

SOORJO COOMAR GOODEVE CHUCKERBUTTY: THE FIRST INDIAN CONTRIBUTOR TO MODERN MEDICAL SCIENCE

by

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AN EDITORIAL note on the Progress of Science appeared in the *Medical Times and Gazette*, London, in 1852; this reads as follows: 'It is with sincere gratification that we today place before our readers an ably-written communication of considerable interest, by a native of our Indian empire. Dr. Chuckerbutty is, we believe, the first native of that clime who has contributed to the progress of the science of medicine; and his friends—and he left many in this country—will rejoice that the high promise that he held out when a student here bids fair to be well fulfilled.'

The communication in question¹ was on a singular case of epilepsy admitted under the care of the author Dr. Soorjo Coomar Goodeve Chuckerbutty into the Medical College Hospital, Calcutta, of which he was the Assistant Physician at the time. During the next two decades S. C. G. Chuckerbutty rose to be a prominent figure in Calcutta but today, little is known about him and his scientific contributions.

Soorjo Coomar Chuckerbutty, son of Radhamadhab Chuckerbutty, a pleader at Dacca, was born in 1826³ (? 1824³, ? 1827⁴) at Kanaksar, a village in Dacca district. He lost his parents at the age of six years and was then obliged to make his own way in the world. He studied initially at the village *pathshala* (school), where he learnt the three Rs in his mother tongue Bengali and elementary Sanskrit and Persian. 'He was 13 before he heard English, but at that time the visit of an official excited his attention. He determined to make himself master of the language. With a few clothes and a little parched rice for food, he set off on a journey of sixty miles to the nearest English school.'⁴ This was at Comilla where he stayed along with several other students at the house of a well-to-do Indian gentleman, Shri Golok Nath Sen who was an official at the district court there. As was usual at the time, Chuckerbutty and other students had to cook their food in turns.^{5*} Subsequently he came to Calcutta and was a student of the Hare School. In 1843, he tried unsuccessfully to get admitted into the Medical College of Bengal with the help of a Bengal civilian Mr. Alexander, who offered to bear his expenses as a student of the College. Next year, however, he succeeded, probably on the recommendation of Professor Henry Goodeve of the College. He proved to be a hard-working and bright student of the Medical College. In 1845 he was selected to go to England for further studies.

Dr. M. J. Bramley, the first Principal of the Medical College of Bengal (established in 1835) had felt that some of its bright students should be sent to England to complete their education. (In this he had followed the example of M. Klot Bey who had earlier taken a few Egyptian students to Paris for similar purpose). Following Dr. Bramley's untimely death, Professor H. Goodeve put forward this project for consideration

* It is on record that he concluded a bargain with the school master to perform the duties of cook in exchange for lessons in English.⁴

by the local authorities of the East India Company and offered to accompany the students to England, arrange for their stay and education there and bear the expenses for one student. The project ultimately materialized when Shri Dwaraka Nath Tagore offered to bear all expenses for the education of two students and adequate public donations were raised for the cost of educating the fourth student. Dr. Goodeve was granted the necessary facilities and he, along with the four students, Bhola Nath Bose, Dwarka Nath Bose, Gopal Chunder Seal and Soorjo Coomar Chuckerbutty, who had been selected, left for England on 18 March 1845 on the barque *Bentinck*. Shri Dwaraka Nath Tagore also went to England by the same boat.^{6,7}

In London, the four students resided with Professor Goodeve⁷ and were admitted into University College. B. N. Bose, D. N. Bose, and G. C. Seal became members of the Royal College of Surgeons (M.R.C.S.) on 27 July 1846 and S. C. Chuckerbutty on 12 May 1848,^{8,9} when he reached the admissible age.⁷ The *Lancet* (20 May 1848) commenting on Chuckerbutty's success mentioned about his zeal and attention to studies, that endeared him to his professors, particularly to Dr. Grant, the professor of comparative anatomy, who provided him with valuable opportunities for learning and took him to Europe during his own tours of the Continent. As for success in the examination, the *Lancet* wrote 'in justice to the gentleman, it should be stated that he passed a severe examination before the Court on Friday evening'. Chuckerbutty passed the first examination for M.B.(Lond.) in the first division in 1847¹⁰ and the second and final examination in the second division in 1849.¹¹ He passed the M.D. examination in the first division standing second in order of merit in the same year.^{11,12} During the years of his study at University College, he was awarded the gold medal for comparative anatomy and many certificates of merit.^{7,12}

Chuckerbutty had discarded the 'sacred thread', the symbol of his Brahmanic caste, on his admission to the Medical College, Bengal.⁴ In 1848, he decided to embrace Christianity. The *Lancet* (14 October 1848) recorded this and mentioned that Dr. Goodeve reported to the Medical College authorities in Calcutta that this change of religious opinion was purely spontaneous. Dr. Chuckerbutty adopted the name Soorjo Coomar Goodeve Chuckerbutty.

