Clinical Manual for India – an internally published handbook for medical students of the Madras Medical College in the late 19th century

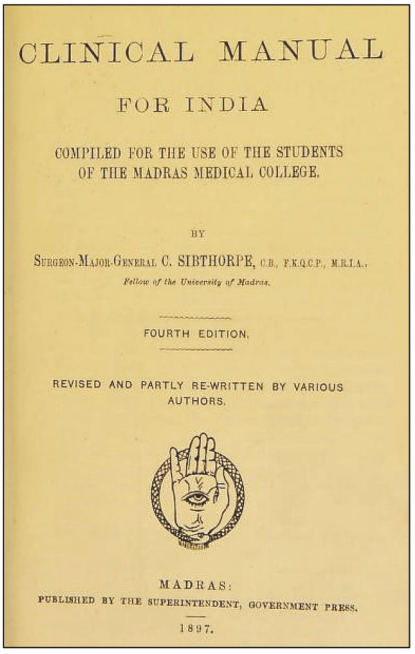
Ramya Raman and Anantanarayanan Raman

A printed book, titled 'Clinical Manual for India: Compiled for the Use of the Students of the Madras Medical College' (hereafter, 'MMC Manual'), was available for student use in the Madras Medical College (MMC) between 1878 and 1897. The first edition of this book must have served as casual class notes prepared by Arthur Branfoot, Professor of Midwifery at MMC in 1878. The second and third editions, more formally prepared than the first, were printed books compiled and edited by Charles Sibthorpe, who taught pathology at MMC. The fourth and the last edition was compiled and edited by a team consisting of Branfoot, John Maitland (Surgeon), and John Smyth (Physician), academics at MMC and concurrently, full surgeons at the Madras General Hospital. This Manual, which might have served similar to either a study guide or a handbook, impresses as a unique effort in enabling and empowering the MB&CM and LM&S students at MMC at that time. The book was intended for the use of medical students of MMC only. No book of similar kind existed for students in medical colleges in other Indian presidencies. Here, we briefly examine the contents of the available 1883 (the second) and 1897 (the fourth) editions of the MMC Manual. The fourth (1897) edition strongly resembles James Finlayson's 'Clinical Manual for the Study of Medical Cases' (1891) in contents and design. The 'Clinical Manual for India' impresses as a powerful and useful teaching – learning tool, especially of diagnostic medicine, since it includes most of the relevant medical information, in spite of a few weaknesses. Notably it cites some of the then newly published medical journal articles and books.

Medical books existed in ancient India[1], e.g. the *Suśruta* and *Çaraka Samhita*–s[2,3], as well as in Rome, and Greece[4,5], e.g. *de Medicina* by Aulus [Aurus?] Cornelius Celsus (*c*. 25 BC–AD 50). A few books, written on diverse topics – treatable as precursors of modern Western medical science – existed in the 18th century Europe[6]. In the early decades of the 19th century India, medical books written by British medical practitioners such as Charles Curtis[7] – a surgeon on the HMS *Medea* (1778–1805) of the British naval fleet – and James Annesley[8] – physician attached to the Madras Medical Establishment – appeared. However, such books were (and are) helpful in relating to the epidemiology of certain diseases and not suitable for use as textbooks.

Many textbooks of clinical medicine, e.g. Kumar and Clark[9], and Wilkinson *et al.*[10], are popular today. Yet, *Davidson's Principles and Practice of Medicine* is perhaps the most popular among medical students and practitioners, for whom the book is inspirational, because of its rich contents presented in easy-to-read prose. Presently, the book is running its 23rd edition[11]. In the first edition – drafted in the late 1940s and published in 1952 – Leybourne Stanley Patrick Davidson (1894–1981) clarified that he would not attempt to describe every rare disease and syndrome on this earth, but would utilize the available space to describe those illnesses commonly encountered by a medical practitioner. Later editions of the book have remained contemporary with periodical revisions made by eminent physicians. The book continues to serve medical students and practitioners alike, maintaining Stanley Davidson's original vision and objectives. Another equally popular textbook of medicine is the *Principles of Internal Medicine*[12], which ran its 20th edition in 2018, and was first brought out by Tinsley Randolph Harrison of Alabama (1900–78) in 1950.

In this context, the book *Clinical Manual for India: Compiled for the Use of the Students of the Madras Medical College* (hereafter, either *MMC Manual* or *Manual*) compiled and edited by Arthur Branfoot, John Maitland, and John Smyth (note 1) (academics, Madras Medical College (MMC) and Conjoint Surgeons, Madras General Hospital (MGH)) published in 1897 (ref. 13; Figure 1) impresses as a unique effort in enabling and empowering the medical students of MMC (note 2). The first edition of this book appeared approximately 150 years ago, pre-dating the first edition of *Davidson's Principles and Practice of Medicine* by 75 years.


CLINICAL MANUAL

FOR INDIA

COMPILED FOR THE USE OF THE STUDENTS OF THE MADRAS MEDICAL COLLEGE.

BY

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Fellow of the University of Madras.

FOURTH EDITION.

REVISED AND PARTLY RE-WRITTEN BY VARIOUS AUTHORS.

MADRAS:

PUBLISHED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1897.

Figure 1. Cover page, *Clinical Manual for India*[12].

