

Medical stores in 1865, pharmacist training and pharmacopoeias in India until the launch of the *Indian Pharmacopoeia* in 1955*

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Medical stores attached to army hospitals serviced as pharmacies in India until the later decades of the 19th century. Only around the 1920s, independent pharmacies as retail outlets began to appear in India. An army surgeon, Edward Nicholson, in an article published in the *Madras Quarterly Journal of Medical Science* (1865), while stationed in Cannanore in the erstwhile Presidency of Madras, laments on the poor quality of the army medical stores and how the surgeons were also to function as the compounder–dispenser in army hospitals. In this paper, we have used this Nicholson’s narrative as a trigger to reconstruct the status of army medical stores in British India and the publication of pharmacopoeias (also referred as *Materia Medica*) in India by British surgeons in India, such as William O’Shaughnessy and Edward Waring in 1842 and 1868 respectively. The Madras Presidency contributed, in an equally significant measure, to pharmacopoeial knowledge. Mohideen Sheriff, an early graduate of the Madras Medical College (MMC) and who superintended the Triplicane Dispensary for several years, wrote the *Materia Medica of Madras*. The MMC offered training to medical students in *Materia Medica* in the 1860s. However, formal training of Chemists and Druggists (= pharmacists) commenced in MMC only between 1870 and 1879. Madras pioneered in establishing the Pharmaceutical Society of India in 1925 – the first established professional body – primarily meant to act as an accreditation society, which was amalgamated with the Indian Pharmaceutical Association functioning in Banares (Varanasi) in 1949.

Edward Nicholson, an Assistant Surgeon in the Madras Army Medical Service, posted in Cannanore (11°87’N, 75°36’E; Madras Presidency), (note 1) in the article ‘Government Pharmacy in India’^{1, p. 340}, remarks:

‘... the medical stores of the hospitals in British India are in sham. ... The more common practice where there were few patients in hospital, is to make up each dose as required. It seems to be one of the comical Indian ways of saving trouble’.

Nicholson speaks about writing a smart prescription with appropriate and precise details of various drugs and their quantities: the right choice of drugs in right proportions is imperative, given that a majority of drugs can turn toxic on exceeding limits even by a slim margin, because sick person’s metabolic status would be variable; the prescribing surgeon needs to be mindful of the metabolic status of patients before writing a prescription; ignorance can distort decisions leading to the recommendation of wrong composition and dosage. In the

French territories of the then India, such as Pondichéry, medical service included trained pharmaciens² (= pharmacists) in support of the surgeons. Moreover, the pharmaciens in French-India were periodically scrutinized by appropriate authorities³ as a measure of quality control. Nicholson¹ laments on the absence of trained pharmacists in the British-India Medical Service in the 1860s. Lack of trained pharmacists forced the surgeon to function both as the doctor and compounder–dispenser.

On the status of medical stores in British India, he remarks^{1, p. 337}:

‘How the pharmaceutical department of the British service is managed I cannot say; I only know of that my inquiries on the point have had no result, and the only apparent system is that there is no system. The drug department seems to be utterly unworthy of attention except when the drug-bill is to be paid ...’

He continues (p. 340) that medical stores attached to British Army stations, including Madras, had no structured arrangements. For example, numerous half-gallon (≈1.85 l) bottles of quinine were shabbily shelved along with *preparata ex ferro* (ferrum ammoniacale, ammonium iron, and the tincture made from it (note

2)). The worst of the shabbiness was that martial items (note 3) (e.g. citrate of iron [C₆H₁₀FeO₆C₆H₆FeO₇], sesquioxide of iron [Fe₂O₃], sulphate of iron [FeSO₄]) were not of usable grade in a hospital situation. The tinctures were stored in inappropriate containers (e.g. wine bottles) with no clear labels. Powdery substances were stored in wide-mouth, mustard and/or caper bottles. The shelves were full of unwrapped brown-paper parcels packed with dated drugs. Those medications with a standard label poison did not discriminate poisonous items correctly: for example, both *liquor arsenicalis* (KAsO₂) and carbonate of ammonia ([NH₄]₂CO₃) were labelled ‘poison’.

Based on a long list of deficiencies of the medical stores attached to Army medical facilities in British India and those in the Madras Presidency, he suggests several reforms to the pharmaceutical department of the Madras army¹:

1. A competent medical officer with exhaustive knowledge of chemistry and pharmacy should be appointed to examine the stores and suggest measures of economy as the resources of India would permit of introducing. Many important medicines could be made in India at one-quarter of the price they cost at that time.

*Fondly dedicated to the memory of Kannimangalam P. Anantanarayanan, who blazed new trails in retail pharmaceutical industry of Madras from 1940 to 1967.

2. A thorough inventory of drugs and their stock levels should be made out, which needs updating as and when necessary.
3. Quack medications should be excluded, but the Medical Officer has the right to procure any drug authorized by the *British Pharmacopoeia*.
4. Medical stores should stock medicines of six months extra supply to meet contingencies.
5. Drugs should be stored in appropriate containers, more so because of the climate that prevailed in Cannanore. For example, a 2 lb parcel of Pulv. Zingiberris rotted in a month after its arrival at Cannanore.
6. Appropriate furnishing of the dispensaries was necessary: a specific and dedicated cabinet for poisons was a dire need. Bottles with dispensation gauges marked are vitally necessary for the correct administration of medicines to patients in the hospital.
7. Most importantly, these medical stores should include an efficient dispenser, at the rank of army sergeant who had learnt dispensing formally.
8. The time was ripe to establish quality training in managing dispensaries in the most efficient manner in medical colleges of the presidency, especially to Indians.
9. The then recently published *British Pharmacopoeia* affords an excellent opportunity to reform the Pharmaceutical Department of the Madras Army.

