

## A western science-based *Materia Medica* by Whitelaw Ainslie of the Madras-Medical Establishment published in 1810

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Ancient India saw achieving better health and longevity valuable. Ayurvédā developed as an upa-védā through persistent knowledge-seeking efforts. Especially in the 5th–15th centuries, Ayurvédā (Siddha practice included) grew substantially. Nevertheless, this growth did not occur in isolation. India's trade flourished with neighbouring nations. Indian knowledge about various treatment procedures and drugs enhanced, sequel to trade. For example, the Unāni practice (Yunāni, Unāni-tibb; note 1) entered India and flourished during the Mogul empire. Over time, the strengths in the Unāni practice such as the use of different minerals in treatment strategies permeated Ayurvédic practice<sup>1</sup>. Ayurvédā recognized the science of drugs (modern equivalent being 'pharmacology') by developing catalogues – the materia medicas – for example, *Dravyaguna* (the 'traits' of materials), which were compiled as *nighantu*-s (sort of encyclopaedic volumes), e.g. *Ashtānga-nighantu* by Vāgabhattā (8th century), *Siddha-sāranighantu* by Ravi Gupta (9th century) and *Dravyaguna-sangrahā* by Çakra-pānidattā (11th century)<sup>2</sup>. For an eloquent note on materia medicas and knowledge of chemistry in ancient India,

read Parker<sup>3</sup>. The Western texts that could be considered materia medicas start with the *Hippocratic Corpus* (5th–4th centuries BC). The most renowned volume in this direction is *de Materia Medica* by Pedanius Dioscorides (AD 49–90?) (Figure 1; note 2). A few other materia medicas appeared after that by Dioscorides, until Felix Palacios's *Palestra Pharmaceutica Chymico-Galenica* made the cut in Madrid (Spain) in 1706 (Figure 1). The fifth edition of the *Farmacopea Española* (1865) was the most structured materia medica of 19th century Europe<sup>4</sup>. This volume was produced by a team of the Spanish Royal Academy of Medicine, consisting of the Marqués of San Gregorio [President], José Camps of Camps, Luis Mårtinez Leganés, Diego Genaro Lletget, Vicente Asuero of Cortazar, Manuel Rioz of Pedraja, Matias Nieto Serrano, Quintin Chiarlone, and Tomás Santero of Moreno [Secretary]<sup>5</sup>.

Against such a background, we provide details from the *Materia Medica of Hindoostan and Artisan's and Agriculturist's Nomenclature* written by a Madras surgeon, Whitelaw Ainslie, published in Madras in 1813. We discuss its relevance published at a time when no materia medica – presented as an exten-

sive pharmaceutical resource developed on the principles of Western science – existed in southern India. A considerably enlarged edition of the same book with a longer title *Materia Medica, or Some Account of those Articles which are Employed by the Hindoos and other Eastern Nations in their Medicine, Arts, and Agriculture; Comprising also Formulae, with Practical Observations, names of Diseases in Various Eastern Languages, and a Copious List of Oriental Books Immediately Connected with General Science, &c. &c* was published by Longman, Rees, Orme, Brown, and Green in London, as two volumes (I – 654 pages; II – 604 pages) in 1826.

### Whitelaw Ainslie

Whitelaw Ainslie was born in Berwickshire, UK in 1767. He joined the Madras-Medical Establishment after qualifying for Doctor of Medicine from Scotland. He worked as an assistant surgeon in Chingleput, about 60 km from Madras city. He later worked in Trichinapoly (Tiruchirapalli) as a superintending surgeon. In 1810, he catalogued the vegetables of India, since he planned to develop that catalogue as a medical treatise, which aimed at establishing a relationship among food patterns of Indians, climate and the diseases that prevailed in India. He submitted this catalogue to the Court of Directors at Fort St. George (= the Government of Madras), the notes of which are archived at the British Library, London (Figure 2). He was appointed as the Superintending Surgeon of the Southern Army in Madras in 1814. He resigned his job in 1815 and returned to the UK. He revised his 1813 materia medica volume, wrote on cholera in India, a literary piece (*Clemenza or the Tuscan Orphan*, 1822), and another on the introduction of Christianity in India (1835). He was knighted in recognition of his revised edition of *Materia Medica of India* in 1835. He died in the UK in 1837.