The purpose of this note is to bring minimal details of this *MMC Manual* to light. The contents of this *Manual* suggest that it was intended more like a 'handbook', since it includes just adequate information necessary for a young doctor, who would be setting up his/her independent practice. However, the question 'Did the part of the title *Clinical Manual for India* mean that this volume was also intended to service medical students in other presidencies, such as Bengal (Calcutta) and Bombay?' remains.

In the 1897 edition of the *Manual* (ref. 13, p. 7) the editors emphasize on the practice of reading standard textbooks by their students:

> 'The different text-books required in the College are very valuable, but students must remember that they do not describe disease as it exists in every case: they have been happily compared to 'maps' of a country, and used as such they will be useful. A good plan is to study the case as it is when corrected by the clinical teacher and at the same time to read up the subject in the text-book: when the student meets with any difficulties, he should not fear to ask his teacher. Much may be learnt also by conversation on such subjects with other students who have already studied them. If the student records his cases carefully and conscientiously, he will have acquired a habit which will be of the greatest use to him in after life, and which will do much to prevent his degenerating into that most abhorrent of beings – a routine practitioner.'
>
> 'Students who desire to study a work exclusively devoted to clinical medicine are strongly advised to obtain one of the three following manuals, as being thoroughly up to date and moderate in size and price: Medical Diagnosis by Dr. Graham-Brown, Physical Diagnosis by Drs. Gibson and Russell, or Clinical Manual by Dr. Finlayson' (note 3).

The above impress as sound advice. They also clarify that the *Manual* had to be treated as a supplementary reading material and not as the primary. Alternately, it could also mean that the *Manual* was to serve as a basic book and be improved upon by exploring other standard volumes.

Possible objectives of the *MMC Manual*

Neither in the second nor in the fourth editions do the editors clarify the purpose(s) of the *MMC Manual*. For sure, this book would not have been introduced without one or more purposes. We speculate a few that probably encouraged the launch of this *Manual* in 1878.

The first must have been the changing academic environment at MMC and in Madras in the 1870s. With the establishment of the University of Madras in 1857 and the Faculty of Medicine in 1863, the extant five-year long graduate-diploma programme Graduate of Madras Medical College (GMMC) offered in MMC must have necessitated revamping and redevelopment as a university-degree programme, viz. *Medicinae Baccalaureus et Chirurgiae Magister* (MB&CM) in 1863–64 (R. Raman and A. Raman, Commun.). The MB&CM programme ran concurrently along with the extant four-year long LM&S (Licentiate of Medicine & Surgery) programme. Because the successful candidates of MB&CM and LM&S were certified by the Madras University's Faculty of Medicine and the qualifying certificates were issued by the University of Madras (ref. 14, pp. 65–78), changes in the course design, structure and quality enhancement of the MB&CM and LM&S programmes in MMC must have been necessary in the mid-1870s (note 4).

Second, the practice and quality control measures adopted and recommended by the General Medical Council of Great Britain & Ireland (GMC) (note 5) influenced the academic programmes of MMC in the 1870s. Many of the practices and quality control measures followed by GMC were considered relevant and important by the Academic Council of MMC. Therefore, many of those measures were introduced at various levels in MMC between the 1870s and 1890s (ref. 13, pp. 393–394). The new measures introduced in MMC were: (i) greater emphasis on the scientific side of medicine by teaching pathology, bacteriology, physiology, and physiological chemistry (medical biochemistry, today) more extensively than what prevailed; (ii) rigorous practical training through more hours of hospital rotation duties; (iii) specific training in mental diseases by teaching an independent subject 'mental diseases', particularly to students of MB&CM, supplemented by hospital rotation duties at the Lunatic Asylum (The Institute of Mental Health, Kilpauk, Chennai, today), and (iv) requirement of 50% in the end-of-year-examinations of each subject as the mandatory minimum to secure an ordinary pass.

Third, unaffordability to procure personal copies of the recommended medical textbooks[15–17] by the students.

The *Clinical Manual for India* is likely, therefore, to have been introduced as a self-help study guide, to achieve the above speculated purposes. The Academic Council of MMC presumably saw a value in introducing a specific, locally designed and produced *Manual* with chapters written by the academic staff of MMC.

The MMC Manual

Four editions of this *Manual* appeared: the first in 1878, the second in 1883, the third (date not available), and the fourth in 1897.

First edition

Charles Sibthorpe (note 6), editor of the second edition[18], remarks that the previous (1878) edition was a 'small' book, which principally included the pharmacopeial formulae (note 7) followed in MGH to which MMC was an affiliated teaching institution. The first edition was compiled by Arthur Branfoot (Professor of Midwifery, MMC, and Superintendent, The Maternity Hospital, Madras) with assistance from a few of his unnamed colleagues at MMC. This edition was accessible to students of MMC for an unknown price. Since no copy of the first edition (1878) is available, little further can be said. However, the most obvious is that the first edition did not have a title. Highly likely, it was circulated to medical students of MMC enrolled in LM&S and MB&CM (note 8) programmes as some sort of privately circulated printed material.

