquired in Burdwan and some parts of Hooghly, Beerbhoom and Midnapore. In Burdwan, the disease began to attract attention as early as July. It increased in severity as the season advanced and became extremely severe in December. It has continued to rage ever since then and the usual abatement was hardly perceptible during the hot weather of 1872.'

The Epidemic Commission in 1864 described the deadly forms of the disease as follows,

'The disease is characterised in its deadly form by great general prostration, cerebral congestion, and early collapse from which the patient, having no power to rally, is cut off in 36 hours to four or five days. During a first attack the head is the seat of congestion. The eyes are bloodshot and aching, the face is suffused, delirium early ensues and collapse terminating fatally in a few hours closed the scene. Next in urgency to the cerebral symptoms, we have to deal with a highly congested state of the thoracic viscera and with great difficulty of breathing; the air-tubes become loaded with mucus and death finally results from asphyxia' (Brahmachari, 1911, pp. 340–343).

Regarding the action taken by the Govt. to treat the sick, the Report states that 'by the end of the year, one assistant surgeon, five sub assistant surgeons and twenty-four native doctors had been sent to Burdwan and 27,617 cases treated



in 17 dispensaries. Large numbers of sick were also visited and treated in their own villages and houses. In Hooghly, five special dispensaries were opened and 23,005 patients treated in them' (Brahmachari, 1911, pp. 340–343).

In the Report of the Charitable Dispensaries under the Government of Bengal for 1866, Dr. James Green, the Inspector General (Green, 1866, p. 13) wrote

'The fever sprang up at the end of the rains. In the villages and particular parts of the district, the seat of the outbreak of fever, three-fourths of the population were found to have suffered under the fever. The mortality in some places has been in greater proportion than one to three attacked; and those who have escaped with life from the fever, have been left prostrated, anaemic, and with enlarged spleens, and anasarca. The disease may be designated relapsing fever; many are jaundiced; the fever sets in with severe symptoms at once, headache, high fever, gastric irritation; adynamic typhoid symptoms, dysentery and diarrhoea often supervene; death occurred in the worst cases on the eighth or tenth day, sometimes on the third or fourth; some of the cases were very protracted, and lasted for several months, the spleen becoming much enlarged; relapses occurred in others, followed by death on the twentieth day of the disease or so. Dr. Mantell considered the disease to be analogous to the severe fever of 1863–64: to be a highly concentrated Malarious fever, and not to be contagious. Dr. Sutherland, who has had a large experience, calls it relapsing or famine bilious fever, and considers it to be infectious and contagious.'

Regarding death, Brahmachari (1911, pp. 340–343) refers to the report of the Inspector-General of Civil Hospitals (report on the Charitable Dispensaries under the Government of Bengal for the year 1871) that stated that the mortality in one outbreak amounted in a few months to one-third the original strength of the community. The terrible mortality which depopulated Purbusthulee and its adjacent villages in 1862, as mentioned in the petition made by the inhabitants of the place to the Government in the same year, must have been due, to a great extent, to attacks of fever of a similar nature.

Elliot (1863, p. 3) estimated that in Oolah or Beernagor in Nadia district (near Ranaghat), 10,000 people died in 6 years' time out of a population of 18,000. According to French (1874a, p. 21) 'the fever, as a rule, when it regularly broke out, was very fatal. It has been generally estimated at about one third of the total population in 1869. The total population of the town and suburbs of Burdwan was estimated at 46,121. In 1872, the census gave a population of 32,687, which shows a decrease in these years of 13,000 or taking birth into consideration, of about 15,000 persons. In Nollah, it is said half of the population died; in Sonamukhi one third died and other places was said to have been "nearly

depopulated"'. Peterson (1910, pp. 76–86) has given a detail statistic of death due to this fever in the district of Burdwan.

Writing in 1870, Sutherland (1870, p. 1090) noted that, 'the suburb (of Krishnanagar, Nadia), which contained 8000 inhabitants, had lost 1000 by death, 5000 had left the place, and only 2000 remained, and the majority of these were in an extremely sickly condition.' The extent of devastation caused by the epidemic can be gauged from Elliot's (1863, p. 8) description,

'Many large "Barees,"¹⁴ in which there were formerly thirty and forty residents, have now been left with perhaps one solitary occupant; whole Mohullas and Streets have been deserted; and large Villages which formerly told their residents by thousands can now almost number them by hundreds. In this manner many of the largest and most populous places in the three Districts have been decimated by a disease which has numbered its victims by thousands, and which has left three-fourths of those who have escaped from immediate death to linger on for a few months, or perhaps years, in state of misery and despair, at last to fall victims by one of the numerous sequences, which are perhaps productive of as great an amount of mortality as the disease itself.'

Elliot further narrates,

'A glance at the Villages of Oolah, Nobla, Meradpore, and such places, tells that they are doomed, and nothing can be more wretched than the appearance they now present. The rich and the poor of all ages and castes have suffered alike, consequently dwelling houses of all descriptions in equal proportions are to be seen in various stages of decay and ruin. Many of them have fallen to the ground, and jungle and rank vegetation have sprung up in their places.'

In 1922, Bentley (1922) in an elaborate article published in the *Indian Medical Gazette*, estimated the economic and demographic impact of the malaria epidemic. We reproduce below three tables compiled by Bentley:

From the above three tables, we can see that the prevalence of Malaria had a direct impact on population growth and agriculture, and in this regard, the Western Bengal suffered the most and the Eastern Bengal the least. Bentley's works are important, as indicated by Klein (1972, pp. 135–136), 'Serving terms as Sanitary Commissioner, and Director of Public Health in Bengal, Bentley wrote several outstanding monographs and pamphlets between 1907 and 1925 on malaria. His work carried him into the fields of

¹⁴ 'Baree,' from Sanskrit Bāṭī, is a residential house in common Bengali.



Table 1 Increase in population in four different zones of Bengal Province (Courtesy Bentley, *Indian Medical Gazette*, September 1922, p. 321)

	Population in 1872	Population in 1921	(%) Increase 1872–1921
Western Bengal	7,604,661	8,039,704	+5.7
Central Bengal	8,202,780	9,433,544	+27.1
Northern Bengal	8,045,432	10,358,303	+28.8
Eastern Bengal	10,980,504	18,650,139	+69.8

Table 2 Relative prevalence of Malaria in different zones of Bengal Province (Courtesy Bentley, *Indian Medical Gazette*, September 1922, p. 323)

	Fever indices (%)		
	1872	1912	1921
Western Bengal	21.9	40.9	51.7
Central Bengal	17.3	22.3	44.9
Northern Bengal	22.3	23.7	33.5
Eastern Bengal	9.3	7.5	14.0

demography and economics, and it was he who first linked systematically the depredations of malaria to agriculture and the cycle of economic life.’ (Tables 1, 2, 3).

Dr. G C Roy’s interest in malaria dates to 1871, when he was an MD student at Glasgow. His first paper on malaria titled ‘On the (therapeutical) action of quinine on malaria’ was published in the *Medical Times and Gazette*. Next month, it was reproduced in the *Lancet*.

His article immediately caught the attention of the international medical community. *Medical Times and Gazette* (Bakewell, 1871, p. 292) published a letter from Dr. R H Bakewell, MD, Medical Officer of Health, Colony of Trinidad, which reads as:

‘Sir, I was glad to see in your number of March 4 an article by Baboo Gopaul Chunder Roy on the subject of Malaria fever in which views are expressed nearly coincident with my own as to the action of Malaria primarily on the ganglionic or sympathetic system of

nerves. In a paper of mine which was read before the Royal Medical and Chirurgical Society on February 14, these views were explained more fully than in the article of Baboo Gopaul Chunder Roy. A very short abstract of the paper appeared in your journal of the 25th ultimo.

On two points I regret to say that I differ from my distinguished confrère. I look upon quinine as a direct chemical antidote to the poison, which I think is an irritant, and not a narcotic poison. It is true that an excessive dose of the Malarious poison will paralyse the whole sympathetic system and produce secondarily the same effect on the cerebrospinal system, but so will many irritant poisons in very large doses. ... The case of malaria poisons where the first symptom is collapse, followed by coma and death, seem to me analogous. I have seen a man die from Malarious poisoning in thirty hours, without ever rallying from the collapse stage, and with a spleen found eight hours of the death of the consistency of cream.’