Keeping Nicholson's above remarks in the background, here we make an effort to capture, the phases of evolution of pharmacopoeias and how they influenced pharmaceutical science and pharmacist training in British India in general and Madras Presidency in particular.

Materia Medicas, pharmacopoeias and independent pharmacy practice

The *Edinburgh Pharmacopoeia (Pharmacopoeia Collegii Regii Medicorum Edinburgensium)* existed from 1699 (ref. 4). Appearance of the *US Pharmacopoeia* in 1820 and the *British Pharmacopoeia* in 1864 facilitated the gradual independence of medical and pharmacy practice in Europe and America in the 19th century. Before the 19th century, volumes known as *Materia Medicas*

catalogued various biological and non-biological materials relevant to humans as drugs with comments on their potential uses.

The oldest known *materia medica* is *Corpus Hippocraticorum* attributed to Hippocrates of Kos (5th–4th century BC)⁵. The *Atarva Védā* (estimated 500 BC) catalogues selected plants and their products, recognized as medicines^{6,7}. The pre-2nd century AD volume of high relevance is *Çaraka Samhitā*, which deals with the medical importance of different plants⁸. *Ayūrvédā* (AD 500–600), the knowledge that dealt with better physical fitness and longevity of humans, recognized drugs of plant and mineral origin by cataloguing them and documenting details, which in principle, equalled a *materia medica*, by providing details on drugs and their uses. Several supplementary volumes such as the *Ashtānga-Nighantu*, *Siddha-Sāra-Nighantu*, and *Dravyaguna-Sangrahā* were written between the 8th and 12th centuries AD^{9,10}. Pedanius Dioscorides's *de Materia Medica* (estimated AD 90) is a signpost volume in the history of medicine. The fifth edition of the *Farmacopea Española* (1865) edited and published by the *Real Academia Nacional de Medicina de Madrid* (Royal National Academy of Medicine of Madrid), Spain¹¹, was the most-articulate *materia medica* of the 19th-century Europe. For a general narrative on the development of pharmacy through the world, read Sonnedecker¹². Whitelaw Ainslie, a senior surgeon attached to Madras Medical Establishment wrote the *Materia Medica of Hindoostan and Artisan's and Agriculturist's Nomenclature* in 1813 (ref. 13), which was,

‘... a catalogue, and an account, of such medicines of the British *Materia Medica*, as are either the produce of Hindoostan, or are brought to it from Asiatic countries, and are to be met with in the Bazars of populous towns; including many Drugs of the Tamool (read as Tamil), Arabian, and Persian *Materia Medica*; as also the names given by the Natives to different articles of diet, and other things for the comfort of sick; and the appellations bestowed on those materials which are employed in arts and manufactures: to which added, in the Tamool, Telingoo (read as Telugu), Dukhanie (read as Dakhini), English, and Latin Languages, another and numerous

Catalogue of the various productions of the Vegetable kingdom, which used as food by the inhabitants of these provinces; and concluding with an Appendix, in which are contained the titles of Diseases in Tamool, Dukhanie, Telingoo, and English; together with a list of Malabar, Persian, Arabic, and Sanscrit medical work; a table of Doses and Weights, with the various forms of Prescriptions, &c. in use amongst the Indians.’

In early days, medical personnel – surgeons (note 4) – were trained to be versatile with *materia medicas* thus enabling them to dispense medications to patients. Surgeons, until approximately the 1800s, functioned both as a physician and pharmacist. *Laboratorium Chymicum* established by Benjamin Samuel Cnoll (1705–1767), a Halle (Germany) Missionary in Tranquebar (Tarangampādi, 11°1'N, 79°50'E) near Tanjāvur (southern India), sparkles in the pages of pharmacy history of India. Cnoll, trained in Medicine in Halle, was recruited to work at the Royal Danish Mission (aka the Halle Mission, the Tranquebar Mission, the Evangelical Lutheran Mission) in Tranquebar from 1732 (ref. 14). He compounded and dispensed medications using locally available plants and minerals following the then popular Danish pharmacopoeia, viz. Thomas Bartholin's *Dispensatorium Hafniense: Jussu Superiorum a Medicis Hafniensibus Adornatum* of 1658. Cnoll's *Laboratorium* included a herbal garden, where he grew local plants of medicinal value. The *Laboratorium*, although indicated as small in unverifiable Internet sources, impresses as the earliest, formally set up chemical laboratory¹⁵, which could be seen as the precursor of Western science-based pharmacy in India.

Governments in Europe started regulating compounding and dispensing of medications, aiming at better quality control in the 1860s. Such an action also influenced the emergence of pharmacies, separate from a surgeon's practice. Chopra *et al.*¹⁶, pp 10–14 provide a detailed list of different Indian *materia medicas*. Basu¹⁷ could also be consulted for similar details.

Milestones in Calcutta

We need to recognize that the *British Pharmacopoeia* was used in India, until

the Indian Pharmacopoeia Commission (IPC) was constituted by the Government of India in 1945 (ref. 18), whose efforts bore fruits with the first edition of *Indian Pharmacopoeia* appearing in 1955 (ref. 19).