Second edition

This was a better organized, enlarged version than the 1878 edition[18] with a formal title, viz. *Clinical Manual for India: Compiled for the Use of the*

Students of the Madras Medical College, 224 pages, published by Higginbotham & Company, Madras, in early 1883 (Figure 2 *a*). This edition was compiled and edited by Charles Sibthorpe with assistance from Christopher J. McNally (note 9), and made available to students at a price of Rs 3–4–0 (note 10) sometime in January 1883 (ref. 18). It included several of the then newly introduced pharmacopeial formulae used in MGH, rules concerning compounding and dispensing of medicines in MGH, distribution of diets to patients, and directions for a comprehensive clinical examination of patients. R. W. Cockerill (note 11) (Professor of Surgery, MMC) wrote a chapter, 'how to deal with patients requiring surgery'. E. F. Drake-Brockman (note 11) (Professor of Ophthalmology, MMC) and A. M. Branfoot wrote chapters on ophthalmology and midwifery, respectively, while J. Maitland wrote one on antiseptic method of surgical dressing, which were new. A short notice about this book can be found in the April 1883 issue of the *Indian Medical Gazette* (*IMG*), Calcutta. The *IMG* notice captures most of the details of this volume (Figure 2 *b*)[19]. The statement (ref. 19, p. 112), 'Though originally compiled for local use, its contents are of general value', suggests that the *Manual* was used at that time only within MMC. The anonymous author of the *IMG* notice saw merit in this book being made available to students in medical colleges of other presidencies in India. The remark[19] on the absence of a section on 'emergency medicine' in the 1883 edition is noteworthy.

A little above the publisher's details on the cover page as well as on the fly leaf, this edition includes an ornate line sketch of a 'hamsa hand' encircled by *ourobóros*, which evades explanation in MMC's context, because both these are symbols of significance in Arab mythology and mysticism[20,21]. Notably the crest of MMC presently includes the hamsa hand, but no *ourobóros*, placed just above the caduceus.

Third edition

Branfoot *et al.*[13], the editors of the fourth edition indicate that this edition of the *Manual* was published a few years before 1894. According to them (ref. 13, p. v):

> 'The third edition of the Manual having become exhausted, the preparation of a fourth edition has become necessary'.

Work towards organizing the fourth edition started in 1894. Nothing further can be said, since no copy of the third edition is available.

Fourth edition

The need for a fourth edition of the *Manual* was recognized in 1893 (ref. 13) and it was published in 1897. What is meant by 'need' is unclear: it could be that copies of the previous edition were exhausted; it also could mean that the science of medicine had changed so significantly that a revision was necessary. Whatever that be, in the meantime, Charles Sibthorpe – the compiler and editor of the second and third editions – was promoted as Surgeon-General, Madras Medical Department, which necessitated his movement out of MMC in 1894. On leaving MMC, he handed the responsibility of publishing the *Manual* to the Principal and the Academic Council of the MMC (ref. 18, p. v):

> 'In a letter to the Government of Madras, dated 8th September 1894, Surgeon-Major-General C. Sibthorpe proposed to hand over his interest in the Clinical Manual to the Government of Madras on the condition that the Principal of the Medical College and the College Council would undertake the re-editing of the book, and that any profit from its sale should be devoted to founding a prize for the students of the Medical College, the rules and conditions for this to be left to the College Council to determine.'

The Government of Madras (Government Order #184, Educational, 1 March 1895) accepted Sibthorpe's offer. Following this, the Academic Council of MMC constituted a revision committee consisting of Branfoot (Principal, MMC) – President, Maitland and Smyth (Professors, MMC) – members, to which the responsibility of bringing out the fourth and 1897 edition was invested. Whether Sibthorpe's request to found a prize from the profit made from the sale of the fourth edition of the *Manual* was complied with is unclear in spite of our best efforts to verify its existence (note 12).

Structure of the fourth edition

This edition retains the same title as in the second and third editions, and additionally includes 'by Charles Sibthorpe', followed by 'revised and partly rewritten by various authors'. Unlike the previous editions published by Higginbotham & Company in Madras, the fourth edition was published by the Government of Madras, printed at the Madras Government Press. The 1897 edition[13] includes a reproduction of the preface to the 1883 (second) edition by Sibthorpe in

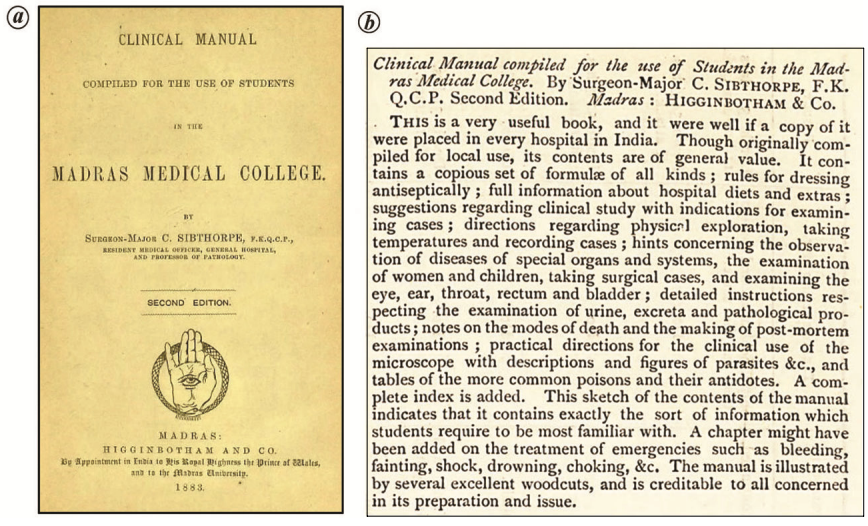


Figure 2. (***a***) Cover page, *Clinical Manual for India*[18]. (***b***) Announcement notice of the *Clinical Manual for India*[19].

pages vii–viii, but is labelled as the 'preface to the first edition'.