Dr. Roy’s first paper on Burdwan Fever, written from the nerve-centre of the epidemic, was ‘Suggestions as to the cause of un-healthiness of lower Bengal and the recent outbreak of epidemic fever.’ Three months later, it was followed by another, ‘Further observations on the epidemic fever of Burdwan.’

In July 1872, on the wake of the deadly Burdwan fever, the Viceroy Lord Northbrook declared a prize of Rs. 1000 for the best essay written by a ‘native’ sub-assistant surgeon on the causes and prevention of Burdwan fever. One year time was given for preparation of the essay, and the deadline was August 1, 1873. Roy submitted a lengthy article, but the Examiners, ‘the Principal of the Medical College and the Sanitary Commissioner for Bengal do not consider any of the dissertations submitted in competition deserving of the prize’ (*Calcutta Journal of Medicine*, 1873, p. 423). Viceroy allowed the writers one more chance to resubmit the essay, but Roy sent his essay to *Calcutta Journal of Medicine*, and it was published anonymously in two instalments.

Table 3 Relative distribution of the various classes of land in different zones of Bengal Province (Courtesy Bentley, *Indian Medical Gazette*, September 1922, p. 324)

	Currently cultivated	Area (%) distribution of cultivable land	
		Cultivated land turned into waste/jungle	Currently fallow
Western Bengal	61	26	13
Central Bengal	58	18	24
Northern Bengal	71	14	15
Eastern Bengal	90	7	3



The Editor of the Journal (Dr. Mahendralal Sircar¹⁵) was disappointed with the Govt.'s failure to identify a prizeworthy essay. He commented,

'This is unfortunate, as the whole community were in anxious expectation that some definite conclusions would be arrived at regarding the epidemic, if not its whole mystery cleared up, by the successful Prize Essay. It was thought that the causes of the Epidemic, which are hitherto shrouded in the deepest obscurity, and which have hence given rise to the wildest speculations about them, would be at least approximately traced, if not link by link, to the ultimate physical change or changes in the soil, or in the atmosphere, or in the mode of living of the people, or in all combined. It was thought that the deprecations of the disease in the human organism would be studied with the minuteness and the accuracy necessary to the discovery of its true pathology and of its appropriate therapeutics. But alas! our expectations were doomed to be disappointed.' Under such circumstances, the Journal decided to publish Dr. Roy's essay because, his 'opinion, based on his personal and minute knowledge, are entitled to respect, though we may not be disposed to give them our unconditional assent'. The Editor made his views clear that the journal differed with Dr. Roy's views on the causes of the epidemic; rather it believed in Deegumber Mitra's 'Drainage Theory' (*Calcutta Journal of Medicine*, 1873, pp. 423–424).

In July 1874, the essay appeared in the form of a book titled 'An essay on the causes, symptoms and treatment of Burdwan fever, or, the Epidemic fever of lower Bengal'. It was printed by Anglo Sanskrit Press, Calcutta. The book had a running text of 92 pages excluding the cover and the title page. The book had the following chapters: causes, symptoms, diagnosis, sequelæ, treatment and preventive measures. As acknowledged by Dr. Roy in the preface of the book, his original essay submitted for Viceroy's competition had to be substantially revised before it was published as a book.

Before this book came into print, Dr. Roy had written a two-part article titled, 'On Burdwan Fever'. After the first part had been published in February, 1874, noted physician

JG French, wrote a letter to the Editor, which reads as follows,

'I now come to Dr. Roy's paper on Burdwan fever in the March number of the Indian Medical Gazette. We agree on all the major points, but in a few minor points I cannot agree with him. I shall not in this paper give any description of the symptoms, or say anything of the treatment of Burdwan fever. My observations are recorded in the Indian Annals (not yet published) and I have nothing to add to Dr. Roy's excellent description of the fever, except that he omitted to mention one common and dangerous form in which after a few days' continued fever violent vomiting and purging set in, followed by collapse, and in some cases death. I cannot recognise the difference between the insensibility of typhus, and that in malignant malarial fever, as described by Dr. Roy, neither can I agree with his assertion that "whilst in typhus death begins at the heart; in malaria it begins at the brain," or that "the early feature in typhus is failure of the heart's action and prostration; the early feature in malaria is failure of nervous function and delirium' (French, 1874b, p. 114).

On the July 1, 1874, Dr. Roy replied to Dr. French's letter as,

'... I cannot help explaining myself on the points on which he differs from me in his observations. 'The common and dangerous form in which, after a few days' continued fever, violent purging and vomiting set in followed by collapse and in some cases death.' has been referred to by me in my paper as bad cases of bilious remittent, which are very obstinate of treatment. I never recognised any difference between the insensibility of typhus and that in malaria, but what I intended to differentiate was the diagnosis between insensibility induced by exhaustion and that from cerebral complication. An analysis of cases of acute Malarious fever will at once show the prominence which brain symptoms receive in this complaint as distinguished from typhus. Dr. Murchison states that in typhus, death from coma is very rare in the first week of illness, whilst all the cases of death from coma in Malarious fever that came under my observation took place within that time. In the advanced stage of both diseases, I admit that cerebral symptoms will be identical. It is not in the nature of delirium or the character of any particular nervous symptom that I claim for Malarious fever any peculiarity, but in the early appearance of the same. In classifying the mode of death, I have restricted myself to two heads which are common forms of termination, viz., exhaustion and cerebral complication. Affections of lungs are mere incidental occurrences and are as

¹⁵ Dr. Mahendralal Sircar (1833–1904) was a renowned doctor of the nineteenth century Bengal, the second MD of Calcutta University, a former president of the Bengal branch of British Medical Association and a private physician of Sri Ramakrishna Paramahansa. Dr. Sircar was noted for popularization of Homeopathy in India. He was a strong advocate of propagation of science in India; in 1876, he founded Indian Association for the Cultivation of Science (IACS) in Kolkata. In 1930, CV Raman was awarded Nobel Prize in Physics for his experimental works in IACS. In 1868, Mahendralal launched Calcutta Journal of Medicine, with himself as editor.



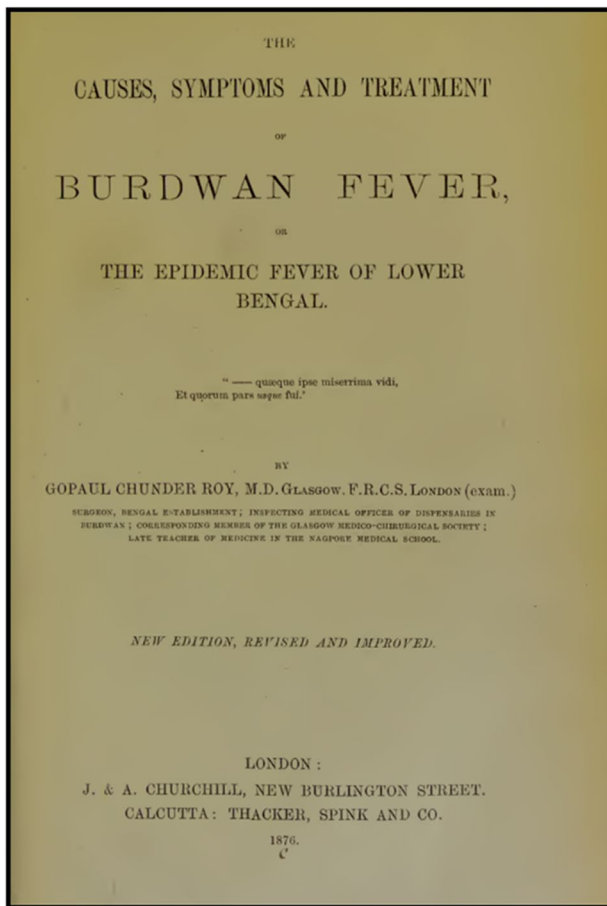


Fig. 4 Title page of Dr. Roy's book on Burdwan Fever (2nd edition, 1876)

much characteristic of mode of death in malaria as of other diseases. If they have been observed in a good many instances, it is because of the naked habit of the natives of Bengal rendering them during illness more susceptible to exposure and change of season. It was impossible to give a fuller account of the disease in a journal which is devoted to the discussion of general topics on medicine. My experience on the subject will be embodied in a pamphlet which is already in print.'