The Medical Act of 1858 of Britain emphasized the need for a standard pharmacopoeia. The Medical Act of 1862 declared that the new pharmacopoeia, due to appear in 1864, was to supersede the then independently produced *London, Edinburgh and Dublin Pharmacopoeias*. The publication responsibility was entrusted to the General Medical Council of Britain (GMCB), to come up with a document appropriate to the whole nation. In the mid-19th century, selection of drugs was subjective, based on the experiences and opinions of prescribers and users. The GMCB published the *British Pharmacopoeia* in 1864. As this edition included many errors and omissions, work on the next edition commenced immediately, led by Robert Warrington of the Society of Apothecaries and Theophilus Redwood of the Pharmaceutical Society. The second edition appeared in 1867 and the third in 1885.

Notwithstanding these developments in England, William Brooke O'Shaughnessy, a medical doctor working as Professor of Chemistry and *Materia Medica* at the Calcutta Medical College, edited and published *The Bengal Dispensatory* in 1842. A committee of six (five from the Bengal Medical Service (note 5), and one James Prinsep, an Orientalist in Calcutta) appointed by the Governor-General in Calcutta examined the need for a pharmacopoeia. O'Shaughnessy was entrusted with the responsibility of the report (= the intended pharmacopoeia). A second committee of six members, including O'Shaughnessy (note 5), scrutinized the draft report, which named it the *Bengal Dispensatory* and approved its publication. In this volume, O'Shaughnessy derived much of his information on various relevant biological and non-biological materials from the works of William Roxburgh, Nathaniel Wallich, Whitelaw Ainslie, George Arnott Walker-Arnott, and John Forbes Royle (India), Achille Richard and Antoine Fée (France) (O'Shaughnessy spells Fée as Feé), and Jonathan Pereira and John Lindley (England). O'Shaughnessy will be remembered for his significant research on several plant products for their remedial capacity; for example, he pioneered in

studying the relevance of cannabinoids (*Cannabis sativa* ssp. *indica*, Cannabaceae)²⁰. In addition to such contributions to therapeutics in India, O'Shaughnessy also published on the science of photography and telegraphy^{21–23}.

The Bengal Dispensatory, 1842

The purposes of the *Bengal Dispensatory*²⁴ (Figure 1) were twofold: (i) to examine and report on the state of the East India Company's Dispensary in Calcutta; and (ii) to explore the possibility of substituting with indigenous materials, particularly for those imported at a high cost from elsewhere. The publication of a pharmacopoeia for the whole of India was one other point of consideration. This *Dispensatory* includes the sections: what are pharmacopoeias, a summary of efforts made in this direction in Europe and America, the necessity for a *Bengal Pharmacopoeia* and its potential utility, and details of the materials listed in it. In the General Presidential Address of the Indian Science Congress session held at Nagpur in 1920, Prafulla Chandra Ray²⁵ described O'Shaughnessy's passion towards chemistry as a science and chemical education. O'Shaughnessy's following remark in the *Dispensatory* supplements what Ray alluded to in 1920:

'... the class of men for whom they were deemed sufficient by the most eminent Colleges of Physicians in the world, was altogether uneducated in the principles of Chemical science. ... that in the preparation of numerous remedies to meet the demands of medical practice, ...'

O'Shaughnessy's *Dispensatory* alludes to variations in the preparation of various materials of medicinal relevance, across the world (see ref. 24, p. vii):

'Take Potash and its compounds for example – obtained in Canada by the burning of forest timber; in Ireland from the Fern; in France, Italy, and along the Rhenish wine-districts (Rhenhessen wine districts of Germany: Bingen, Neirstein, and Wonnegau), from Cream of Tartar (potassium bi-tartrate, $KC_4H_5O_6$, a by-product during wine making); in India with most economy from Nitre

(saltpetre) – in each case a totally different process is required for its extraction, purification, and adaptation to medicinal use.'

The paragraph below^{24, p. vi} exemplifies the direction that was followed in developing the *Dispensatory* (note 6):

'The study of reactions of several vegetable substances of one kind of medicinal power (for instance, of different purgatives, bitters, tonics, &c.) on other vegetable or mineral substances which it may desirable to prescribe at the same time for the same individual, is also an imperative reason for the compilation of local Pharmacopoeias. Thus the *Quassia Amara* (*Quassia amara*, Simaroubaceae) of Jamaica, and *Menyanthes trifoliata* (Menyanthaceae) of Ireland, the *Gentiana lutea* (Gentianaceae) of the Alps and Appenines, the *Agathotes Chirayta* (*Swertia chirata*, Gentianaceae) and Goluncha (goluncha, *Cocculus cordifolius*, Menispermaceae) of Bengal, all agree in being intensely bitter, and in possessing at least powerful tonic properties: but infusions of these vegetables act so differently on the preparations of iron, of magnesia and other substances, that a different form of prescription is perhaps essential in each case.'

O'Shaughnessy elaborates that India rapidly requires competent medical practitioners and druggists. He suggests that this *Dispensatory* would equip medical practitioners and druggists in such a way that they can perform efficiently. For example, he indicates that the *Dispensatory* would enable Indian druggists to learn to produce medically useful magnesia, such as 'calcined magnesia' (magnesium oxide, MgO) and 'carbonate of magnesia' (MgCO₃) from the residue after preparing common salt (NaCl) from either the magnesian limestone (carbonate rocks) of Sylhet and the Himalaya or from magnesite (MgCO₃) of Madras. For other preparations, he suggests use of Chinese cinnabar and its crude chloride (calomel, Hg₂Cl₂) sold in local markets. For antimonial preparations, he recommends the use of sulphuret of lead (lead sulphide, PbS) and sulphuret of antimony (antimony trisulphide, Sb₃S₃) both liberally available in local markets.