Dr. Goodeve Chuckerbutty returned to India after obtaining the highest medical qualifications from the University of London. His patrons in England including Sir Edward Ryan who had been President of the General Council of Education while in Calcutta, recommended Dr. Chuckerbutty's appointment to the Covenanted Service and a professorship at the Medical College, Calcutta.⁷ This was not agreed to by the authorities and he was admitted to the Uncovenanted medical service and appointed the Assistant Physician to the Medical College Hospital (10 May 1850). He continued to perform his duties in this capacity till 1854 when he was appointed the officiating Professor of Materia Medica and Clinical Medicine and Second Physician to the Hospital. During this year, the authorities of the East India Company in London threw open to public competition the appointments to the Covenanted Medical Service. Chuckerbutty's 'ambition had always been to become a member of the Covenanted Service of the East India Company, and thus remove from his race, the stigma of a proscription which denied them a career of honourable ambition in their own land'.⁴ As soon as he learnt about this decision of the East India Company

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authorities, he gave up all the advantages he enjoyed at Calcutta and at great expense and contrary to advice, set out for England. 'If I fail' he wrote, 'it will be a satisfaction to me that I have used my best efforts to the service of my country and that it is only physical difficulties thrown in our way by the Legislature which have been the cause of my disappointment.'⁴

Dr. Goodeve Chuckerbutty appeared at the first open competitive examination for appointment to the Covenanted service held during 8–11 January 1855. The *Medical Times and Gazette* published the full reports of this examination on the 10 February 1855. Twenty-two out of the twenty-eight candidates who appeared, passed, and George Marr was the first and S. C. G. Chuckerbutty second in order of merit.* He was now appointed to the Covenanted Medical Service as Assistant Surgeon (24 January 1855), and was the first Indian to win by sheer merit his way into this service that had until then been reserved for Europeans only. On his return to India, he was reappointed Assistant Physician to the Medical College Hospital. Only in view of his long experience in the medical service in India, he was exempted from probationary duty at the General Hospital and with a regiment (*Lancet*, 1855, i, 620). As an officer of the Covenanted Service, he successively became Surgeon (24 January 1867) and Surgeon Major (1 July 1873) to the Bengal Army.²

In 1857, he was again temporarily appointed to the *Materia Medica* chair. But circumstances prevented his holding this post permanently; and he was reappointed in August 1860 and again in March 1864 and finally obtained the office permanently in 1866 when Norman Chevers vacated this post to become the Professor of Medicine and the First Physician to the Hospital. In the intervals between his appointments to the post of the professor, Goodeve Chuckerbutty held charge of various hospitals and dispensaries in Calcutta. He was appointed Fellow of the Calcutta University in February 1863 and a Justice of the Peace for the town of Calcutta in May the same year. He was one of the founders of the Bethune Society and the Bengal Branch of the British Medical Association¹⁵ of which he was the president for one year.¹⁶

As a teacher and physician, Goodeve Chuckerbutty acquired great reputation amongst his students. Bully Chunder Sen who was a student when Goodeve Chuckerbutty was the Second Physician, wrote that he was a very sound physician especially in the diseases of the chest.¹⁷

His scientific contributions appeared in the *Medical Times and Gazette*, the *Lancet*, and the *British Medical Journal* and in the *Indian Medical Gazette* and the *Indian Annals of Medical Science* of Calcutta.¹⁵ He edited the fourth (? fifth) edition of his professor Henry Goodeve's *Hints on Children in India*, a book on paediatrics.² In addition to the scientific papers, he published many articles embodying his addresses before learned societies in Calcutta, the subjects varying from the spread of education among Indians, improvement of sanitation of the city, etc.² His major contributions were on dysentery and cholera, the papers on which appeared in the *Indian Annals*

* There has been considerable confusion regarding the results of this examination among European and Indian writers. The *Harkaru*, an Anglo-Indian newspaper of Calcutta, wrote on 8 March 1855 that Chuckerbutty was 'bracketted at the head of the list with two English students. Our fellow townsman has achieved the high distinction of being *nulli secundus* and we congratulate him upon it.'¹⁸ Several Indian writers were of the same impression⁶ that Chuckerbutty had stood first and even Crawford, the famous medical historian, wrote at first to this effect.¹⁴ Subsequently he corrected himself.³

of *Medical Science*. But his papers on smallpox and other diseases were also of interest.