For next 2 years, Dr. Roy did not write on Burdwan Fever. Then in 1876, the new, revised and enlarged edition of his book appeared with the title 'The causes, symptoms and treatment of Burdwan fever, or, the Epidemic fever of lower Bengal'. It was simultaneously published by J & A Churchill, London and Thacker, Spink & Co, Calcutta. It was printed by Virtue and Company Limited, City Road, London (Fig. 4).

The main text of the book had the following chapters: Burdwan fever, causes, malaria, symptoms, diagnosis,

sequelæ, treatment and preventive means, running into 124 pages. The name of the chapters remained almost unchanged from the first edition, the introductory section on Burdwan Fever and the section on Malaria being the new additions. Interestingly, Roy's two articles were appended to the main text: The past and present state of medicine in India (pp. 125–154) and On papaya carica (pp. 157–168).

Dr. Roy begins his book with a heart touching description of the devastation that caused a tragedy unparalleled in the history of the nineteenth century Bengal: 'The devastation of the Epidemic has a very sad tale to tell (1875). Countries that once smiled with peace, health, and prosperity, have been turned into hot-beds of disease, misery, and death. Villages that once rang with the cheerful, merry tone of healthful infants, now resound with loud wailings and lamentations. Huts, which offered too little space for their occupants, are left without a tenant. The skulls of human beings now strew the fields at every few yards' distance'... 'The fell disease has mocked every human effort, and absorbed in its powerful grasp, day by day and inch by inch, every blessed spot which once used to be prized for its salubrity' (pp. 1–2).

He then goes into narrating the origin and spread of the disease. In the next chapter, he identified four causes of the epidemic: '(a) seasonal peculiarities, as variations of temperature and moisture, (b) want of sanitary arrangements in Bengal villages, and (c) dampness of soil. Other causes are assumed to explain the spread of it, as (d) over-population and poverty, (e) contagion, and (f) epidemic influence' (pp. 12–13). It should be kept in mind that during 1875–1876, the exact cause of malaria was hotly debated; it is only in 1880, the French army doctor Alphonse Laveran detected malaria parasite in the blood of patients and it is only in 1897, Ronald Ross, while working in India, proved the role of Anopheles mosquitoes in the transmission of malaria parasites in humans.

Dr. Roy then describes the nature of the epidemic fever as, 'It is of malarious origin, and varies in type according to the severity of the poison and the constitution of the recipient. The characteristic feature of malarious diseases is their periodicity and tendency to recurrence. The longer intervals of health indicate a system less influenced by malaria, whilst a stronger dose of the same will induce in the same individual less and less of intermission, till the fever will merge into the remittent or continued type. Thus, one would pass through the phases of quartan, tertian, quotidian, double quotidian, remittent, or continued, and the danger to life will increase as the climax is reached. All the varieties are changeable from one to the other, and do not in themselves form distinct species. Thus, in the 1st year of the epidemic, cases of the continued and remittent types are observed, which are mentioned by the native Kavirajs as "Jwar bikar". As the severity declines it becomes



quotidian and ultimately quartan. The last type of fever prevails extensively in the district of Burdwan, and shows that the poison is wearing itself out. The new cases are observed in August and September, when the subsidence of water from the face of the earth gives fresh impetus to the generation of malaria' (pp. 73–74).

Despite his firm belief about the malarious nature of the epidemic, Dr. Roy noticed that 'This slow but sure travelling of the disease and its invasion of one village after another, have given rise to the suggestion of the epidemic being not of malarious origin, but consisting of some such element that bears the stamp of contagion' (p. 77).

Dr. Roy, next, differentiated the epidemic from typhoid, 'From typhus it is distinguished by the absence of contagiousness, by the eruption and by peculiarity of temperature' (p. 88). And, this differentiation, according to him, was the key to diagnosis, 'The peculiarity of temperature in malaria, when contrasted with that of typhoid, will give a valuable clue to diagnosis. Thus, if on the 2nd or 3rd day, the temperature rises so high as 102° or 103° we can at once make up our mind that the case we have to deal with is not enteric fever. Besides, looseness of bowels, a constant element in the latter, is an exceptional attendant on malarious fever. It is a complication only of the bilious remittents, in which, however, its early appearance as a bilious flux, and the bilious vomiting and hepatic tenderness, mark the distinguishing features. Remittent fevers complicated with dysentery have often been mistaken for typhoid, and more than once, cases were reported to me as such by native doctors when personal inquiry revealed the true nature of the disease' (p. 92).

As for symptoms, Dr. Roy noticed that, 'The first and most frequent in order is enlargement of the spleen. It is found in at least three fourths of the people affected, and varies considerably in size, from being just perceptible under the costal cartilages, to filling up the whole abdomen. In a female, it occupied such an immense bulk that a Sub-Assistant Surgeon mistook it for an enlarged ovarian cyst and suggested operation as the only means of cure' (pp. 93–94). Dr. Roy also noticed that, 'The change in the blood from malaria can be briefly noted in the following words: a hydræmic or a watery condition, deficiency of red and increase of white corpuscles, and deficiency of fibrine' (p. 103).

During the epidemic, a debate over the effectiveness of quinine against malaria erupted; some even blamed the excessive use of it for the spread of the epidemic. In an article published in *Calcutta Journal of Medicine* (1873, pp. 195–205), the editor Dr. Mahendralal Sircar cautioned against the excessive use of cinchona, 'Cinchona is one of the most powerful vegetable drugs. If cinchona be indicated as the true specific, and if the patient's organism be vehemently invaded by the disease which is to be cured by cinchona, in that case one drop of the 12th potency of cinchona, containing one quadrillionth part of a grain, is sufficient to

cure the disease perfect... A small dose of cinchona acts only a short while, scarcely a few days; a large dose for several weeks, unless the organism frees itself from the drug by vomiting, diarrhæa, etc. This shows how foolish it is to take several large doses a day, as is the case in common practice....'. *Cikitsā-Sammilanī* (1887), a Bengali medical journal, in a series of articles, objected to the overuse of Quinine. But Dr. Roy opined that, 'it shows that quinine is par excellence the best tonic and antiperiodic. In it we have a powerful remedy to check the progress of intermittent fever, and whatever has been said against it to detract its virtue, is not in conformity with the general experience' (p. 107).

Finally, Dr. Roy suggests prevention measures, '1st. The main distinctive condition of villages that have been less threatened with malaria and death is their newness and scanty population. 2nd. All of them are seated on an elevated soil, either natural, or made artificially so to subserve a special object. The greater the difference between the elevation and the general surrounding level the more striking is the improvement. 3rd. They are tidier in their appearance, present less jungles, enjoy better sanitary conditions, and their soil dries up sooner after rains on account of greater intermixture of sands in its ingredients' (pp. 121–122).

The book received an immediate and negative review in *Indian Medical Gazette* (1876a, p. 137): 'This is a book manufactured from the researches of Elliot, Mantell, Saunders, Smith, Payne, French, and others whom Dr. Roy takes great care not to mention. We have carefully gone through it, and can safely state that there is not a paragraph in it of the slightest value, the substance of which has not been published elsewhere.' The journal notices with disappointment that, 'We wearily read through the earlier part, coming on no new fact or observation, till we came to the section on symptoms, and here at least we thought there would be something fresh; but we were doomed to disappointment; there is not the history of a single case.' The journal further accuses that Dr. Roy spent much space on discussing the works of his predecessors, but 'Just six pages to the most important part of the subject!' The journal went on ridiculing Dr. Roy, 'However, we must do Dr. Roy the justice to remark that the nature of these six pages will render the reader very content that there is no more.' The journal was also not impressed with Dr. Roy's discussion on 'ploughing' and 'eating sugar bubbles and people wanting nourishment.' The journal is very critical of Dr. Roy appending annexures with two unrelated topics as, 'One quarter of the book is called an appendix, for what reason we have not the least idea. An appendix is put to a book to add information about the subject of the work, which information for different reasons it is necessary to keep separate. But this is not Dr. Roy's idea.' The journal suspected that, 'the appendix is simply added to fill the book up.'