O'Shaughnessy's concluding remarks^{24, p. xxiii} foreshadow the need for a pharmacopoeia for the whole of India. He declares how the *Bengal Dispensatory* would be a useful platform for incorporating newer information and how this volume could also stimulate the researches of others (*sic.* allied fields in medicine). Readers interested in viewing O'Shaughnessy's book may access https://books.google.com.au/books/about/The_BengalPharmacopoeia_and_General_Con.html?id=9hY0HQAAAJ&redir_esc=y.

Pharmacopoeia of India, 1868

Twenty-four years later, the *Pharmacopoeia of India*²⁶ was published under the leadership of Edward John Waring (Surgeon, Indian Army, Calcutta) (Figure 2). As a young surgeon, Waring wrote *Practical Therapeutics* and this experience interested him to indulge into pharmacology (note 7). During his posting as a Medical Officer in Burma, he experienced problems obtaining raw materials from other countries for use in medical scripts. This provoked him to search for raw materials in local markets and forests. During his stint as the Resident Surgeon of Travancore and physician to the ruling Prince of Travancore, Bāla Rāma Varmā (aka Āyilyam Tirunāl, r. 1860–1880) in 1860, he explored forests around Travancore (Thiruvananthapuram today) for plants of medicinal value. He wrote *Remarks on the Uses of Some of the Bazaar Medicines and Common Medical Plants of India* in English enabled with side-by-side *Tamizh* translation, which was printed at the Travancore Sircar Press, Thiruvananthapuram in 1860 (Figures 3 and 4). The English-only edition of the same book went through several revisions, the last and fifth edition appearing in 1897. After Waring's return to England in 1863, he retired from Indian Medical Service in 1865, when he was requested to compile the *Pharmacopoeia of India*. James Martin (surgeon, who also promoted the cause of forests, climate, and human health, India), Alexander Gibson (surgeon, botanist, Forester, India), Daniel Hanbury (Botanist, Pharmacologist, England), Thomas Thomson (surgeon, botanist, and a collaborator of Joseph Hooker, India), John Forbes Watson (surgeon and reporter on Products of

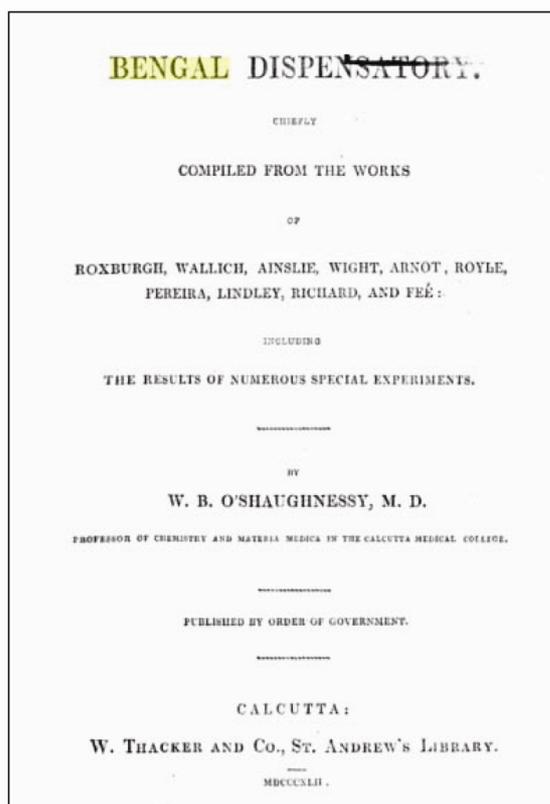


Figure 1. O'Shaughnessy's *Materia Medica of Bengal*.

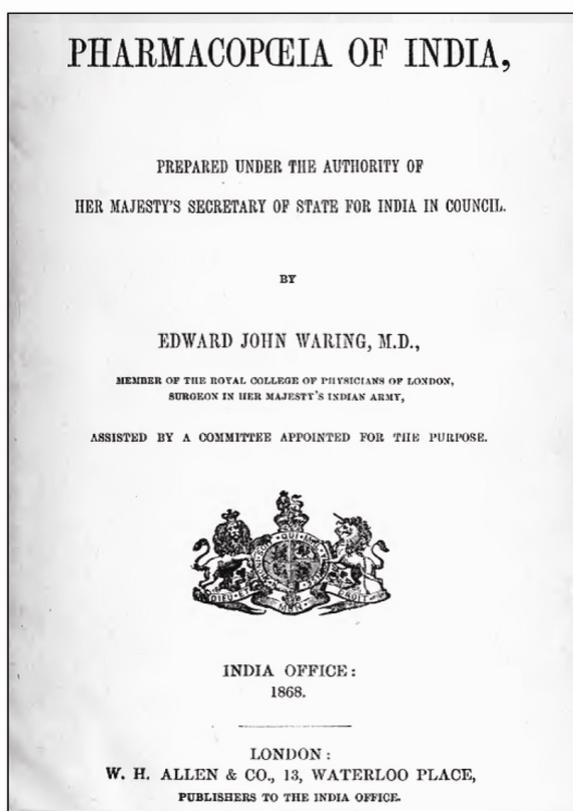


Figure 2. Waring's *Pharmacopoeia of India*.