The early papers of Goodeve Chuckerbutty dealt with cosmopolitan diseases, viz., epilepsy, heart disease, perinephric abscess, etc. The paper on heart disease was entitled 'The Connection between Rheumatism, Pericarditis and Jaundice' and it recorded three cases with pericardial effusion with congestive cardiac failure and jaundice, the latter clearing up with the relief of cardiac symptoms. This was one of the early communications describing such combination of symptoms and the writer could cite only a French author mentioning this.¹⁸

In October 1864, he described twelve cases of long continued fever associated with maculated mulberry rash on the trunk, dusky red hue of the face, neck and hands.¹⁹ He found that the pulse was frequent and weak and the fever high. The other features were: watchfulness, delirium succeeded by stupor and coma, furry brown tongue, muscular tremors, subsultus tendinum and scanty urine. There was redness of the conjunctiva. The bowels were relaxed initially for a day or two; later there was constipation. The rash appeared between three and seven days, fading and vanishing after some five to eight days. There was marked anorexia, great prostration, dullness of hearing and sleeplessness. The morbid anatomy of the cases examined post-mortem was as follows: the internal organs appeared hyperaemic and there was fatty degeneration of the heart and the kidneys. The Peyer's patches were unaffected. These cases were diagnosed by him as of *typhus fever* on clinical grounds and morbid changes. Bacteriology was yet unborn and there was no other method of confirming the diagnosis. The case records, post-mortem findings, critical analysis of symptoms presented in the paper, show that the diagnosis was very probably correct and thus this was the first account of typhus fever in India, an earlier account from a jail in Agra being unconvincing on account of description of the rash.

Goodeve Chuckerbutty was interested in analysis of statistics relating to the cases treated in the hospitals and dispensaries where he worked. Some of these figures make interesting reading providing an insight into the prevalent diseases and their mortality rates about 120 years ago. During a half-year at the out-patients' department of the Medical College Hospital, he treated a total of 5,839 cases, 4,835 males and 1,004 females, working out the age and sex distribution and noting that most cases were between twenty-five to thirty years of age. He classified the diseases under sixteen headings of which the *General Affections* accounted for 2,232 cases. The conditions included in this group were intermittent fever mostly malaria 771, remittent fever (mainly enteric) 13, syphilis 579 and common rheumatism 631. The diseases of the spleen and the liver were included under the *Glandular Diseases*; there were 319 cases of splenic diseases, 134 of hepatitis and four each of cirrhosis and jaundice. The heart diseases included endocarditis, pericarditis, hydropericardium, aortic and mitral valvular disease, cardiac dilatation, etc. Unlike his European colleagues, he had no difficulty in recognizing the skin diseases in Indians and recorded psoriasis, ichthyosis, pityriasis, etc. He recorded that phthisis was rapidly fatal among the natives and East Indians and counted many victims annually.

He had tried *kamila*, an indigenous drug, in the treatment of tape worms and found it effective. For the treatment of malarial fever, he used rather small doses of

quinine with ferrous sulphate and magnesium sulphate initially; this was followed by ferrous carbonate and cinchona. He recorded good results which were apparently helped because he had been treating a semi-immune population.

He felt the great need of determining the average duration of life in this country and recommended concrete measures for registration of births and marriages.²⁰ He reverted to this subject again in 1867 when he published a paper entitled 'A Clinical Retrospect of Hospital Experience of Civil Medical Cases' dealing with a total of 7,125 indoor patients, 6,662 in the Medical College Hospital and 811 in Chitpore and Baitacannah Hospitals and the 5,839 out-patients referred to in the earlier report.²¹ The average mortality in the three hospitals was 24.4 per cent and in the Medical College Hospital alone 22.7 per cent. He noted that for the four years commencing in 1850, the gross mortality rate was 16.45 per cent and for the similar period commencing in 1860, the rate was 25.32 per cent. The major causes of death were cholera, dysentery, smallpox, phthisis, remittent fever and intermittent fever. The death rates were as follows: cholera 46.6, dysentery 30.26, smallpox 39.21, phthisis 45.3 per cent. He found that in some diseases the ratio of mortality to admissions was higher in the latter four-year period. He felt that there was a 'change of type in the constitution of diseases in India'—an idea he sought to prove by other data as well. This view had been put forward by some workers in Europe and it had many supporters and opponents. His colleague Dr. Ewart was one who did not believe in this theory.