While collecting details for his catalogue of vegetables, Ainslie says: 'Having long thought that in a Country like

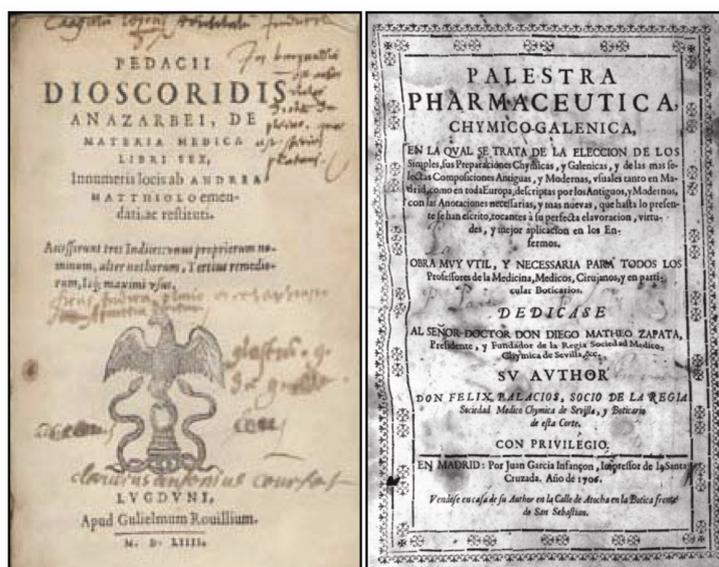


Figure 1. (Left) *de Materia Medica*. (Right) *Palestra Pharmaceutica Chymico-Galenica*.

## HISTORICAL NOTES

this [India], so great a part of whose Inhabitants eat no animal food, it might be interesting (as connected with an important branch of the Materia Medica) to ascertain, and bring under one head, the numerous Vegetable Productions which are in consequence used as Diets.<sup>7</sup>

In this catalogue, Ainslie remarks that some of the pulses and grains listed by him would thrive in sheltered situations in southern England, and recommended that experiments should be carried out (i.e. in the UK) to grow them. The catalogue includes details under (1) corns and small grains, (2) garden stuffs, (3) large beans and small pulses [many of which have no English names], (4) roots, (5) fruits and nuts, (6) greens and teas, and (7) hot seeds, spices, seasoning agents and oils. Each section provides the product's native name, English name, botanical name (wherever known), and general remarks on, for example, value as food material or as material of medical use, and on cultivation (Figure 3).

Ainslie will also be remembered in Madras medical history for having led a committee appointed by the Madras