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India, India Museum, London), and Robert Wight (surgeon, botanist, India), in addition to O'Shaughnessy, who compiled the *Bengal Dispensary* 24 years before, constituted the committee to assist Waring in his compilation project.

Waring's 502-page long *Pharmacopoeia of India* includes vegetable *materia medica* (pp. 1–261), Products of fermentation and distillation (pp. 621–270), animal *materia medica* (pp. 271–286), inorganic *materia medica* (pp. 287–390), articles and solutions employed in chemical testing (pp. 391–400), and classified catalogues of drugs derived from the organic kingdom (pp. 401–430), followed by an appendix and a comprehensive index. As the entire volume is available freely on the internet (<https://archive.org/details/pharmacopoeiaof00wariuoft>), we do not provide any notes here, except to remark that Waring's volume presents itself as a thorough one, which includes sections that were not dealt with in similar previous works such as those of Ainslie and O'Shaughnessy.

Pages xv–xvi in Waring's pharmacopoeia list those materials not included in the *British Pharmacopoeia*, which was used in India as a primary source book then. This list was an important addition to medicine and the science of pharmacy at that point of time. Mohideen Sheriff (aka Moodeen Sheriff) (note 8), who held the academic degree GMMC (Graduate of the Madras Medical College), served the Madras Government as the Medical Officer-in-Charge of the Triplicane Dispensary (13°05'N, 80°28'E). He was a member of the secondary team in the Waring's *Pharmacopoeia of India* project. Sheriff brought out a significant volume in this direction, details of which are provided in the following section.

Milestones in Madras

Mohideen Sheriff's Materia Medica of Madras, 1891

One major reason for the appearance of *Materia Medica of Madras*²⁷ was Sheriff's membership in the Madras Working Committee to cooperate in the conduct of the International Exhibition held in Calcutta between 4 December 1883 and 10 March 1884 (ref. 28). Sheriff volunteered to send indigenous drugs from Madras

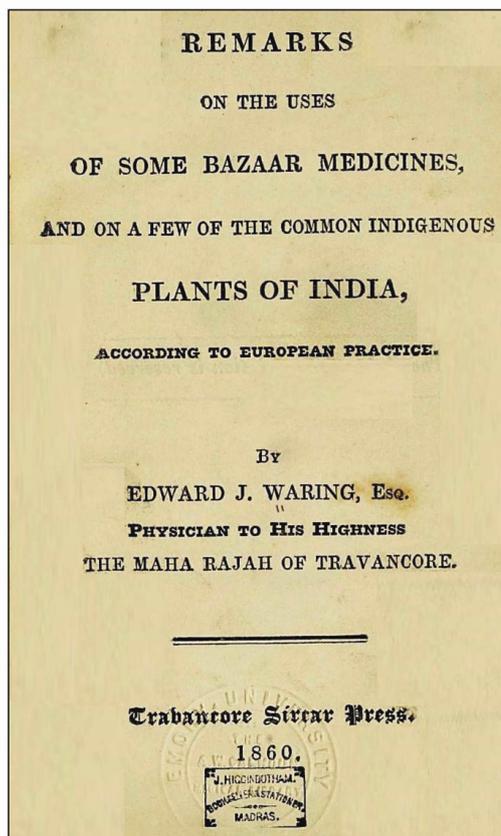


Figure 3. Waring's *Bazaar Medicine* (published in Travancore = Thiruvananthapuram).

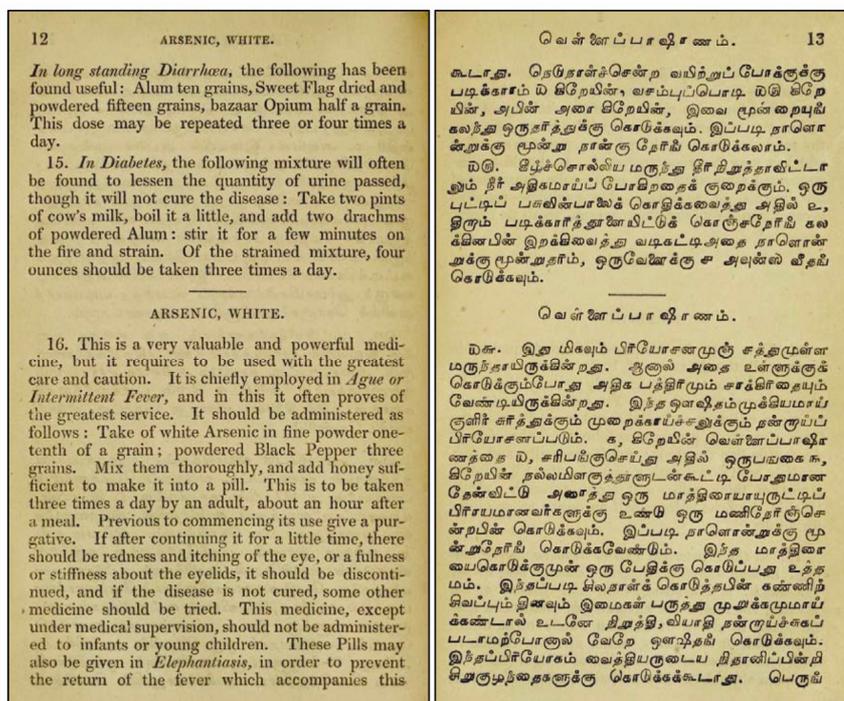


Figure 4. Pages 12 and 13 from Waring's *Bazaar Medicine* showing relevant Tamizh translation. Tamizh language readers can observe terms such as 'grains' and 'ounce' transliterated as such, whereas the numerals are indicated using Tamizh numerals (see https://en.wikipedia.org/wiki/Tamil_numerals).

for display. He was granted Rs 200 by the Government of Madras towards expenses. He sent 954 natural materials of medical importance and a catalogue to this exhibition. The Government of Madras at the conclusion of the Calcutta exhibition supported the publication of Sheriff's catalogue as the *Materia Medica of Madras* (Figure 5), which appeared in 1891. Sheriff also used much of his earlier compiled notes for Waring's *Pharmacopoeia of India* towards the publication of this volume.