During 1864–65, Goodeve Chuckerbutty was placed in charge of smallpox hospitals in Calcutta. Temporary hospitals used to be built or residential buildings hired for this purpose during epidemic outbreaks. He gave a detailed account of the Chitpore hospital, its administration and of the patients admitted; those relating to the latter being of epidemiological interest.²² The final case mortality figures were 20.8 per cent and 23.9 per cent for female and male Europeans and 41.8 per cent and 58.5 per cent in male and female Indians respectively. Of the unprotected cases, about 53 per cent died; once vaccinated or inoculated (variolation) showed a mortality of 25–30 per cent. Of the few cases having second attacks of smallpox, 7.8 per cent died.

As for the practice of acquiring or building some sort of temporary hospitals to accommodate smallpox cases, Goodeve Chuckerbutty recommended that a permanent hospital should be built for cholera and smallpox cases. Subsequently Cholera and Smallpox Wards of the Campbell Medical School Hospital continued to accommodate most of such cases for many decades until the building and inauguration of the present Infectious Diseases Hospital of Calcutta.

In 1865, the paper 'Cases Illustrative of the Pathology of Dysentery' was published.²³ During a period of fourteen months, 280 cases of dysentery had been admitted under his care into the Medical College Hospital. Of these ninety-one patients died (case mortality 32.5 per cent); 189 were discharged cured and post-mortem examination was done in thirty-eight cases. Apart from the clinical classification of the cases, the morbid changes encountered were described in great detail. From his descriptions, it appears that majority of cases belonged to what was recognized about four decades later as bacillary dysentery; but there was a fair number of cases of fulminating amoebic dysentery some with liver abscess. Besides these, there were a few cases of

intestinal tuberculosis, uraemic dysentery, tape-worm infection with dysenteric symptoms, scurvy, etc.

The lesions described as mamillated ulcers, circular ulcers, rodent ulcer, carbuncular lesions, submucous abscess with small mucous membrane lesion and perforating ulcers, were very probably due to acute amoebic dysentery. Though Goodeve Chuckerbutty was aware of Annesley's work, he did not adhere to the latter's broad classification of dysenteries into acute uncomplicated and hepatic dysentery. As was the fashion with some of the workers of this period, Goodeve Chuckerbutty described his own observations without any attempt at comparison with the findings of previous writers.

He delivered a lecture on the pathology of hepatic abscess²⁴ before the Bengal branch of the British Medical Association in 1867. He postulated that there was coagulation of blood in the small vessels in the intestines in dysentery; thrombi from branches of mesenteric veins were carried into the portal vein and thus to the liver causing blockage of small branches supplying hepatic lobules which became pale and soft and ultimately small and large abscesses were formed. This concept was possibly an extension of that of Budd who in 1845 laid stress on the fact that metastatic infarcts might follow ulceration or gangrene of the intestine and from that Budd evolved the theory that in tropical countries, the endemic prevalence of abscess of the liver was causally related with dysentery that was likewise endemic in these regions. Budd's concept was not accepted by many European workers and even up to the beginning of the present century, Duncan of the London School of Hygiene and Tropical Medicine regarded liver abscess and dysentery as unrelated.²⁵

His paper 'Cholera, Its Symptoms, Clinical History, Pathology, Diagnosis, Prognosis, Treatment and Prophylaxis' was published in 1867.²⁶ In this paper only his own experiences were recorded and no 'second-hand material' was included by him. The description of the clinical features in this paper is excellent. As regards the cholera stools, he was of the view that 'they seem to consist of the ordinary secretion from the mucous lining of the intestines more or less diluted with water'. He discussed the question of cholera being due to a poison and analogous to the virus of smallpox and measles which must run its course and be eliminated in its own time. He did not agree with this view regarding the aetiology of cholera. Like many other earlier writers, he felt that the disease arose from a peculiar condition of the atmosphere which caused catarrh of the alimentary tract.