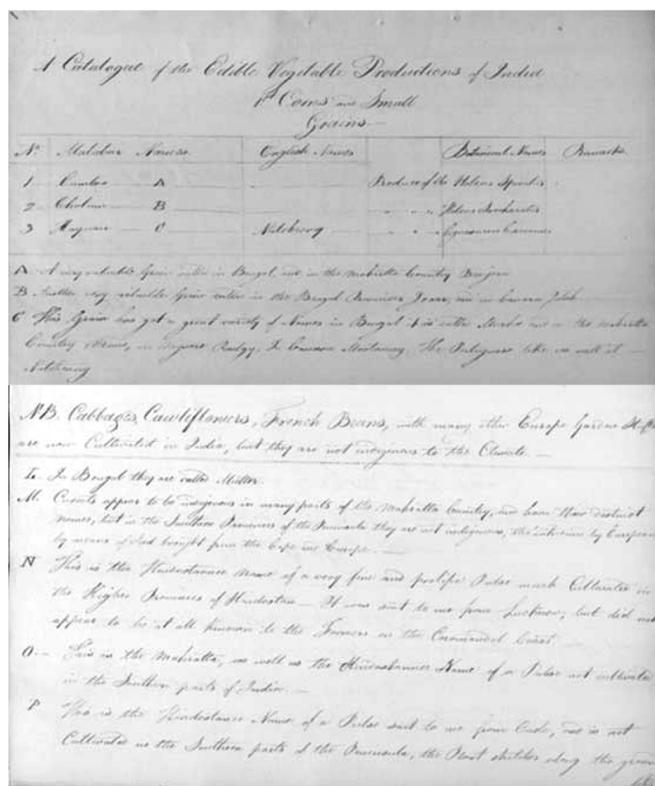
Government to investigate the causes of the epidemic fever affecting the populations of Coimbatore, Madurai, Dindigul and Tirunelveli of the Madras Presidency. The report of this committee [W. Ainslie, President; A. Smith, Second Member; M. Christy, Third Member] is available as a published document<sup>6</sup>. This report refers to malaria, which was ravaging India for ages. Unknown as 'malaria' during the Ainslie Committee's investigation, the illness is referred as 'epidemic fever' and was treated symptomatically. The number of deaths in India due to malaria in the late 1800s and the first half of the 1900s is estimated at a little more than a million a year<sup>7</sup>. In India alone, around the 1850s, the British government was using nine tons of quinine annually. The point to be noted here is that Clements Markham brought *Cinchona* saplings from Peru to India only in 1869 and those saplings were subsequently established in the Government Botanical Garden at the Nilgiris<sup>8</sup>. Although the chemistry of *Cinchona* bark was characterized only in the 1820s (ref. 8), its importance in treating this deadly

fever was known throughout the world in the later decades of the 18th century. Obviously, *Cinchona* bark was imported into India during Ainslie's time in Madras. Recall that William Roxburgh, while stationed at Samulcottah Botanical Garden found the bark of *Swietenia febrifuga* (Meliaceae) as a potent substitute for *Cinchona*<sup>9</sup>, thus saving on country's exchequer. The report by Ainslie *et al.*<sup>6</sup> frequently refers to using *Cinchona* bark in the treatment of the epidemic fever.

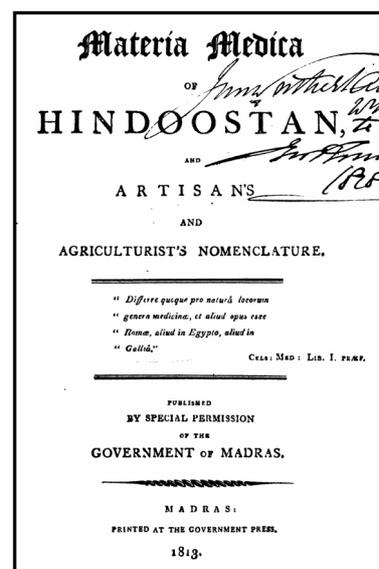
### *The Materia Medica of Hindoostan and Artisan's and Agriculturist's Nomenclature (1813)*

This edition (301 pages of text, 44 pages of indices) was published with the special permission of the Government of Madras and printed at the Government Press, Madras, in 1813 (Figure 3). Ainslie's name, as the author, appears in the following page. Ainslie (signed as Whitelaw Ainslie, M.D., Superintending Surgeon of the Madras Establishment) outlines the purpose of this volume:

'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, Arabian, and Persian Materia Medica;



**Figure 2.** Pages from W. Ainslie's notes written for his catalogue of vegetables, submitted to the Court of Directors, The East India Company, Fort St. George, Madras (1810). Source: British Library, <http://www.bl.uk/manuscripts/FullDisplay.aspx?ref=IOR/F/4/379/9495>.



**Figure 3.** Cover page of Whitelaw Ainslie's *Materia Medica of Hindoostan* (1813).

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 (read 'Tamil'), Telingoo (Telugu), Dukhanie (a Urdu dialect spoken principally in Deccan, also known as 'Hyderbadi Urdu', read as 'Dakhini'), English, and Latin Languages, another and numerous Catalogue of the various productions of the Vegetable kingdom, which as 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.'