Dr. Roy was very upset with this nasty criticism of his book and sent a letter to the editor:

‘I have been much amused to read your review of my book on Burdwan Fever (communicated) in your issue of May last, and to show that opinions of critics differ according to their personal dislike or favour towards the author or the class he represents... The public and the profession are the best judge on such subjects. But I cannot help refuting certain statements that are intended to detract from the merit of the book and independent researches of the writer. It has been mentioned that I have manufactured my essay from the writings of Mantell, Saunders, Smith, Payne, and French, and not mentioned their names. This fact, if it be a fact, has taken me by surprise. I am as yet ignorant of Dr. Payne’s contribution on the literature of the subject and Dr. Mantell’s writing is yet a sealed page to me. Dr. Saunders’ and Smith’s observations have been duly acknowledged, and if certain statements of mine correspond with Dr. French’s observations, I will take the liberty to explain that they were made independently and appeared in print either in the *Indian Medical Gazette* or in the *Calcutta Journal of Medicine* long before Dr. French’s paper saw the light. The present edition is nothing more than a reprint of the former pamphlet revised and enlarged, which was once reviewed by the late Editor of the *Indian Medical Gazette* in his editorial columns.¹⁶ I will conclude my letter by drawing your Reviewer’s attention to the numerous extracts from my pamphlet which the late Editor freely made use of in support of arguments, and will request your readers to judge therefrom how far they can bear out the truthful remark of your Reviewer that ‘There is not a paragraph in it of the slightest value.’ Surely when statements are so contradictory, one of the two must be wrong. I was led to publish it in a separate form from the very kind notices taken of my book by some of the eminent men in the profession in England, and how much it would amuse them to see that we in India are growing wiser than our teachers.’

On receiving the letter, *Indian Medical Gazette* (1876b, p. 193) appended a note to Dr. Roy’s letter, which stated: ‘Although contrary to the rules of journalism, we print the above letter, and shall be very glad if it affords any

¹⁶ “Essay on the causes, symptoms, and treatment of the Burdwan fever” by Surgeon G. C. Roy, M.D., F.R.C.S. Dr. Roy, as an inspector of dispensaries in the Burdwan district, had abundant opportunities of becoming familiar with the features of the Burdwan fever in all its phases. His duties involved continual itineration through the most unhealthy parts of the district at all seasons, and gave scope for close observation of the conditions of the country and people. This essay was originally written for the prize offered by His Excellency the Viceroy, but, being “crude and disjointed,” failed of its object. It was afterwards revised and enlarged.’ (*Indian Medical Gazette*, Nov 1, 1875, pp. 298–299).

satisfaction to Dr. Roy. The malarious nature of the Burdwan fever was fully recognised in 1864, ... the literature of the subject was exhaustive, and contained everything important that has hitherto been known on this topic. If Dr. Roy has not availed himself of these sources of information, which were within his reach, we fail to see how this fact can be considered creditable to him. We are sorry that Dr. Roy should not have thought it beneath him to misrepresent what our Reviewer said, by omitting after the clause “There is not a paragraph in it of the slightest value,” the words, the substance of which has not been published elsewhere.’ The journal informed that the Reviewer ‘chiefly referred, in addition to the numerous articles in the *Indian Medical Gazette*, are the Official Reports by the Civil-Surgeons of Burdwan, and those by the Sanitary Commissioners, Magistrates, and Deputy Surgeons-General.’ The journal also refuted Dr. Roy’s allegation of selective discrimination against him by the Reviewer.

The book also received a critical review in the *British Foreign Medico-Chirurgical Review* (1876, p. 435) which reads as follows:

‘Roy on Burdwan Fever: In our last volume but one we noticed the essay of Dr. Roy on the fever which has prevailed for some years past in the district of Burdwan, in lower Bengal. The present work is a reprint of that essay, with the addition of a short section on malaria, in which the author alludes to the opinions that were under discussion some months ago, as to the non-existence of the febrific miasm so called, and the dependence of the fevers usually attributed to malaria on simple chill, and shows that the occurrences at Burdwan were opposed to the latter view. In an appendix there are some remarks on the past and present state of medicine in India, and observations on the solvent action of papaya juice on nitrogenous articles of food. There is a belief, widespread in the tropics, that the papaya or papaw plant has great influence in making meat tender, or even in hastening its putrefaction...’

The journal however, appreciated Dr. Roy’s investigation with papaya juice.

British Medical Journal (1877, p. 166) published another review:

‘This being a second edition of Dr. Roy’s work on the fever which has devastated portions of Lower Bengal of late years, does not call for any lengthened notice. The account of the fever and of its mode of progress has been enlarged. Its etiology, and that of fevers in Bengal has been more fully discussed. But the result is unsatisfactory; no fresh light is thrown on the difficult question, why this fever sprang up fourteen years



ago, why it continued to spread in certain districts, and why it appears to be now steadily disappearing, while during the same time there has been no material change in the physical geography of the district or in the habits and condition of its inhabitants. Dr. Roy's opinion is, that the fever was a Malarious one, produced by the cumulative effects of imperfect drainage and of the poverty of the natives. Quinine he considers to be the chief remedy...' Regarding the Appendix on 'juice of the Carica Papaya as a solvent of meat', the journal commented that, 'Dr. Roy is only imperfectly acquainted with the accounts that have been given, in the West Indies and elsewhere, of this peculiar action of the juice. It has long been known as a popular anthelmintic throughout the tropics.'

Four years later, Dr. Roy wrote his last paper on Burdwan fever, namely, 'Remarks on the so-called typho-malarial fever and their treatment.'

5 Other works

In addition to publishing papers on medical research, Dr. Roy presented an important paper on history of medicine at popular level, which was much discussed in the contemporary media. In 1870, Keshub Chandra Sen was touring England, delivering lectures on religious reforms, and Gopaul Chunder accompanied him. *British Medical Journal* (1870e, pp. 123–124) announced that:

Babu Gopaul Chunder Roy on Indian medicines

'The Hunterian Society is about to hold a special meeting after the conclusion of its session in order to hear a lecture from Babu Gopaul Chunder Roy on the history of medicine in India. ... Babu Keshub Chandra Sen, the well-known religious reformer, is to be present and will address the meeting. He is, we understand, a cousin of Babu Roy. The meeting will be an open one ... and the meeting will take place at 8 o'clock on Wednesday, August 3rd.'

The August 6 issue of the *British Medical Journal* (1870f, pp. 155–156) published a report:

'Medicine in India: 'A Special Meeting of the Hunterian Medical Society was held on Wednesday evening in the Theatre of the London Institution, to hear an address from Baboo Gopaul Chunder Roy on the state of medicine in India prior to the British rule... He then referred to the high state of civilisation which existed in eastern countries in very early ages. There was good reason for believ-

ing that astronomy had its origin in India, and in that country, medicine attained, at an early period, a high degree of development. An advance, however, was arrested by the Mohammedan conquests; and therefore, Hindoo science, remaining as it did at the point where it was centuries ago, presented a strange contrast with modern science. The physicians of India had sprung from two of the castes—the Brahmins, who were the most highly educated and from whom the priests were chosen, and the Boyshos (Vaiśyas) or traders, who were not allowed to learn Sanskrit or to reach the higher education of the Brahmins. Medicine and surgery were distinct; the latter being entrusted to barbers, whose operative skill was very limited. Medicine was from very ancient times divided into anatomy, Materia medica, and the treatment of diseases. The study of anatomy was very imperfect, in consequence of the prejudices against handling dead bodies. What knowledge of anatomy the Hindoo possessed, was gained from the dissection of goats; and an acquaintance with the human skeleton was obtained by allowing bodies to remain in water till the bones and ligaments alone were left. The umbilicus was supposed to be the centre of the vascular system. The blood was regarded as a mixture of humours. The Materia medica attracted attention at an early period; and the articles were described with a view to their dietetic as well as to their therapeutic properties... Baboo Chunder Roy recommended a careful investigation of Indian medicinal plants; believing it probable that among them would be found some valuable remedies for the prevalent diseases of the country. In the works on practice of medicine, the description of symptoms was very exact, but the treatment was empirical. In fevers, low diet was enjoined; the patient was kept for forty-eight hours without medicine; then bitters and purgatives were administered; and then, if the fever persisted, arsenic in divided doses. This treatment rarely failed to arrest the disease in ten days; but it left the patient's constitution in an impaired state. Surgery was in old times entrusted to barbers, whose practice was limited mostly to the treatment of ulcers, abscesses, etc. But for ages there had been persons who performed the operation for depression of cataract, cupping (by means of cow's horns), bleeding (in the calves of the legs), etc. Hygiene had long held a place in the Hindoo system, being mixed up with religious rites... Turning, next, to the British rule, the lecturer referred to the influence of a surgeon, Mr. Broughton, in establishing the East India