Post-mortem examination was done in sixty-three fatal cases under his care; fifty-two of these were *primary* and in the rest cholera developed in the course of other diseases (*intercurrent*). Of the primary cases twenty-six and twenty-three died during the second and the third stages of cholera. His description of the morbid changes in the three stages of cholera was more or less similar to that of many writers in India and elsewhere, who had encountered cholera since 1817. He described appearances similar to that of Bright's disease in a few of his cases and in several others he found what was held to be the evidence of desquamation of the epithelium of the uriniferous tubules, viz. expulsion of milky fluid on pressure upon the pyramids of the kidneys.

The treatment followed in his cases was described in detail. Opium and astringents

formed the sheet anchor of treatment in the first and the second stages and calomel was used to 'allay gastric irritation'. In the second stage, he employed stimulants but felt that medicines might have to be discontinued, only cold drinks or ice or bland fluids being given. Injections of warm saline solutions had during this period gone out of use and this measure and blood transfusions were deprecated. For suppression of urine in the third stage, dry cupping and diuretics were employed and for uraemic coma attempts were made to promote elimination by means of purgatives, e.g. castor oil.

During the period of four years from 1860, 47.9 per cent of cholera cases admitted under his care in the Medical College Hospital, died. He was of the opinion that mortality at the commencement of an epidemic was as high as 75 per cent and it came down to about 25 per cent towards the end of the outbreak. The mortality rate of his cases compares favourably with that of Wall who lost 70 per cent of his cases in Calcutta; and the rate varied between 60–80 per cent till the introduction of treatment with intravenous hypertonic saline infusions by Rogers in 1908–09.²⁷ For prophylaxis, he recommended good sanitary laws on board ships and along caravans and recommended cleanliness as an effective measure of control.

Goodeve Chuckerbutty held very decided views on the spread of education among the people of India. Some idea about his opinions may be had from his introductory lecture at the commencement of the thirty-sixth session of the Medical College of Bengal.²⁸ After describing the curriculum the newly-admitted medical students would have to master, he discussed the question of national education in India. Oriental classical education including mastery of Sanskrit or Arabic, Vernacular education, and English education available in the country at the time were considered. The alumni of centres of Sanskrit learning had been described by Macaulay as 'utterly useless for all worldly business' and Arabic was felt to be unsuited for popular education, the knowledge of this language was required only for its intrinsic merit. He mentioned that 'oriental mania' died out after the vigorous administration of Lord Bentinck. At the time, the teaching was poor in the vernacular schools. He was of the opinion that the grand principle should be to teach European knowledge in a popular and vernacular dress. As for English education, he felt that it was very useful for working anywhere and the language was a treasury of European civilization. It was expensive; but he felt that the rich should be made to pay education fees for the spread of English education among their countrymen. He laid great emphasis on the importance of education of Indian women and of the lower classes. He dealt with this subject more than once before the meetings of the Bethune Society and other learned bodies of Calcutta.

Goodeve Chuckerbutty's scientific writings reflect the state of medical science particularly as it obtained during the third quarter of the nineteenth century. Past was the age of Twining and the generation of European surgeons of the East India Company who practised massive and repeated venesections, leeching, drastic purgatives, mercury in large doses till salivation and soreness of the gums were induced along with a regime of near starvation. The earlier attempts to treat cholera by parenteral replacement by saline solutions of the fluid lost, had not generally succeeded, and no attempts had been made to improve this rational mode of therapy.

The treatment of malaria, particularly the dreaded terai fever had immensely improved by Hare's reintroduction of heavy dosage of quinine in this condition. But the science of bacteriology was yet to come, chemical pathology only infrequently employed, and except for *Balantidium coli* (Malmsten, 1857), the protozoan parasites affecting man and causing many major diseases in India, e.g. malaria, kala-azar and amoebic dysentery, were yet undiscovered. In spite of the fact that newer concepts of pathology were being evolved in Europe and other Western countries and microscopes were available in Calcutta, there was little enthusiasm among the local European teachers of pathology to employ microscopy in their investigations. Only as late as 1869–70, did Timothy R. Lewis examine the cholera stools with the microscope and describe diverse elements found in it including some amoebae, the significance of which was not clear to the investigators. It is against this background, that the contributions of Goodeve Chuckerbutty should be assessed.