The text in this edition is presented in two parts (I, II) and two appendices (A, B). Part I opens with a brief chapter on the rigour and intensity of medical learning, pre-learning requirements (such as a pass in the First Examination in Arts (F. A.) – a two-year intermediate class between high school and university study), and learning techniques. Part I includes 23 chapters that deal with clinical examinations of different internal organs and external body parts, and diagnosis of various illnesses. Part II includes eight chapters that are of general relevance in medical training, such as conduct of post-mortem examinations and dieting. The appendices include a reproduced text of the curriculum and changes made in 1896–1897 (Appendix A) and a brief note on the sero-diagnosis of enteric fever by John Smyth (Appendix B). In high probability, Smyth's note on the sero-diagnosis was a last-minute addition to this *Manual*. There are 33 illustrations – eight 'plates' and 25 'figures' and a two-column subject index can be found in pages 398–415.

India ink line sketches, labelled as figures, are sharp and informative (Figure 3). The plates appear strange because they are ammonia prints in cyanotype tone (note 13) that are customarily used in the civil engineering industry and not usually used in medical textbooks. Ammonia prints, done at the Survey Office, Madras (indicated at the bottom of some plates), are intriguing because the technique for elegant reproductions of ink and hand-coloured illustrations was well known in the 1890s (ref. 22). Moreover, students learning art at the School of Industrial Arts (MSIA) established by Alexander Hunter (note 14), then in Popham's Broadway, Madras, were trained in creating high-quality artworks of human anatomy and medicinally important plants in the 1850s. Hugh Cleghorn (note 14), teaching materia medica in MMC in the 1850s utilized MSIA students in preparing anatomical artworks for teaching at MMC[23]. Nonetheless, the blueprint plates in the 1897 edition of the *Manual* are adequately detailed and legends are explanatory (Figure 4).

Table 1 lists the names of surgeons who wrote chapters and the titles of chapters in this edition. All chapter authors were MMC academics, who held

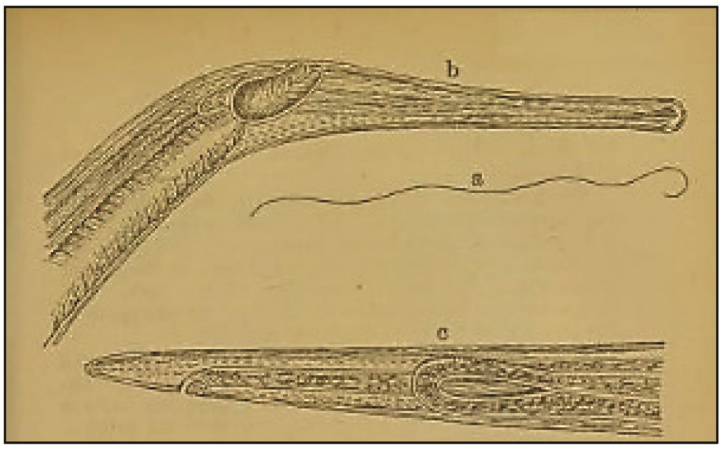


Figure 3. India ink sketch ('figure' facing p. 72, ref. 13). (a) *Filaria bancrofti* (natural size), (b) Head and neck, (c) Tail, Lithographed in Survey Office, Madras, 1897. Presently, *F. bancrofti* is *Wuchereria bancrofti* (Nematoda: Onchocercidae).