Company in India in the last century, The idea of founding an English medical university in Calcutta arose in 1836. At first there was great difficulty, on account of the religious prejudices, The necessity for dissection was at last strongly felt; and it was a memorable event when Baboo MODOOSUDUN GUPTO first broke through the prejudices of his race, and dissected a human body. From this time, medicine advanced; a hospital was founded; and degrees were given by the University. Baboo Chunder Roy complained that the degrees in Medicine of the Indian Universities were not recognised in England. They were obtained only after stringent examination; and in not one instance where the native holders of them had come to England to undergo the competitive examinations for the Indian Medical Service, had there been a failure. It had been said that the preliminary training was deficient; but it should be remembered that Sanskrit stood in India in the place of Latin, and that English itself was a foreign tongue to the Hindoos. He complained of the low estimate in which the native graduates of the Indian Colleges were held, and trusted that means would be taken to remove the stigma of inferiority which was attached to them.’ Dr. Cooke moved a vote of thanks to the author of the paper. In another page of the same issue, the journal commented, ‘The condition of the native graduates of the Indian Universities, as described by the author of the paper and by Baboo Keshub Chunder Sen, is one which, *prima facie*, requires investigation and improvement.’

Dr. Roy read this paper again at the 7th Meeting of the Glasgow Medico-Chirurgical Society on May 3, 1871 (when he was admitted to the Society as a Corresponding Member) and the lecture subsequently appeared as a paper in *Glasgow Medical Journal* (1871a, pp. 538–551) and received critical acclaim. The report of Dr. Roy’s presentation of the paper appeared in the *Glasgow Medical Journal* (1871b, p. 423) as, ‘Dr Gairdner had listened with extreme pleasure to the paper. He believed that it would be found by comparing the works of the earlier Greek writers with those of the ancient Hindoo authors that a very considerable part of their ideas had been borrowed from the East. After some complimentary remarks from Dr Lyon and Dr Ritchie, Dr Morton pointed out the resemblance between the early history of medicine in India and its history in Europe at the period when the “humoral” pathology was in the ascendant in the West. He also bore testimony, from his experience as an Examiner, to the attainments of the Medical Students who had been educated in India, and came to this country for a qualification. The President, Dr Adams, announced that a proposal had spontaneously originated with the Members of the Society

that evening to have Mr Roy elected a Corresponding Member of the (Glasgow Medico-Chirurgical) Society.’

Australian Medical Journal (1872, pp. 55–56), in a report on the paper, wrote,

‘The *Glasgow Medical Journal* contains a very interesting paper on the past and present state of medicine in India, by Dr. Gopaul Chunder Roy, F.R.C.S. In an empiric practice which has lasted for many ages, the Indian physicians cannot have failed to make some useful discoveries, and to some of these, en passant, Dr. Roy directs attention. Gold forms a much-esteemed portion of their pharmacopoeia, and though it is often added to impose upon the imagination of the patient, yet the author states that he has frequently seen chronic intermittent fever get well under its influence, after quinine and iron have been fruitlessly tried. The sulphide of mercury, a drug we never use internally, is their great remedy in chronic dysentery, and Dr. Roy states that it acts, when given in small doses, ... Dr. Roy urges that the native practice should be carefully investigated, and whatever of good it contains should be selected and utilized.’

The lecture was also published as a pamphlet by the publisher Dunn & Wright. Commenting on it, *Lancet* (1872c, pp. 361) writes that, ‘This pamphlet is a reprint from the *Glasgow Medical Journal*. The historic aspect of the question presents such a wide and interesting field for research and speculation and commends itself so strongly to a native medical man, that we could wish that Dr. Roy had been more exhaustive in his treatment of it. However, it contains some readable information, mixed up with a few platitudes, and a reference to the “glorious British power.”’

The timing of Dr. Roy’s paper on History of Medicine in India is interesting to note. From 1850s onwards, public science communication became an important agendum for the leaders of Bengal Renaissance, thanks to the efforts of stalwarts like Akshay Kumar Dutta, Ishwar Chandra Vidyasagar, Rajendralal Mitra and others. The benevolent power of science was clearly understood and a cultivation of science was felt to be an urgent need. This was also the era when scholars, both Europeans and Indians, started rediscovering and appreciating India’s glorious past in science and technology. The nascent nationalism in the second half of the nineteenth century instilled a sense of pride, in the minds of Bengal’s middle class, drawn upon the imagery of an ancient and great Aryan nation that the Vedic and post Vedic India (i.e., the Hindu India) was. Consequently, in the nineteenth century, traditional indigenous medicines, particularly Āyurveda, showed signs of revival. A scholar of the calibre of Dr. Roy was understandably not unaware of the intellectual development taking place in colonial Bengal. His paper should be judged in this very context.



Dr. Roy also wrote on some other issues and delivered a few lectures. In September 1871 issue of *Calcutta Journal of Medicine*, he wrote an article titled ‘The system of jail administration in England’. On August 9, 1872, Dr. Roy presented a paper titled ‘Social life in India’ at the lecture room of Social Science Association, London. *Lancet* (1872d, pp. 248) published an appreciation of the lecture.

6 A discussion on Dr. Roy’s works on Burdwan Fever

Dr. Gopaul Chunder Roy’s name is generally known to the scholars of history of science, but is largely unknown to the common public. Yet, there is no doubt that he was among the important players who spearheaded the nineteenth century intellectual awakening in Bengal.

Dr. Gopaul Chunder Roy was one of the few physicians of the nineteenth century to point out that the devastating effect of Burdwan Fever cannot be solely attributed to environmental effect or insanitary habits of Bengalis; rather the answer to the causes of the spread of the epidemic and the high mortality rate can be found in the deplorable economic conditions in the rural Western and Central Bengal caused not only by the construction of railroads, decline of agriculture etc. but also on another reason, not explicitly mentioned by Roy and not brought out by any other author: the economic decline in rural Bengal by the forcible indigo plantation by the planters, in collusion with the British Govt. The extreme economic exploitation by the indigo planters and the reign of terror unleashed by the ‘Nīlkar Sāheb’s in the rural Bengal between 1850 and 1880s caused havoc in parts of Bengal; we can understand that Dr. Roy was right in identifying the root cause of the epidemic and resultant mortality, that could not be eradicated by the application of quinine alone.

According to Mukharji (2018, p. 240), G C Roy’s book stands out clearly of other contemporary works in the sense that Roy did not blame just pathogens, lack of proper sanitation or ecological disasters for the epidemic, rather, Roy felt that once the epidemic sets in, it is aggravated due to poverty, caused by exploitative colonial economy that disturbed the very foundation of Bengal’s social fabric, an important aspect ignored by most of the contemporary reports. Mukharji (2018, pp. 251–252) further explains, ‘A broader, social framework for understanding disease and mortality were, therefore, not completely absent within the medical circles in British India. Yet, there were clearly distinctive elements about Roy’s framework. In Cornish, for instance, there is a tendency to reduce poverty to nutrition alone. For Nightingale, by comparison, peasant education was a key component in her ‘biomedical liberalism.’ It was

through education that she sought to produce healthy peasants who would be ‘precursors to a liberal, democratic, citizen.’ Neither of these two elements features in Roy’s programme. Peasant education is not something Roy comments on and he does not necessarily wish to transform peasants into proto-citizens. Likewise, his critique of poverty does not get reduced to dietary measurements alone. Clothing and over-crowding, for instance, are also mentioned as the negative consequences of poverty. Indeed, there is a long tradition of colonial attempts to compute adequate dietaries; that Roy chose not to pin his critique of poverty to this tradition and retain a fairly broad attack on poverty, per se, is in itself worth noting. This broader canvas upon which Roy sketches his account of the Burdwan Fever, often overwhelms the reader. Whereas Elliot or French evince a clear sense of purpose that allows them to ignore the messiness of life around them and focus on a small set of issues they felt were possible causes, Roy constantly got sucked into the minutiae of that very mess. As a result, there is a lot of detail that is better suited to an in-depth, immersive ethnography of rural change than a simple medical treatise.’