His description of the clinical features of and the morbid changes (as seen by the naked eye) in the major diseases—dysentery and cholera are examples of meticulous attention to all variations seen and their presentation in detail after suitable classification. The causative agents of these diseases being entirely unknown, there was little alternative to recording one's observations. His concept about the development of liver abscess following dysentery was rational though not entirely original.

As for typhus fever, Goodeve Chuckerbutty was probably the first to recognize that the disease did occur in India, though Megaw, who himself suffered from it and diagnosed the condition on clinical grounds alone, is credited with this.²⁹

He was one of the early workers in India who recognized that rheumatic heart disease occurred among Indians, a fact that was not generally accepted by most European authorities of this period.

Surgeon Major S. C. Goodeve Chuckerbutty died on 29 September 1874, at Kensington, London, where he had gone on furlough. He had been in indifferent health for some time, suffering from severe asthmatic attacks and a dilated heart was suspected. The change to England during summer had apparently done him good; but the autumn proved too much for his chest condition. At the time of his death, he was barely forty-eight years old.¹⁵

Personally, he was described as 'possessed of an intelligent countenance, mild pleasant expression and general manner'. His photograph and portrait in colour bear this out. He was much respected by his countrymen, colleagues and fellow officers as well as his students and in his honour a ward in the Medical College Hospital, where he spent the major part of his years of professional activity, was named after him.

REFERENCES

1. CHUCKERBUTTY, S. C. G., *Med. Times Gaz.*, 1852, N.S. 5, 406.
2. CRAWFORD, D. G., *Roll of the Indian Medical Service, 1615–1930*, London, Thacker, 1930, p. 148.
3. MITRA, S. C., *Saral Bangla Abhidhan* [A Dictionary of Bengali Language], 7th ed., Calcutta, 1936.
4. *Med. Times Gaz.*, 1855, i, 173.

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5. SEN, A. N., *Swargiya Dina Nath Sener Jibani o Tatkaler Purba Banga* [Biography of the late Dina Nath Sen and an account of contemporary East Bengal], Calcutta, published by the author, 1948, vol. 1, p. 15; vol. 2, p. 400.
6. UKIL, A. C., *The Centenary of the Medical College, Bengal*, Calcutta, Statesman Press, 1935.
7. GHOSH, S. K., *Calcutta med. J.*, 1934, 28, 514. (This paper is based on an article by Mahendra Lal Sarkar, M.D., D.L., published in 1897, and freely reproduced from the same.)
8. *Lancet*, 1846, ii, 138.
9. CORNELIUS, E. H., personal communication, 1969.
10. *Lancet*, 1847, ii, 188.
11. *Lancet*, 1849, ii, 625.
12. WESENCRAFT, A. H., personal communication, 1969.
13. *Lancet*, 1855, i, 424.
14. CRAWFORD, D. G., *History of the Indian Medical Service, 1600–1913*, London, Thacker, 1914, vol. 1, p. 504.
15. MACLEOD, K., *Ind. med. Gaz.*, 1874, 9, 330.
16. *Ind. med. Gaz.*, 1868, 3, 113.
17. SEN, B. C., *Calcutta med. J.*, 1907, 1, 193.
18. CHUCKERBUTTY, S. C. G., *Med. Times Gaz.*, 1853, N.S. 6, i, 564.
19. *Idem.*, *Ind. Ann. med. Sci.*, 1865, 18, 122.
20. *Idem.*, *ibid.*, 1857, 7, 179.
21. *Idem.*, *ibid.*, 1867, 21, 96.
22. *Idem.*, *ibid.*, 1866, 20, 337.
23. *Idem.*, *ibid.*, 1865, 19, 90.
24. *Idem.*, *Ind. med. Gaz.*, 1867, 2, 222.
25. SCOTT, H. S., *A History of Tropical Medicine*, London, Arnold, 1939, vol. 2, p. 827.
26. CHUCKERBUTTY, S. C. G., *Ind. Ann. med. Sci.*, 1867, 11, 61.
27. SEN GUPTA, P. C., *J. Ind. med. Ass.*, 1969, 53, 88.
28. CHUCKERBUTTY, S. C. G., *Ind. Ann. med. Sci.*, 1870, 27, 58.
29. NAPIER, L. E., *Principles and Practice of Tropical Medicine*, Calcutta, Thacker Spink, 1943, vol. 1, p. 280.