On p. vii, Sheriff declares that the medicinal properties of the drugs included in this book were solely from his experience of testing their efficacy on patients he had treated at the Triplicane dispensary and were not extracted from any other source. He reinforces that close to 100 out-patients, on an average, were treated every day at the Triplicane dispensary and this turn-out of patients enabled him to test the efficacy of various drugs. Referring to his retirement from Government service on 7 July 1889, he laments that it was a 'deplorable death-blow' to this undertaking. The time gap between 1883 (exhibition date) and 1891 (the publication date), he explains, was needed to test the efficacy and usefulness of drugs on several patients. For some illnesses such as epilepsy and hysteria, patients were few and that was another reason for the time gap. The *Materia Medica of Madras* volume is labelled '1' on the wrapper and the intended '2' of this volume never appeared. Sheriff²⁷ attributes the non-appearance of volumes after the first to his retirement. On pp. 1-137 of the published volume, he speaks of medically useful plant materials. The information provided is extensive and detailed. Pages 1-4 from his book, reproduced here, indicate the depth of details he provides (Figure 6). On pp. 139-171, he provides indices of names of the referred plants as available in 17 languages: English, German, French, Hindustani, Dukhni, Tamil, Telugu, Malayalam, Kannada, Bengali, Persian, Arabic, Sanskrit, Gujarati, Maratti, Burmese and Sinhala. He compiled this volume by aligning details with those in Waring's *Pharmacopoeia of India*. He explains the alignment using specific symbols. Those marked with an '*' represent that the plants are listed in Waring's *Pharmacopoeia of India*; those marked with a '†' represent plants not listed in the Waring's *Pharmacopoeia*;

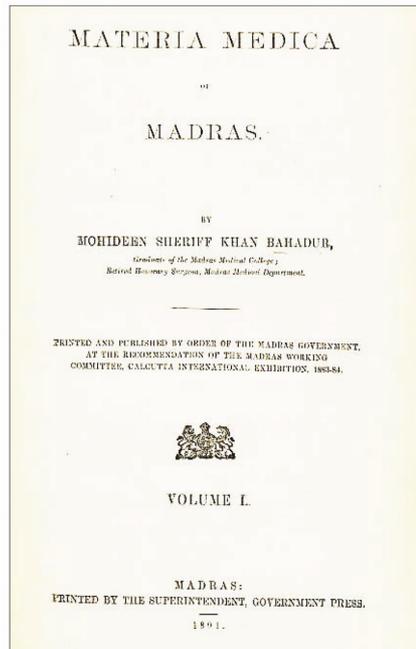


Figure 5. Mohideen Sheriff's *Materia Medica of Madras*.

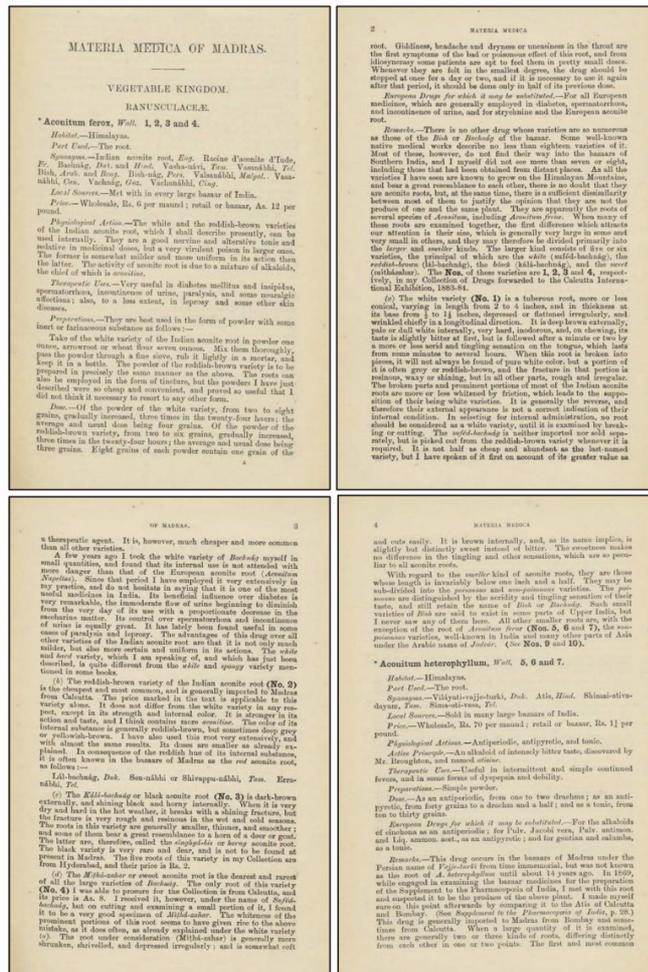


Figure 6. Pages 1-4 from Mohideen Sheriff's *Materia Medica of Madras*.