Not that no British officer too held the same view as Roy. For example, ‘In order to curb mortality and morbidity from fever it was necessary to administer suitable food and stimulants to the sick people. Even Dr. Saunders recognized very early (in 1869) the importance of feeding the debilitated and impoverished sick, and has strongly and consistently urged the necessity of diet as a primary essential in any remedial or restorative efforts’ (Sarkar, 2010, pp. 71). But certainly, others have ignored it.

The necessity of relief to the victims by distributing food (as many of them were suffering from malnutrition and were unable to cope up with the disease) was felt by everyone during the epidemic; yet even today researchers favour the environmental disaster theory as, ‘The predisposing causes of malaria epidemic in Bengal emanated from the topography of the riverine areas of the province and the insanitary habits of the people. But the proximate causes stemmed largely from colonial infrastructures—roads, railroads, embankments, system of labour migration, changes in the crop pattern, export oriented commercial crops, etc. Environmental decay stemmed from long-term evolution, but British colonial policy hastened the process and accentuated the epidemic’ (Samanta, 2017, pp. 25). Similarly, ‘The rapid siltification of rivers in the latter part of the nineteenth century was accompanied by declines in prosperity, cultivation, and population’ (Klein, 1972, p. 157). Clearly, Dr. Roy’s humanitarian approach is yet to have many takers even today.

A comparison of Dr. Roy’s work with that of the others shows that Dr. Roy was much more elaborate compared to his contemporaries and tried to highlight every important detail in his treatise. Moreover, as we have



already mentioned that Dr. Roy was a patriot and there is every sign in this work that he felt for his countrymen and directly or indirectly the govt. It was not easy for a servant of the British govt. ‘The first thing that would strike any reader reading Elliot, French, and Roy side by side is the brevity of the two former texts. Elliot’s text was only 32 pages long and French’s was 69 pages. By contrast, Roy’s, 1874 text was already 99 (actually, 92- author) pages in length and this increased to 124 pages (plus two tangentially related appendices of about 40 pages) at the time of its second issue in 1876. This additional girth was not simply verbosity. While Elliot and French both seem closely focused upon isolating a specific set of causes, Roy gives us something of a scattershot. Despite pursuing the same ends as Elliot and French, Roy’s work provides a much thicker description of average village life in Burdwan. His particular focus, as we have already seen earlier, is the poverty of the average villager and the causes behind it. By contrast, neither Elliot nor French mention rural poverty at all. Their focus is on the soil, on drainage, on temperature, and not so much on human beings at all. The rural people feature in their texts only incidentally as they by their allegedly ‘insanitary habits’ aggravated pre-existing pathogenic conditions. There was no account in their texts of how life in Bengali villages had changed for the worse through zamindari rack-renting, railway-enabled dumping of Manchester-made goods, and so on. Nothing political or economic appeared in their treatises’ (Mukharji, 2018, pp. 251).

Another early incident will also highlight Dr. Roy’s concern for the wellbeing of his countrymen. As reported in the *Indian Medical Gazette* (1867b, pp. 131), ‘Baboo Gopaul Chunder Roy then read a paper on the status of Sub-Assistant Surgeons, in which he contrasted their small pay and gloomy future with the large emoluments and glorious prospects of officers in the Judicial, Engineering, and Police Departments. He complained that a Native Sub-Assistant Surgeon, after long service, might find himself placed under the orders of an Uncovenanted Medical Officer or even an Apothecary who was his junior; and urged his colleagues to make an effort to better their condition and cherish an independent spirit, as there was no hope of redress from Government, which had refused to put the department on a better footing on the grounds that the supply of candidates equalled the demand.’

During his lifetime, Dr. Roy’s work was not favourably accepted by European medical community and his book and articles came under heavy criticism for their differing and nearly political views. Yet, time has proved that his work was the most influential. ‘Gopaul Chunder Roy, ...was the author of the most extensively cited English book on malaria written by a Bengali in the nineteenth century.’ (Deb Roy, 2017, pp. 116–117). Deb Roy (2017, pp. 290) further comments that, ‘That the book

(on Burdwan Fever) was published simultaneously by different English firms in London and Calcutta, and went into multiple editions suggests that Roy’s work attracted a considerable audience.’ Arnold (2004, pp. 80) attributes the popularity of Roy’s book for its humane narrative, ‘In 1874 a Bengali doctor, Gopaul Chunder Roy, published his own mournful account of ‘Burdwan fever’, and his funeral images were repeated again and again in Bengali writing over the next 50 years.’

Despite such impactful work, Dr. Roy did not receive due recognition during his lifetime and struggled to get even a simple appreciation for his contribution as indicated by Deb Roy (2017, pp. 116–117), ‘Bengali writers in English found themselves at the bottom of the hierarchy of authors on malaria, pleading often with superior officials in the colonial bureaucracy or with European writers for their share of recognition... Articles published by him (Roy) later in his life vented his desperation for recognition and patronage from European authorities and the state.’

In January 2, 1882 issue of *Indian Medical Gazette* (p. 24), a letter by Roy to the editor of the journal was published, which corroborates with Deb Roy’s observations,

‘In no department of science or reform is conservatism displayed with greater tenacity than in practice of medicine. The doctors cling with fond attachment to the dogmas and doctrines instilled into them in their early days, and repudiate any new innovation or change by however master by a mind it may be put forth. Generally, one generation is allowed to pass before a truth comes to be universally acknowledged. Notwithstanding the overwhelming testimony in favour of anti-septic treatment, there are yet sceptics who would refuse to walk in the same groove; even Jenner’s vaccination was not tacitly approved and accepted. Such conservatism has its good and bad aspect, for whilst it sifts every investigation and is a safeguard against incorrect doctrines which a young tyro airs about him, it retards progress and stifles original research. Though we are not to accept every statement that finds light in the papers, yet we ought to weigh the arguments and see how much of grain is concealed under a bushel of chaff. Such being the fate of men of eminence, the smaller fry, like ourselves, must fare infinitely worse. I have been led to this reflection by the fate which a few of my contributions have met.

In 1873, I published my first researches on the peculiar action of Papaya juice on the nitrogenous articles of food and compared its action to pepsin. In 1880 M. Wurtz gives the doctrine publicity and takes the credit without any acknowledgment of my priority of claim.

In 1874, I wrote in my ‘Essay on the causes, symptoms and treatment of Burdwan fever’ that the causation of



it was in the soil, that its mode of progress pointed to some fermenting agency like yeast, which acting on the susceptible soil evolved the poison which we call malaria. Although the ‘fungoid’ theory of malaria is far from being established at present, yet I beg to put forth that my theory was not far out of the track.

In 1877 I published my experiments on snake-poison, in which I contradicted the theory of its action through the medium of nerves, and maintained that the action of the poison was exerted primarily on the blood and its corpuscles which were dissolved in the fluid. In short, that death was the result of rapid putrefaction of blood set up by the Ptyaline. M. Lacerda has now proved that the injection of permanganate of potash, which has the property of staying decomposition in organic matter, destroys the virulence of the poison and promises to be the antidote.

Now Sir, as I have nobody at my elbow to prop up my claims, I am obliged to be my own trumpeter at the risk of so much apparent egotism.’