Ainslie dedicates this work to Johann Peter Rottler (note 3) for his help in determining plants of India. This volume consists of two sections, viz. Catalogues I (pp. 1–216) and II (pp. 217–272), followed by an appendix that includes (i) a table of names of diseases in English, Tamil, Dakhni and Telugu (pp. 273–283), (ii) a list of books (chiefly medical) in Tamil, Persian, Arabic, and Sanskrit (pp. 284–291), (iii) further particulars on the purging croton nut (*Croton tiglium*, Euphorbiaceae), and (iv) additional notes on details not referred to in the body of the work (pp. 295–301). These are followed by an English index (23 pages), a Tamil index (13 pages), and a Latin index (8 pages). The first index includes English equivalents wherever available, such as 'spurge' for a member of Euphorbiaceae, 'gingelly oil' for sesame oil (extracted from the seeds of *Sesamum indicum* (Pedaliaceae)), and sweet potato (*Ipomoea batatas*, Convolvulaceae). This index also includes Tamil names of materials referred to in this text, which have been transliterated in Roman fonts with appropriate diacritical marks to relay the correct diction. The pages captioned the Latin index include biological names as known then.

Section I (pp. 1–51) refers to chemical and biological materials that have been referred in the British Materia Medica, but found in Asiatic countries used by the Indian (medical) practitioners. It

starts with a short description of sulphuric acid (referred as 'Acid, Vitriolic') with its Indian vernacular names mentioned either in transliterated Roman alphabets or in Tamil alphabets and its Latin name *Acidum Sulphuricum*. Details of its local production are explained: 'by burning "some" (no mass mentioned) sulphur with a small portion of saltpetre [ $\text{KNO}_3$ ] in a strong earthen vessel'. Ainslie adds, '... nearly in the same manner that we do.', implying the similarity in the production of sulphuric acid then in Britain. He indicates its use as follows: 'prescribed dilute, internally, in scrophulous [= chronic] affections, and in case of general debility: it is also given in an infusion of cloves [flower buds of *Syzygium aromaticum*, Myrtaceae], in certain bowel complaints unaccompanied with tenesmus [= constant urge to pass stools].'

His annotation on camphor (Figure 4) is an example of the details Ainslie supplies under each item he has listed (p. 7). This section includes the biological name of camphor source, viz. *Laurus camphora* (presently *Cinnamomum camphora*) (Lauraceae), which he indicates to be growing wild in Japan (note 4). He refers to what was diagnosed by Indian physicians as *Krishna Dosham* (mentioned as *Kistnah Doshum*) and equates it to typhus fever (note 5).

Ainslie also refers to metallic substances as used in Indian medical practice (pp. 52–60). Under the title 'arsenic', he recognizes four types: 'arsenic white oxide' [arsenic trioxide,  $\text{As}_2\text{O}_3$ ], the 'sophuret of arsenic' [arsenic sulphate,  $\text{As}_2(\text{SO}_4)_5$ ], 'realgar arsenic' [Arsenicum rubrum, Tetra-arsenic tetrasulphide,  $\text{As}_4\text{S}_4$ ], and the 'golden orpiment arsenic' [arsenic sulphide,  $\text{As}_2\text{S}_3$ ]. Under these heads, he talks of the chemistry of arsenic and its use by Unani and Ayurvedā physicians. Further to describing details of medical values of arsenic, Ainslie talks of the product being imported from China, Sumatra, Japan, and Turkey. He explains the medicines of the Tamil Materia Medica, based on a Siddha medical text *Agattiya Vythiya Murai 500*, also used by the people of Telugu country and Muslims, which he thinks will be of value to European practitioners (pp. 63–133). Details of medications and their suggested doses from the Tamil medical practice are also given (pp. 134–136). A list of weights and measures used by Indian physicians is

also included, with equivalents of Apothecaries' weights and measures supplied, e.g. 2.5 grains of dry paddy (including the husk) = 1 Apothecaries' grain (pp. 137–139). These pages also include details on how native medical practitioners wrote prescriptions pertaining to water extract (infusion), kashāyam (decoction), thazham, thuvālai (liniment), léhiyam (electuary), çoornam (powder), māthirai (pill), and kalimbu (poultice).