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and those marked with a ‘¶’ represent plants that were then being cultivated in the Nilgiris. He further indicates that his effort to complete his writing on leguminous plants was futile. As Mohideen Sheriff died on 21 February 1891, David Hooper (Government Quinologist, Ooty [Udagamandalam, 11°24’N, 76°42’E]) was instructed by the Government of Madras to complete Sheriff’s *Materia Medica of Madras*.

Training of pharmacists: Chemists and Druggists Department, Madras Medical College

Training in *materia medica* with appropriately qualified teachers started in the Madras Medical College (MMC) in the 1860s. This training was intended for students of medicine and not pharmacists²⁹. Annual Reports of MMC of this period clarify that medical students were trained and examined in ‘practical pharmacy’. George Bidie, a surgeon, attached to the Madras Army Medical Service published a *Handbook of Practical Pharmacy*, which in high probability, served as the primary reading material for medical students. James Edward Dickinson (Relieving Principal, MMC, 1876) in the 53rd Annual Report of the Madras Medical College³⁰ mentions that Bidie’s *Handbook of Practical Pharmacy* was available in the MMC library. No further details of this publication are traceable. The Relieving Director of Public Instruction (R. M. MacDonald) in an official memorandum (Memo #2, 895, 10 July 1879; <http://digital.nls.uk/india-papers/browse/archive/74952809?mode=transcription>, accessed on 19 July 2017) to the Relieving Chief Secretary (C. G. Master) at the Government at Fort St. George, remarks (p. 4):

‘6. CHEMIST AND DRUGGIST. – A private student, who has been attending the class of Chemistry, *Materia Medica*, *Practical Chemistry* and *Practical Pharmacy*, has been declared fully qualified to undertake the duties of chemist and druggist.’

The above communication reinforces that between 1870 and 1879, formal training of chemists and druggists commenced in MMC. For certain, MMC

included a Chemists and Druggists Department in 1879, although the Annual Report for 1879–80 refers to it as the ‘*Materia Medica* Department’³¹. From 1874, learners on successful completion were certified as chemists and druggists by MMC³², p. 251, although the University of Madras was functioning from 1857. Further improvements in the Chemists and Druggists Department in MMC occurred in 1900–1901, with full-time academics appointed holding titles of professors, lecturers and assistant professors³³. Details on the length of training are available in Elwes³⁴, p. 67:

‘The Chemists and Druggists Department, which has been founded with a view to supplying well-qualified Chemists and Druggists for the Presidency (Madras Presidency). The students undergo a two years’ course, at the termination of which they are required to pass the Government Technical Examination in Pharmacy.’

By the 1920s, Diplomas endorsing every qualified chemist and druggist, trained in the Chemists and Druggists Department of MMC, were issued by the Commissioner of Technical Examinations, Government of Madras. The Chemists and Druggists Diploma was reconstituted as the Bachelor of Pharmacy (B. Pharm.) in 1955. Two notable names in the chronicles of the Chemists and Druggists Department of MMC were J. C. David and V. Iswariah (note 9). David, an MBBS graduate of MMC, was the first professor of *Materia Medica* appointed in 1931 after Ph D (Pharmaceutical Science) from Britain. Iswariah, an MBBS and MRCP (Edinburgh) titles holder, took over as the professor of Chemist and Druggist Department in 1948. David and Iswariah figure prominently in the annals of pharmacy in India, because of their popular textbook entitled *Pharmacology and Pharmaco-therapeutics*, published by S. Varadachary & Co, Madras, in 1965, and the revised edition completed by another distinguished pharmacist – pharmacologist of Madras, M. N. Guruswami, published by Vikas Publishing House, Delhi, in 1979. Possibly, the David–Iswariah volume existed before S. Varadachary & Co. published it in 1965. Unfortunately, we could not get any details of this earlier edition.

Pharmaceutical Society of India

Inspired by the Pharmaceutical Society of Britain (PSB), a professional society, enshrining objects similar to that of PSB was established in Madras, in 1925, known as the Pharmaceutical Society of India (PSI)³⁵. Singh³⁵, p. 69 says:

‘The Society was started in the years 1923 under the name of “The Pharmaceutical Association”; ... In 1925, the name was changed to as “The Pharmaceutical Society of India”. The prominent architects and builders of this society were Wilfred Pereira, of the Wilfred Pereira Ltd, and A.N. Lazarus, of Messrs Spencer & Co. Ltd. (note 10)’.

The principal objects of the PSI were to federate all of the qualified pharmacists of India, facilitate a uniform system of pharmacy education, and establish compulsory registration of pharmacists. The following from Singh³⁵, p. 70 are worthwhile in the context of the establishment of PSI in Madras and also in terms of pharmacy education imparted in MMC then:

‘But for Madras Medical College, no other medical college in India offered diploma of the standard as conducted in Madras. The standard of membership of the Society was sufficiently high to ensure efficient service, and the qualifications required for entry to it were approximately on par with those of the Pharmaceutical Society of Britain.’