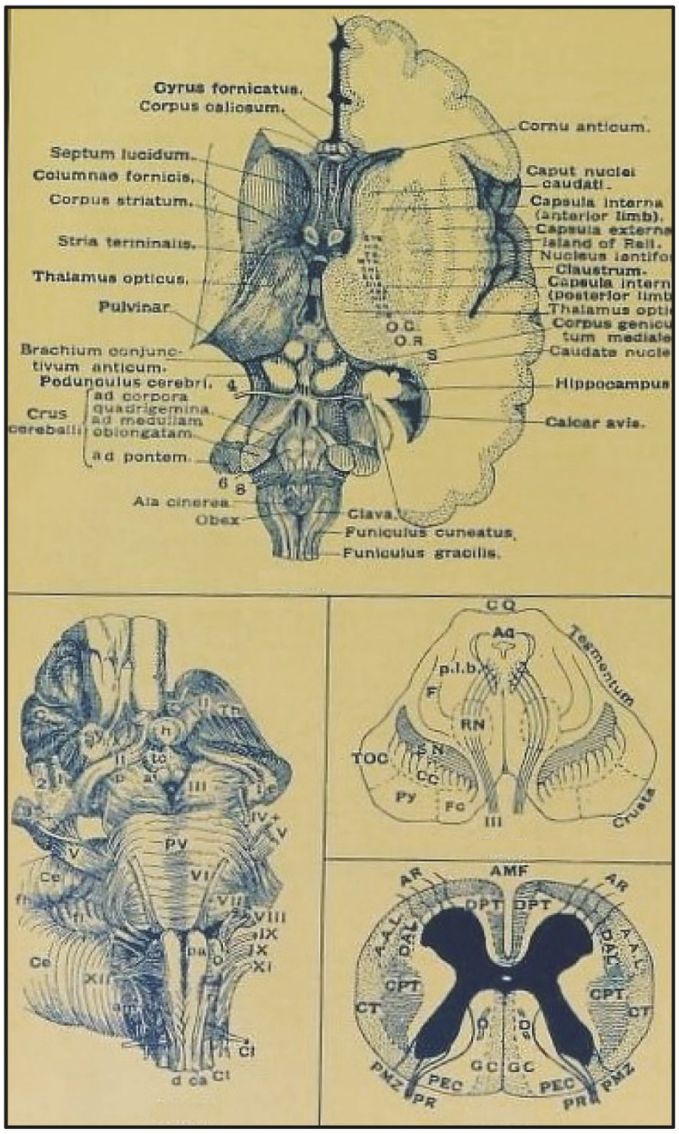


Figure 4. A cyanotype blueprint (Plate V, facing p. 84, ref. 13). Views of the brain and spinal cord.

Table 1. Chapter titles, authors and pages: *Clinical Manual of India*, 1897, 4th edn

Part 1 – On clinical study and the clinical examination of patients	
1.	'Clinical study' – Allan Evan Grant (Surgeon-Captain) (pp. 1–9).
2.	'Clinical examination and note-taking of medical cases' – A. E. Grant (pp. 9–27)
3.	'Clinical examination and note-taking of surgical cases' – John Maitland (Surgeon-Lieutenant-Colonel) (pp. 27–39)
4.	'Methods of physical examination' – A. E. Grant (pp. 39–46).
5.	'Examination of the respiratory system' – Gardner George Giffard (Surgeon-Captain) (pp. 47–58).
6.	'Examination of the circulatory system' – G. G. Giffard (pp. 58–71)
7.	'Clinical examination of diseases of the lymphatic system' – J. Maitland (pp. 71–74)
8.	'Examination of the abdominal organs' – Donald Frederick Dymott (Surgeon-Major) (pp. 75–80)
9.	'Summary of the anatomy and physiology of the nervous system' – A. E. Grant (pp. 80–102)
10.	'Clinical examination of the nervous system' – A. E. Grant (pp. 102–128)
11.	'The body temperature in health and disease' – A. E. Grant (pp. 128–135)
12.	'Clinical examination of skin diseases' – D. Simpson* (Surgeon-Captain) (pp. 135–147)
13.	'The examination of the ear' – John Smyth (Surgeon-Major) (pp. 148–154)
14.	'Clinical examination of diseases of the throat and nose' – J. Smyth (pp. 154–158)
15.	'Clinical examination of diseases of the eye' – Robert Henry Elliot (Surgeon-Captain) (pp. 158–163)
16.	'The examination of the rectum' – J. Maitland (pp. 163–166)
17.	'The examination of the bladder' – J. Maitland (pp. 167–169)
18.	'Clinical examination of gynaecological cases and observations on the management of labour and the puerperal state' – Arthur Mudge Branfoot (Brigade Surgeon-Lieutenant-Colonel) (pp. 170–175)
19.	'The examination of children' – A. M. Branfoot (pp. 176–178)
20.	'The examination of the insane' – Charles Henry Leet-Palk*** (Surgeon-Captain) (pp. 179–186)
21.	'Clinical observation of cases of contagious disease' – A. E. Grant (pp. 156–194)
22.	'The examination of the urine' – D. F. Dymott (pp. 194–212)
23.	'The examination of intestinal discharges' – D. F. Dymott (pp. 213–216)
Part II	
1.	'The treatment of emergencies' – J. Smyth (pp. 217–252)
2.	'Directions for the employment of antiseptics in surgical practice' – J. Maitland (pp. 252–268)
3.	'Post-mortem examinations' – J. Smyth (pp. 265–297)
4.	'The use of a microscope' – R. H. Elliot, 'note on the malarial parasite' by Ronald Ross** (Surgeon-Major) (pp. 297–320; Ross's note: pp. 303–307)
5.	'Poisons and antidotes' – John Lawrence van Geysel (Surgeon-Major) (pp. 320–325)
6.	'Dieting of the sick' – A. N. Branfoot (pp. 326 – 351)
7.	'Indigenous drugs' – Robert Robertson (Surgeon-Captain) (pp. 352–362)
8.	'Formulae' – G. G. Giffard (pp. 363–392)
Appendices	
A.	Extract from the annual report of the Principal, Madras Medical College, Madras, for the year 1896–97 – A. M. Branfoot (pp. 393–394)
B.	'Note on sero-diagnosis of enteric fever' – J. Smyth (pp. 395–396)

*Only limited details of D. Simpson were traceable. He was the Acting Civil Surgeon, Cannanore in 1893, who was transferred to Madras Medical College (MMC) as the Professor of Pharmacy and Materia Medica. On transfer to Madras, he also held the position of Second Surgeon, MGH.

**Ronald Ross never served in MMC at any stage of his life. Branfoot *et al*. should have sought a note on the malarial protozoan for the fourth edition of the *Manual*, since Ross was studying the malaria problem and transmission of the protozoan by the mosquito in 1893–95.