Dr. Roy’s frustration and a feeling of deprivation are again conspicuous from a report published in *Lancet* (1886, pp. 382), which reads as follows,

‘Literature of Snake Poison and Self-vindication: Under the above title Dr. Gopaul Chunder Roy writes to us complaining that it does not afford much encouragement to workers for the sake of science to find their researches ignored and shelved into obscurity by brother members of the medical profession. Our correspondent states that he has in India been singularly unfortunate in this respect, and in proof of this assertion he refers to an article written by him, and published in 1876 in the *Indian Medical Gazette*, on the action of snake-poison of the blood, in which, against the accepted theory of Sir Joseph Fayrer and Drs. Brunton, Lewis, Cunningham, and Weir Mitchell, he attempted to prove that snake poison has a decided action on the blood. From Mr. Richard’s small book, “The landmarks of snake poison literature,” Dr. Roy gathers that the same view has been endorsed by two prominent contributors on the subject—viz., Dr. Wolfenden, late Professor of Physiology at the Charing-cross Medical School, and Dr. Lacerda. In the paper already alluded to, Dr. Roy also stated that the local effect of cobra poison on the blood was not that of a vital change, a view afterwards endorsed by Dr. Mitchell and Sir Joseph Fayrer, and recommended the administration of chlorate of potash, anticipating Dr. Lacerda’s discovery of the antidotal virtue of permanganate of potash. Again, our correspondent states that in 1872 he read a paper on the solvent action of

papaya juice on the nitrogenous articles of food; and although the first to make a systematic inquiry on the subject, his labours were ignored by M. Wurtz, who in 1880 isolated the ferment, and named it “papyaine.” Dr. Roy also alludes to his researches on the nature of malaria, and to a description of the phenomena met with in the blood, which was embodied in his official report for 1881, and is practically identical with the description of Professor Bizzozero’s blood particles, given in this journal on Jan. 21st, 1882. While fully aware of the necessary imperfections of his original researches, our correspondent claims amongst his co-workers the humble place of an artist who, though not skilful enough to give the last finishing touch, has yet done his best to add one brick to the building of the superstructure.’

7 Last days and untimely death

This extraordinary life dedicated to the quest for medical knowledge and to the wellbeing of his countrymen, ended in a most unexpected way and at the age of only 43, when Dr. Roy was at a high of his career, and a lot was expected from him. Dr. Baman Das Basu (1867–1930), a fellow IMS officer, described the last days of Dr. Roy in an article published in *Medical Reporter* (Basu, 1895, pp. 139–140).

In July 1886, Dr. Roy received orders for field service in Burma on the 5th August. A month later, he was sent back to Kolkata in charge of the invalid troops. On reaching Kolkata, Dr. Roy applied for 3 months’ sick leave. Dr. Basu writes that for some time, Dr. Roy had been suspecting that he was suffering from albuminuria and the condition of his heart was also unsatisfactory. The anxiety and worry of the previous few months had considerably accelerated the progress of the disease, and on examination it was ascertained that the quantity of albumin was one-fourth and there was a distinct ‘aortic systolic bruit’ in the heart. The medical board granted Dr. Roy 3 months of sick leave and pronounced him unfit for Military Service. This left Dr. Roy 3-month short in service for being eligible to receive pension. Dr. Roy considered this an injustice in his critical state of health and fought back against the authority. Finally, on January 31, he was communicated by Col. Cruickshank that he had been granted furlough¹⁷ on medical certificate, for 1 year.

In his article, Dr. Basu described the last days of this distinguished and dedicated medical scientist as, ‘On the 7th of

¹⁷ A period that a soldier, worker, or prisoner is allowed to be absent, especially to return temporarily to their own home (Cambridge Dictionary).



February, when with his family in Burdwan, he suddenly had an attack of what seemed to them to be Asthma, the violence of which alarmed everyone. He recovered over and on the 14th of February, brought his family down to Calcutta to witness the jubilee rejoicing.¹⁸ He reached Calcutta at 9 p.m. and seemed as well as he had been for some months passed, but at about 11 p.m. woke up with the return of the asthmatic fit and before medical aid could be procured, he expired.’

Dr Basu further described his distinguished senior colleague in IMS as ‘Dr. Roy’s love for his profession was genuine; he read and followed the progress of medical science with great enthusiasm, made many experiments himself... In private life he was gentle and the most unassuming of men, ... Nature had endowed him with an extraordinary fund of sympathy... Duty before everything else was his principle of conduct...’.

The personal files of Dr. Roy as a retired IMS officer have been kept at the National Archives of India, New Delhi (Identifier PR_000002788586, File No.: Bundle No.94 Sr.No.-10, Part: Bundle). However, they are yet to be digitized. For writing a complete biography of Dr. Roy, these files need to be studied.

8 Concluding remarks

Dr. Gopaul Chunder Roy was an exceptional talent among the nineteenth century luminaries of Bengal. Dr. Roy’s ancestry of an elite and upper caste background, his training in Europe as a Surgeon (he was the first Indian to be an FRCS) and his entry into Indian Medical Service did not alienate him from the realities of his native country. He possessed three important qualities: first, an inquisitive mind, which drove him experimenting with different dimensions of medical science and producing the largest numbers of research works among Indians of the colonial era; secondly, he felt for the fellow countrymen, their sickness, poverty, and misery and always highlighted the issue of official negligence of the poor people of India who faced epidemics after epidemic; finally, he had a strong sense patriotism. He wrote important treatise on Burdwan Fever- the book is still available in print, and never hesitated to counter the opinions of European doctors. It was not easy for a govt. servant in the colonial era. Dr. Roy became a victim of the racist attitude of fellow British IMS officers and he suffered in career for his bold and independent stand, yet he never compromised on principle and professional ethics. During his lifetime he earned international recognition for his work, perhaps the first Indian to earn so. He was a true representative of the nineteenth century intelligentsia who lead the Bengal Renaissance. Nevertheless, he remains one

of the least discussed among stalwarts. This article is a tribute to this great son of India.

Appendix A: G.C. Roy’s publications during his early medical career

1. ‘Tertiary amputation in a case of gunshot wound of the forearm; recovery’, *Indian Medical Gazette*, July 1, 1866, pp. 186.
2. ‘A case of depressed fracture of the skull, in which a portion of the cerebral substance escaped; recovery’, *Indian Medical Gazette*, January 1, 1867, pp. 11
3. ‘Case of ruptured liver, spleen, and kidney, with fracture of one arm, &c.’, *Indian Medical Gazette*, May 1, 1867, pp. 121
4. ‘Two cases of fracture of skull, extravasation of blood and laceration of cerebral substance, having different symptoms in each’, *Indian Medical Gazette*, October 1, 1867, pp. 245
5. ‘A disputed case of obstinate costiveness’, *Indian Medical Gazette*, April 1, 1869, pp. 78–79.
6. ‘A case of extensive injuries of the hands and a successful case of rhinoplastic operation’, *Indian Medical Gazette*, May 1, 1869, pp. 95.
7. ‘Remarks on the etiology and treatment of cholera’, *Calcutta Journal of Medicine*, 2(8), August 1869, pp. 297–301.
8. ‘Two cases of injuries of the liver, with remarks’, *Lancet*, January 7, 1871, pp. 10–11
9. ‘The system of jail administration in England’, *Calcutta Journal of Medicine*, September 1871, 4(9), pp. 346–349.
10. ‘On the solvent action of papaya juice on the nitrogenous articles of food’, *Calcutta Journal of Medicine*, 6(3–4), March & April 1873, pp. 129–135
11. ‘Observations on the nature of cholera poison’, *Indian Medical Gazette*, May 1, 1873, pp. 120–22
12. ‘Dr. Fayer on cobra poison’, *Indian Medical Gazette*, April 1, 1873, pp. 109 (Letter to the Editor)
13. ‘On the solvent action of papaya juice on the nitrogenous articles of food’, *Glasgow Medical Journal*, January 1874, pp. 33–39.
14. ‘Report on cholera in the Jehanabad subdivision of Burdwan’, *Indian Medical Gazette*, May 1, 1874, pp. 116–17
15. ‘Two cases of poisoning by opium successfully treated by subcutaneous injection of atropine’, *Indian Medical Gazette*, July 1, 1875, pp. 182–83
16. ‘Surgery in the malarious district of Jehanabad’, *Indian Medical Gazette*, April 1, 1875, pp. 98–99

¹⁸ Golden Jubilee rejoicing of Queen Victoria’s coronation.