Ainslie also speaks of mercury (Hg) elaborately (pp. 105–108). Being unsure whether the Indian physicians knew of the use of Hg and its preparations in medicine, particularly those of lepromatous kinds, he relies on le Clerc<sup>10</sup>, who clarifies that the Arab physicians of the 12th century knew the use of Hg in the treatment of skin diseases. He comments on the use of Hg by Tamil medical practitioners as follows (p. 105): 'The preparations of Mercury found in use amongst the Tamool Practitioners give us but a poor opinion of their knowledge of chemistry. Their pharmaceutical operations are crude and unscientific; ... Yet, after all, however much we may be inclined to small at some of their strange mixtures, it must be confessed that the characterizing principles are generally correct, and that, ...'.

He subsequently explains the principles and practices followed by native Indian physicians, particularly of the Tamil country, in making five types of mercury-based compounds, where the term 'rasa' (or *rassa*) refers to Hg [Tamil] – *rassapušpam* (a sort of muriate of mercury), *rasacarpooram* (another sort of muriate of mercury), *šādilingam* (a sort of factitious cinnabar), *šaviram* (a further derivative of *rassapušpam*), and *rassasenduram* (a zinc-mercury amalgam). Besides describing details of the making of these mercury products, Ainslie also indicates how each of these mercury compounds is being used in the treatments of different diseases. In brief, he indicates *rasapušpam* and *rasacarpooram* for venereal afflictions, scurfy ulcers, and leprosy. *Šādilingam* to be used with specified masses of the bark of *Calotropis gigantea* (then known as *Asclepias gigantea*, Asclepiadaceae), charcoal, *Piper nigrum* (Piperaceae), and the juice of *Gossypium herbaceum* (Malvaceae), and the well-ground material on hardening should be smoked for eye disorders. *Šaviram* is prepared with alum,

**CAMPHOR.** *Carpeorum* (TAM.) — *Cafoor* (ARAB.)  
 (DUK. AND HIND. ALSO MALAY.) — *Carphura* (SANS.) — **LAURUS CAMPHORA.** LIN.

Campbor is very much in use amongst the Native Practitioners of India, who prescribe it externally, as we do, in cases of sprains and rheumatism. The Vytians suppose it to possess the power of shortening the cold fit of an intermittent fever, and to be highly useful in the disease they call Kistnah Doshum, which corresponds with our Typhus fever. The Arabians place it amongst their Mokewyatdii (Cardiacs). The greater part of the Campbor, that is found in the bazars, is not the produce of the Laurus Camphora, which grows wild in Japan, but is brought to India from Sumatra, (1.) where it exudes from a large tree resembling the Bay, and which is indigenous to that island. A great deal of what is called by Merchants "Nasiza Camphor," is produced on that part of Borneo which was ceded to us by the Sooloos.

Figure 4. Section on 'camphor' from Ainslie's *Materia Medica* (1813), page 7.

**ASBESTOS.** *Kull nār* (TAM. AND CAN.) — *Puttin*  
*kā nār* (DUK.) — *Rātinā* (TEL.) — **ASBESTOS.**

Captain Arthur, of the Corps of Engineers, was the first European who discovered this magnesian fossil in the lower provinces of Hindoostan; (in Mysore.) It is that sort which has been called by mineralogists *Amianthus*: its texture is delicately fibrous, its colour flaxen, and its fibres perfectly flexible. The *Ligniform Asbestos* I found in a Trichinopoly bazar: in external appearance it resembles wood, its fibres are somewhat rigid, and its colour is a dusky brown. The Tamool name of this sort is also *Kullnār*, which literally signifies stone-flax.

From the quality the *Amianthus* has of resisting fire, it is evident that it might be turned to very useful purposes.—*Pliny* informs us that he saw Napkins made of it; and the Princes of Tartary use it in burning their dead, with the view of preserving the ashes of the corpse distinct from those of the wood. Dr. *Lister* speaks of the wicks of the perpetual lamps of the Brahmins being made of it; and such may probably exist in the higher tracts of India, where I have understood that the Hindoos were not unacquainted with the method of making cloth from it. *Thauberg* found a fine white variety of Asbestos in Japan, there called *Sekim*, and which the Japanese were in the habit of spinning, weaving, and making into cloth.