***Only limited details of C. H. Leet-Palk were traceable. A statement occurs in Thurston and Rangachari[43] (p. 241): 'For the following tabular statement of admissions into the Lunatic Asylum, Madras, I am indebted to Capt. C. H. Leet-Palk, I.M.S.', which suggests that he taught psychiatry in MMC and possibly superintended the Lunatic Asylum.

conjoint positions at MGH, except Ronald Ross, who was then reporting to the Chief Medical Officer, Secunderabad–Belgaum District Medical Service in the Deccan.

Details from selected chapters

To illustrate the quality of information included in this edition, we supply summaries of four chapters: the circulatory system by Gerald George Giffard (Part I, chapter 6, pp. 51–71), contagious diseases by Arthur Grant (Part I, chapter 21, pp. 156–194), use of a microscope by Robert Henry Elliot (Part II, chapter 4, pp. 297–320, including a note on the malarial parasite by Ronald Ross, pp. 303–307), and sero-diagnosis of enteric fever by John Smyth (Appendix B, pp. 395–396).

Examination of the circulatory system by Giffard

Giffard provides details of examination of the circulatory system, starting with external examination, palpation, percussion and auscultation of the heart. He reinforces that the apex beat is the most vital and should be listened to first (p. 59) (note 15):

> 'The force of the 'apex-beat' depending, as it does, on the force of the cardiac contraction, will vary both in health and in disease. In health, except during and after violent exercise, nothing is seen but a slight heaving at the spot indicated above.'

The word 'above' in the preceding quote needs to be understood as (p. 59):

> 'The apex-beat of the normal heart in a healthy male is seen one and a half inches (3.8 cm) below and one inch (2.5 cm) to the sternal side of the left nipple, in the fifth inter-costal space. Its relation to the nipple in the female is so variable as to be useless. Two and a half inches from the left border of the sternum in the fifth inter-costal space is the place to expect to find it in full-grown women.'

Several such useful tips for a newly starting medical student in diagnosing heart-related problems are available in Giffard's chapter (pp. 66–67). A few of the tips given by him are shown here as examples. Visible venous pulsation is vital in diagnosing a heart disease. Yet, visible arterial pulsation is rarely recognizable in normal condition and is sometimes highly masked when the vessels are atheromatous and tortuous, common in the elderly. In marked enlargements of the heart, especially in slim persons, pulsations can be felt between the second, third, fourth and fifth ribs, immediately to the left of the sternum. Bulges on the chest depend on aneurysms of the aortic arch. They invariably commence above the fourth rib and present similar to localized tumours. Hypertrophy of the heart, pericardial effusion and mediastinal tumours can also cause localized bulges, but almost always below the level of the fourth rib. The apex beat will be either absent or faint when the heartbeats are feeble and when the apex of the heart can no longer beat against the chest wall because of fluid effusion in the pericardium. Marked tympanites and ascites and other forms of abdominal distension will occasionally displace the apex beat upwards. The apex beat will rarely be found to the right of the sternum when there is much effusion into the left pleural cavity, and the heart is pushed far to the right side of the chest. The differentials that a student needed to know in the context of mitral and aortic valve diseases – such as mitral and aortic obstructions and regurgitations are supplied in reasonable detail.

The sphygmograph used for the graphic recording of pulse waves and rate was a mechanical device popular in the later decades of the 19th and early decades of the 20th centuries. Karl von Vierordt (1818–1884) of Würzburg, Bavaria, designed the first sphygmograph in 1854 by amplifying the radial pulse. The early sphygmograph compressed the radial artery proximally with the application of measured weights and disappearance of the pulse allowed determination of the systolic blood pressure. Such early sphygmographs enabled reading, although indirectly, the mechanical aspects of heart contraction and relaxation (Figure 5). Alfred Henry Garrod of Cambridge, UK, explained the radial pulse wave form as sphygmosystole and sphygmodiastole[24] – referred as the systole and diastole today. Before the discovery of electrocardiography[25], sphygmography was the only available method to know and evaluate arrhythmias. Giffard (p. 69) reinforces sphygmography as a highly useful technique in understanding human circulatory system:

> 'A sphygmographic tracing is generally taken over the radial artery. The tracing is made up of a series of curves or pulsations, each of which corresponds with a completed heart beat (figure 1 in the original text, reproduced here as Figure 6 *a*). Each typical curve consists of a systolic and diastolic part, corresponding respectively to the period of contraction and dilatation of the ventricle; or it may be divided into: (a) Line of ascent, (b) Summit, (c) Line of descent, in which may be observed two or sometimes three secondary waves with intervening notches, named, first or distension wave; second or great trace, and third wave, which lies between the other two, but is usually absent.'
>
> 'The line of ascent, summit-wave, or percussion-impulse (*a* to *b*, figure 2 in the original text; reproduced here as Figure 6 *b*) is produced by the more or less sudden contraction of the left ventricle. Then the arterial walls partially collapse, which is indicated by the first part of the line of descent, ending in the first notch (*b* to *c*). A wave of blood next passes out of the heart into the aorta, and this gives rise to the first secondary wave or leave of distension (*c* to *d*). Then there is a reflux of blood towards the heart, by which the aortic valves are closed, which corresponds to the portion of the line of descent from *d* to *f*, ending in the great or aortic notch *f*. During this reflux a vibration may occur, causing the third secondary wave (*e*). The aortic valves are then suddenly closed by the pressure of the reflux current of blood, and this accounts for the great secondary wave (*f* to *g*). Finally, the blood flows onward and, as a result, the line of descent is continued from *g* to *h*.