Among the several intents identified by PSI in its early documents, the two key ones were: (1) to include a standing member of the Society as an examiner of the candidates appearing for the Diploma in Chemists & Druggists title in Madras Medical College, and (2) the use of the title MPS (India) (Member of the Pharmaceutical Society of India). Unfortunately, these intents never got approved. PSI also strived for the replacement of the term ‘compounder’ with ‘pharmacist’ and the term ‘chemist and druggist’ with ‘pharmaceutical chemist’. The society pioneered in publishing a quarterly journal *The Pharmacist* from July 1939 (ref. 36), which was short-lived (note 11). The major objects of PSI were to

unite qualified pharmacists of India, facilitate a uniform system of education for pharmacists and establish their compulsory registration.

The Society and its members played a vital role in submitting the memorandum presented to the Drugs Enquiry Committee (note 12) led by Ram Nath Chopra (see Singh³⁷), in emphasizing the need for a Poisons and Pharmacy Act, in seeking the restriction of dispensation of medications to qualified chemists only, and in raising the quality of examinations for those aiming to qualify as compounders, so that they service the pharmaceutical profession better and in a professional manner. This early professional Society was amalgamated with the Indian Pharmaceutical Association, then headquartered in Banares, in 1949 (ref. 38).

Conclusion

Although many different editions of *materia medica* (= pharmacopoeias) were published in India, the *British Pharmacopoeia* regulated Indian pharmacy practice until the *Indian Pharmacopoeia* appeared in 1955. Harkishen Singh (Punjab University) has written substantially on this segment of scientific history³⁹. No document clarifies whether some or all of Nicholson's suggested reforms were carried out in later years. The present narrative, nonetheless, bridges some of the prominent gaps in the history of pharmacy practice and pharmaceutical science in India, further to clarifying details pertaining to contributions made by the Presidency of Madras.

Notes

1. Further to the medical title M.R.C.S. (Member of the Royal College of Surgeons of London), Nicholson was a Fellow of the Chemical Society of London. In the chronicles of Madras science, Nicholson is particularly remembered for his volume on Indian snakes, the second edition of which appeared in 1874 (ref. 40). In the preface to the 1874 edition, he explains that the first edition of that volume appeared when he was serving in Burma and he was dissatisfied with it, because it did not include illustrations. When posted in Bangalore in 1874, he published the second edition with illustrations. The Malabar District of the Madras Presidency was infested by dense populations of venomous snakes (e.g.

cobra [*Naja*, Reptilia: Squamata: Elapidae] and Russell's viper [*Daboia russelii*, Reptilia: Squamata: Viperidae]). Human deaths due to snake bites were a serious problem. Hence Nicholson's interest in dealing with snakes, snake bites, and in knowing about snake venoms does not surprise us⁴⁰, pp. 144–164.

2. Tinctures are solutions made by chemicals (drugs) dissolved in either 100% alcohol or aqueous alcohol: for example, tincture of iodine made using specific volumes of elemental iodine dissolved in aqueous alcohol.
3. Ferruginous waters; the spring waters that included iron salts.
4. A medically trained person is always referred as a surgeon because of the vocation, irrespective of whether the person practices surgery or not. A clear evidence for this exists in the titles of medical practitioners in State and Central Government services in India, who are customarily designated as 'Civil Assistant Surgeons' and 'Civil Surgeons', even today.
5. The first-appointed Planning Committee consisted of William Jackson (Apothecary-General, Calcutta), James Ranken (Secretary, Medical Board, Calcutta), Mountford Bramley (Principal, Calcutta Medical College, Calcutta), John T. Pearson (Deputy Apothecary-General, Calcutta), James Prinsep (Assay Master, Calcutta Mint) and William O'Shaughnessy. The later appointed Scrutinizing Committee consisted of Simon Nicolson (Surgeon, General Hospital, Calcutta), Nathaniel Wallich (Professor of Botany, Calcutta Medical College), Charles Egerton (Surgeon, Calcutta Medical College), Strong (Surgeon to Mysore Princes) and William O'Shaughnessy.
6. The text reproduced here from O'Shaughnessy is nearly the same as in the original, except that the family names of plants cited and the current valid names are supplied in parentheses.
7. The term 'pharmacology' may not have prevailed at this time of Waring's stay in India. However, with investigations in synthetic organic chemistry starting in the 1820s (e.g. Friedrich Wohler synthesizing urea from inorganic substances in 1828) and Oswald Schmeideberg of the University of Strasbourg leading the way in medical chemistry, use of 'pharmacology' had begun, although its formal acceptance occurred much later. In this text 'pharmacology' has been used deliberately and as a matter of convenience. Today pharmacology has grown so much that we have sub-branches such as pharmacogenomics and pharmacogenetics.
8. Mohideen Sheriff Memorial Prize (value Rs 38½) commemorates Mohideen Sher-

iff's contributions to medicine in Madras. Books or surgical instruments or a medal in *Materia Medica & Therapeutics* were given away annually to the best Muhamaddan student studying in Madras Medical College⁴¹.

9. Iswariah is variously spelt in the literature: e.g. Ishwariah, Ishwaraiah, Iswariah and Iswaraiah. We have preferred to stay with the spelling used by his student P. S. R. K. Haranath (<http://www.indphar.org/MyjournevinPharmacology.pdf>)
10. Spencer & Company and Wilfred Pereira (Private) Limited were two leading pharmaceutical retailers of Madras of the 1960s.
11. The short life of *The Pharmacist* published from Madras could have been due to the establishment of the *Indian Journal of Pharmacy* by the Department of Pharmacy, Banares Hindu University, in the same year⁴².
12. For details of the Drugs Enquiry Committee, 1930–1931, see Singh³⁵.

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