Figure 5. Section on asbestos from Ainslie's *Materia Medica* (1813).

nitre (KNO<sub>3</sub>), iron sulphate (FeSO<sub>4</sub>), and sal ammoniac (NH<sub>4</sub>Cl) and given to treat asthma and phlegmatic problems in microquantities. *Rasasenduram* is used mixed with copper sulphate and the root of *Amaranthus campestris* (Amaranthaceae) to treat foul ulcers.

Catalogue II includes details on materials (a little more than 500, grouped under 7 sections based on their economic contexts) used by the people of Tamil land in the 18th century. He provides impressive details and most critically, he supplements details with vernacular names either in original languages or in transliterated Roman fonts. For example, Figure 5 shows a copy of his notes on asbestos, wherein his comments start from Pliny the elder (AD 23–79) until Thunberg (1743–1828), to how the Japanese found use for a fine quality asbestos into making fabrics. Catalogue II includes details of different materials (more than 500) of both natural and synthetic origin used in different contexts in the Tamil country. An example is the copy of the details he provides under asbestos.

Ainslie also discusses about rice cultivation in the Tamil country. His brief remarks start with a comparison of

Tennant's notes<sup>11</sup> on the agriculture in Bengal (p. 270): 'On this coast (Coromandel), from being exposed to an opposite rainy season, the harvest months are necessarily different from those of upper Hindoostan, as are also several of the articles that are cultivated; ...'

In this section, he provides worthwhile remarks on the cultivation practices of *Oryza sativa* and related water-management practices in Tamil land, referring particularly to the white-grain variety Samba and the red-grain variety Kār.

### Remarks

The earliest formal effort in this direction, i.e. producing a catalogue of medically relevant materials and their derivatives was that by John Fleming<sup>12</sup> of the Bengal Medical Service. Another formally produced materia medica of the 19th century in India was that of Uday Chand Dutt<sup>13</sup>, a medical officer of the Bengal Civil Medical Service, published in Calcutta in 1877. Baghvat Singhjee<sup>14</sup> (note 6) wrote *A Short History of Aryan Medical Service* in 1896 that includes a chapter 'The Indian Materia Medica'. A

more comprehensive volume was by Khory and Katrak<sup>15</sup> published in Bombay in 1903. Krishnarao Mangeshrao Nadkarni<sup>16</sup> published his massive tome, *The Indian Materia Medica* in 1954, which has currently undergone several reprints and revisions. Ainslie's *Materia Medica of Hindoostan* (1813) appeared in Madras, three years after Fleming published his volume. Nevertheless, Ainslie's volume is more detailed and comprehensive than that of Fleming's in terms of quantity and quality of information supplied.

Ainslie's volume (1813) contains details of materials of medical use in India generically and of the Tamil country in particular in the first 138 pages, referred to as Catalogue I, captioned *The Materia Medica of Hindoostan*. The remainder of this volume consists of Catalogue II captioned *Agriculturist's Nomenclature*. Catalogue I includes references to materials of medical importance, whereas Catalogue II is a bibliographic enumeration of materials of general economic importance (e.g. asbestos), although it periodically alludes to materials of medical importance (e.g. mercury, and other metals such as Au, Zn, Ag). In the preface, Ainslie says: 'It has long been a source of regret that there was no where to be found a correct list of what particular articles of the British *Materia Medica* could be procured in the Bazars of Hindoostan, with their names in the languages which are spoken in the Peninsula; or any arranged account of the *Materia Medica* of the Native Indians. It is with a view of remedying these evils, in some measure, that the following Catalogue is now presented to the Public.'