Giffard further says (p. 70):

> 'Pressure applied over an artery generates a murmur. This can be heard well in the third part of the subclavian artery. In contrast, pressure inflicted by either a tumour or enlarged glands or fibrous thickenings can also produce an arterial murmur. An example of this is the subclavian murmur heard either above or below the left clavicle in some instances of phthisis'.

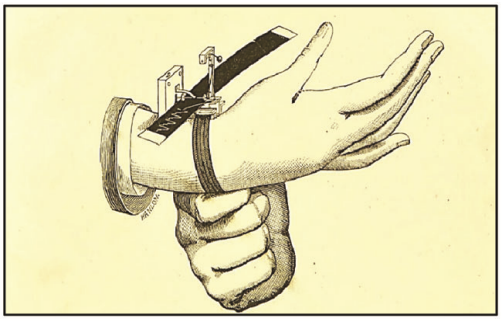


Figure 5. Application of Dudgeon's sphygmograph (source: Dudgeon[42]).

Giffard concludes his chapter with a clarification on the different kinds of murmurs that are heard while listening to the heart. A murmur highly similar to those heard in valvular heart disease is also produced in an artery, when pressed upon with the diaphragm of the stethoscope. In disease, murmurs are conducted from the heart, especially from the aortic valves to the arteries at the base of the neck, and in some unusually loud cardiac murmurs, the sounds can be heard in the femoral, and even in the radial arteries. In aneurysms, a peculiar form of murmur and swashing sound can usually be made out.

Contagious diseases by Grant

Arthur Grant's chapter on contagious diseases (pp. 186–193) refers to many infectious diseases common in southern India. Clarifying the terms 'contagion' and 'contagium', he explains the term 'incubation period' (latency) and the precautionary isolation period required for the sufferer. Grant talks about various fatal contagious diseases known at that time, such as typhoid (referred as the 'typhoid fever'), variola, varicella, scarlet fever, measles, relapsing fever, plague and cholera. Referring to typhoid, he specifically mentions that the usually dark skins of Indians will not manifest any obvious rashes and therefore the diagnosis needs to be made with care: a highly useful clue to a young medical practitioner, who could be misled by the poor presentation of external rashes.

An unnumbered table, adapted from the data collected by the Association of Medical Officers of Schools in England (ref. 13, p. 191) (slightly modified and presented as Table 2), includes some fascinating details on the isolation periods for patients suffering contagious diseases. The table supplied by Grant also refers to 'ringworm' (dermatophytosis, tinea, caused by different species of fungi) but mentions (p. 191), 'may be considered cured, when the affected patches of the skin have resumed their normal appearance'.

Use of microscope by Elliott

With Carl Zeiss Aktiengesellschaft (Jena, Germany) manufacturing microscopes and other optical instruments from November 1846, the use of microscopes became common and popular in science in general and medical science in particular throughout the world. Therefore, it does not surprise that a chapter on the relevance of microscopy in medical learning, written by Elliott an ophthalmic surgeon in Madras, was included in this *Manual*. He explains basic details of simple and compound microscopes and how to diligently handle a microscope to obtain the best outcomes (pp. 297–300). Elliot also explains preparation of blood smears and how to distinguish the 'coloured' (red) and 'colourless' (white) corpuscles, leucocytosis, action of different reagents on blood, and infective microorganisms that cause anthrax, tuberculosis, leprosy, pneumonia, and malaria, for instance (pp. 300–302). For preparing blood smears and use of reagents to detect pathogenic microorganisms he refers to Michael Foster's book[26] published in London, and for the morphological recognition of various pathogenic microorganisms he consults the book by Christopher John McNally[27] published in Madras. A specific reference to *Spirochaete obermeiri* (currently *Borrelia recurrentis*, Spirochaetes: Spirochaetaceae) for its role in the relapsing fever (borelliosis) can be found (p. 302). Except morphological details of the bacterium, nothing further is mentioned about borelliosis. In this section, Elliott describes microscopic methods of determination of haemoglobin levels in blood and Ehrlich's method of staining tubercle bacilli.