17. 'The rational treatment of cholera; with chemical and pathological remarks', *Indian Medical Gazette*, March 1, 1876, pp. 69–71
18. 'Experiments with cobra poison', *Indian Medical Gazette*, December 1, 1876, pp. 313–14
19. 'Remarks on the Gurjan oil treatment of leprosy at Port Blair,' *Indian Medical Gazette*, May 1 1876, pp. 124–25
20. 'On the treatment of fractures by position' (Letter to the Editor), *Indian Medical Gazette*, November 1, 1876, pp. 306
21. 'On the rational treatment of cholera and remarks on the outbreak at Ranchee', *Indian Medical Gazette*, December 1, 1877, pp. 287–89
22. 'Remarks on the action of snake poison on the blood', *Indian Medical Gazette*, December 1, 1877, pp. 315–17
23. 'Hysteric epilepsy,' *Indian Medical Gazette*, February 1, 1877, pp. 38–39

Appendix B: G.C. Roy's publications on Malaria and Burdwan Fever

1. 'On the (therapeutical) action of quinine on malaria,' *Medical Times and Gazette*, March 4, 1871, pp. 245
2. 'On the therapeutical action of quinine on Malaria,' *Lancet*, April 15, 1871, pp. 503
3. 'Suggestions as to the cause of un-healthiness of lower Bengal and the recent outbreak of Epidemic fever,' *Indian Medical Gazette*, March 1, 1873, pp. 63
4. 'Further observations on the epidemic fever of Burdwan', *Indian Medical Gazette*, June 2, 1873, pp. 150–152
5. 'The Burdwan Fever' (Part 1), *Calcutta Journal of Medicine*, 6(11–12), November & December, 1873, pp. 423–437
6. 'The Burdwan Fever' (Part 2), *Calcutta Journal of Medicine*, 7(1–2), January–February, 1874, pp. 28–46
7. 'An essay on the causes, symptoms and treatment of Burdwan Fever, or, the Epidemic fever of lower Bengal', Anglo Sanskrit Press, Kolkata, 1874.
8. 'On Burdwan Fever' (1st part), *Indian Medical Gazette*, February 2, 1874, pp. 37–39
9. 'On Burdwan Fever' (2nd part), *Indian Medical Gazette*, March 2, 1874, pp. 60–61.
10. 'On Burdwan Fever' (Letter to the Editor), *Indian Medical Gazette*, July 1, 1874, pp. 190.
11. 'The causes, symptoms and treatment of Burdwan Fever, or, the Epidemic fever of lower Bengal', simul-

- taneously published by J & A Churchill, London and Thacker, Spink & Co, Kolkata, 1876.
12. 'Review of Burdwan Fever' (Letter to the Editor), *Indian Medical Gazette*, July 1, 1876, pp. 193.

Appendix C: G.C. Roy's publications from Sooree (Suri) Charitable Dispensary

1. 'Treatment of liver abscess by aspiration,' *Indian Medical Gazette*, March 1, 1878, pp. 68–69
2. 'Compound dislocation of left humerus at the elbow; reduction, arthritis, excision of elbow joint; recovery' (Under the treatment of Dr. G. C. Roy. Reported by Civil Hospital Assistant Hurry Mohun Bhattacharjee of Sooree (Suri) Charitable Dispensary), *Indian Medical Gazette*, July 1, 1879, pp. 199–200
3. 'Some remarks on the relation of filaria sanguinis hominis to chyluria and other lymphoid diseases', *Indian Medical Gazette*, August 1 1879, pp. 226–227
4. 'A case of intravenous injection of milk', *Indian Medical Gazette*, November 1 1879, pp. 311–312
5. 'A case of wound of axillary artery; Ligature of the vessel above and below the seat of injury; death', *Indian Medical Gazette*, February 2, 1880, pp. 45–46
6. 'A case of accidental suffocation', *Indian Medical Gazette*, March 1, 1880, pp. 71
7. 'A case of ainhum', *Indian Medical Gazette*, September 1, 1880, pp. 247
8. 'Remarks on the so-called typho-malarial fever and their treatment', *Indian Medical Gazette*, August 2 1880, pp. 208–209.
9. 'A case of placenta previa treated by partial separation of placenta and ergot; recovery', *Indian Medical Gazette*, September 1, 1881, pp. 258
10. 'A case of croup: tracheotomy: death', *Indian Medical Gazette*, October 1, 1881, pp. 279–280
11. 'A case of rupture of spleen', *Indian Medical Gazette*, December 1, 1881, pp. 32–33
12. 'Some remarks on leprosy', *Indian Medical Gazette*, February 1 1881, pp. 45–46
13. 'Papaya juice' (Letter to the Editor), *Indian Medical Gazette*, April 1 1881, pp. 121
14. 'Delirium tremens as a complication in acute diseases', *Indian Medical Gazette*, February 1 1882, pp. 42–43
15. 'A case of chyluria treated with benzoic acid', *Indian Medical Gazette*, April 1 1882, pp. 96–97



16. 'Microorganisms or granules of Bizzozero in the blood' (Letter to the Editor), *Indian Medical Gazette*, April 1 1882, pp. 110
17. 'Filaria sanguinis hominis', *Lancet*, April 15, 1882, pp. 625
18. 'Notes on a case of puerperal fever,' *Indian Medical Gazette*, July 1 1882, pp. 180–181
19. 'A case of cobra bite, with remarks,' *Indian Medical Gazette*, November 1 1882, pp. 292–294
20. 'A vindication' (letter to the editor), *Indian Medical Gazette*, January 2, 1882, pp. 24
21. 'Cases of laryngotomy and tracheotomy' (Treated by Dr. G. C. Roy in the Sooree Charitable Dispensary. Reported by Assistant-Surgeon Apurba Krisna Chaudhuri), *Indian Medical Gazette*, October 1883, pp. 286–287
22. 'A case of encysted peritoneal effusion; operation; recovery', *Indian Medical Gazette*, November 1883, pp. 319
23. 'Fibrinous coagula in the heart', *Indian Medical Gazette*, May 1883, pp. 117–119
24. 'On a modified method of using the aspirator', *Indian Medical Gazette*, June 1883, pp. 162–163
25. 'A case of hepatic abscess treated by Dr. G C Roy; Recovered after free opening and drainage' (Reported by Civil Hospital Assistant Huri Mohan Bhattacharjee), *Indian Medical Gazette*, July 1883, pp. 279–280
26. 'Retention of menses from absence of vagina: operation: peritonitis: death', *Indian Medical Gazette*, September 1883, pp. 251–252
27. 'A curious case of malposition of tooth' (Under Dr. Gopaul Chunder Roy, reported from Sooree (Suri) Charitable Dispensary), *Lancet*, November 3, 1883, pp. 772–773
28. 'Treatment of erysipelas with external application of white lead paint' (Letter to the Editor), *Indian Medical Gazette*, September 1883, pp. 264
29. 'Case of liver Abscess treated with free incision and drainage; recovery' (Under the care of Dr. G. C. Roy, reported from Sooree Charitable Dispensary), *Lancet*, December 20, 1884, p 1092
30. 'A case of imperforate anus and prepuce' (Under the care of Dr. G. C. Roy, reported from Sooree Charitable Dispensary), *Lancet*, December 20, 1884, pp. 1092
31. 'A case of kidney disease inducing hypertrophy of heart and haemorrhage into the brain', *Indian Medical Gazette*, April 1884, pp. 116–117
32. 'Fracture of skull; extensive extravasation of blood on dura matter producing compression of brain; trephining; partial relief of symptoms; death' (Under the care of Dr. G. C. Roy, reported by Sooree Charitable Dispensary), *Indian Medical Gazette*, August 23, 1884, pp. 319
33. 'Is quarantine effective in cholera', *Indian Medical Gazette*, January 1884, pp. 11–14
34. 'Birbhum Dispensary- A case of catheter fever, (Under the treatment of Dr. G. C. Roy. Reported by Civil Hospital Assistant Huri Mohun Bhattacharjea), *Indian Medical Gazette*, September 1884, pp. 262
35. 'Two cases of atrophy of liver', *Indian Medical Gazette*, July, 1885, pp. 211–112.
36. 'The rational method of treatment of hydrophobia', *Lancet*, January 9, 1886, pp. 60–61
37. 'Some remarks on the specific origin of disease', *Indian Medical Gazette*, December 1886, pp. 355–356
38. 'On the relative digestive value of Fairchild's peptonizing powders, pepsin and papaya juice on milk', *Indian Medical Gazette*, January 1887, pp. 2

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