Ainslie largely meets the above objects in this volume, although occasionally he strays from the main theme, offering distractive comments. Nevertheless, recognizing the time as the 1800s and the region, which was distanced from Europe substantially, his objects are appreciable. From the quotation (*op. cit.*) in the preface of his book, we can infer that Ainslie targeted the people of peninsular India as his readers. He supplies names of materials he had referred to in this volume in at least ten languages spoken in India: Arabic, Dakhni, Gujarati, Hindi, Kannada, Malayalam, Persian, Sanskrit, Tamil and Telugu, further to referring to names in languages such as Javanese, Malay and Sinhalese, spoken beyond the Indian land mass. The effort made by Ainslie to compile these

vernacular equivalents is stupendous. Another notable feature is that all biological names follow the binomial system of nomenclature, which is a key strength of this volume, given that bulk of the information on materials of medicinal importance refers to biological materials. In terms of organization of lists, he has used Tamil names to start with and has arranged them alphabetically, writing first their *Tamil* names in Roman letters.

John Fleming's *A Catalogue of Indian Medicinal Plants and Drugs with their Names in the Hindustani and Sanscrit Languages*<sup>12</sup>, has been a key source of reference for Ainslie. He refers to Fleming at different points in his volume. For example, in the context of referring to *Eupatorium ayapana* (presently *Ayapana triplinervis*, Asteraceae), Ainslie refers to Fleming's remarks on this plant and its medicinal use. Cross references to other similar volumes published overseas with appropriate details are cited in Ainslie's volume as footnotes. Occasionally Ainslie also refers to uses of materials in other nations such as Japan, China and Java (e.g. his footnote in p. 88), which add value to this book. His remarks referring to others' findings, such as Captain Arthur's discovery of magnesian fossil in Mysore province in the late 18th century and its relevance in the discovery of asbestos are impressive (Figure 5).

Forty-eight pages of three-language indices (English, Tamil and Sanskrit) are useful additions. We see these indices as of paramount value, because some of the volumes published in India in recent times do not include any index.

## Notes

1. Unani medical practice is believed to have evolved with the classical five-volume text *al-Qānūn fī-al-Tibb* by Abd Allāh ibn Al-Hasan ibn Ali ibn Sīnā (Avicenna) (980–1037) in the Kingdom of Persia.
2. Dioscorides was a surgeon in army of Emperor Nero of Rome. He had travelled through Italy, Gaul, Spain and North Africa, and recorded the medicinal value of several plants. He compiled them as a volume (AD 70). Originally written in Greek, Dioscoride's Herbal was later translated into Latin as *De Materia Medica*. It remained authoritative for medicinal plants for over 1500 years. The original work of Dioscorides did not include any illustrations. In the early decades of the 6th century, a Byzantine artist

illustrated Dioscoride's Herbal for presentation to Juliana Anicia, daughter of Anicius Olybrius, Emperor of Byzantium.

3. Johann Peter Rottler (1749–1836), an Alsatian Lutheran Mission preacher and medical doctor, who came to India following Johann Gerhard König of the Royal-Danish Lutheran Mission (also known as the Tranquebar Mission, the Evangelical Lutheran Mission of Halle). Rottler will be remembered in the 18th–19th century Madras for his contributions to the botany of southern India<sup>17</sup>.
4. Today we know that *Cinnamomum camphora* (Lauraceae) is a native of China, south of the Yangtze, and it also grows plentifully in Taiwan, Japan, Korea, extending up to Vietnam in the south.
5. Typhus fever was the most common waterborne disease recognized in the 17th century. It was caused by microbial contamination from human faeces. Symptoms include high fever, weakness, headache, lack of appetite, stomach pain, and flat-pinkish spotty rashes. Typhus fever and typhoid were differentiated in 1837. Edward Jenner presented a detailed comparison of the two diseases based on clinical and post-mortem appearances, describing the difference in the rash and the lesions of Peyer's patches and the mesenteric glands seen in typhoid were never seen in typhus in 1850 (ref. 18, p. 8). Typhoid fever is caused by various strains of *Salmonella* (Proteobacteria: Enterobacteriaceae), while typhus is caused by various species of *Rickettsia* (Proteobacteria: Rickettsiaceae).
6. Bhagvat Sinhjee Sangram Sinhjee Bahadur (the Maharaja of Gondal, Rajkot, 1865–1944; r. 1869–1944), the only ruler of a princely state in pre-independent India, who qualified formally in medicine with M.B.C.M. and F.R.C.P. from Scotland.

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