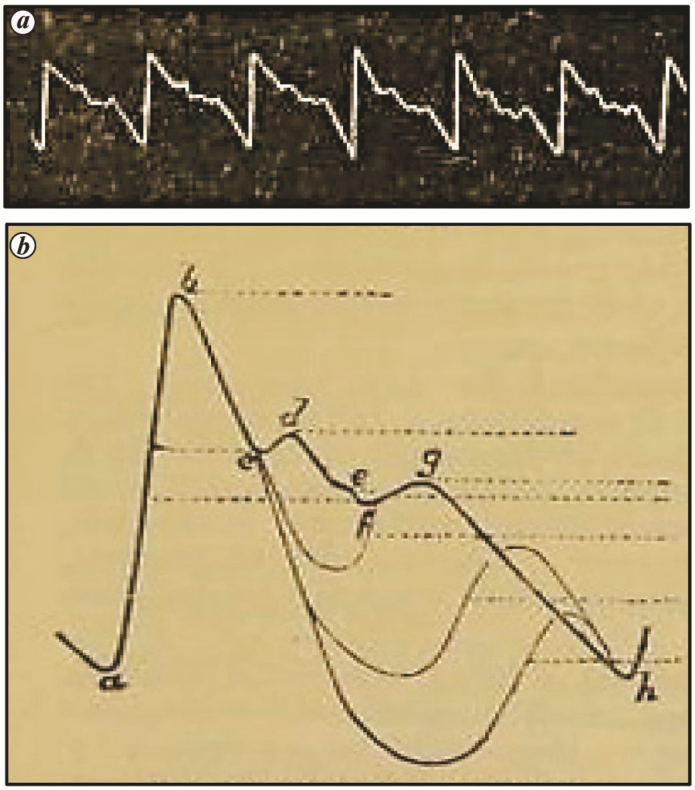


Figure 6. ***a***, Sphygmographic tracing[13] (p. 69, labelled 'Figure 1'). ***b***, Enlarged sphygmographic curve[13] (p. 69, labelled 'Figure 2').

Table 2. Isolation periods of contagious diseases*

Disease	Period (days)
Asiatic cholera	10
Chickenpox	18
Diphtheria	12
Typhoid fever	23
German measles and epidemic roseola	18
Influenza	5
Measles	16
Mumps	25
Scarlet fever	14
Smallpox	18
Whooping cough	21

*Adapted from Arthur Grant, *Manual* (ref. 13, p. 191).

Sero-diagnosis in enteric fever (or the typhoid) by Smyth

John Smyth explains the diagnosis of typhoid by describing both the microscopic method and the new serologic method described by Georges-Fernand Widal[28], a physician at l'Hôpital Côchin, Paris, in the 1900s. The Widal test, building on the principle of agglutination of *Salmonella typhi*, demonstrated 'agglutinin' – an antibody – in the serum of an infected patient, against the flagellar and somatic antigens of *S. typhi*. Being the then latest technique[28], Smyth's elaborate notes included in this *Manual* impress. However, Smyth in this chapter does not mention William Osler[29], who refers to serodiagnosis in passing in his book (pp. 1–38).

Remarks

The most impressive element of the *MMC Manual* is that it is the collective effort of several academic staff of MMC, presenting a comprehensive study guide to MMC students between 1878 and 1897. Although the specific purposes for introducing this study material have not been mentioned, very likely the changes that were occurring in the educational milieu of Madras, such as establishment of the University of Madras and creation of the Faculty of Medicine within it, and the awareness of enhancing rigour in the quality management of medical education in Britain were the possible forces that led to the publication of this *Manual*.

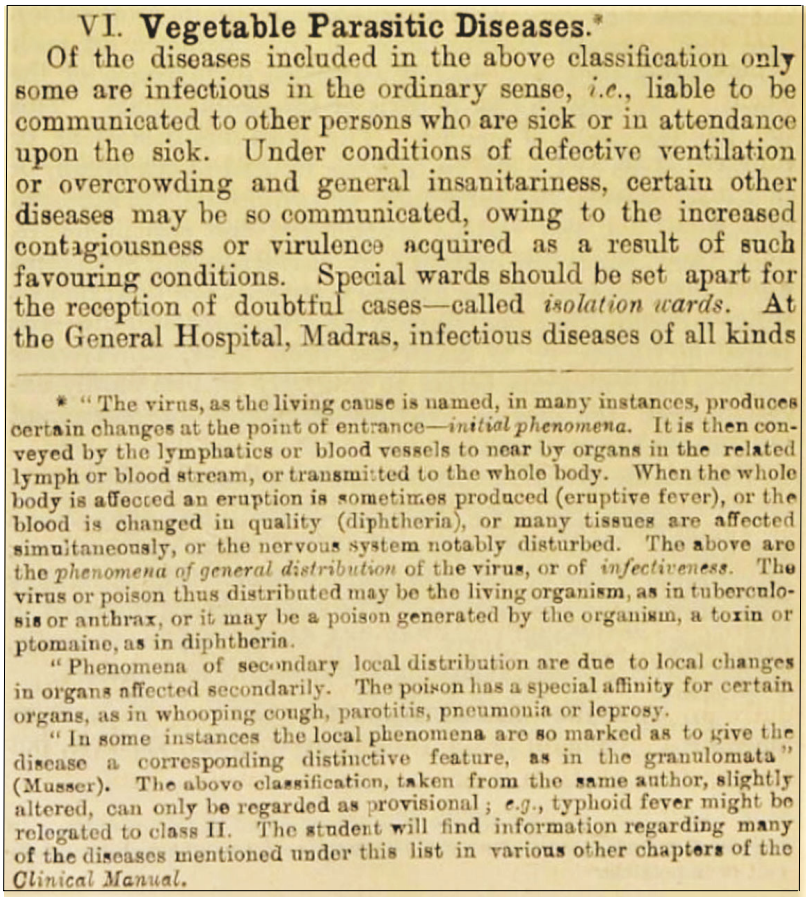
The style of presentation and chapter organization in this *Manual*[13,18] bear considerable resemblance to James Finlayson's (note 16) *Clinical Manual for the Study of Medical Cases*[17]. The general layout and contents in both books are similar: for example, chapter II in Finlayson (1878, pp. 33–49) is 'Examination and reporting of medical cases', whereas in Branfoot *et al.*[13] two chapters deal with this subject: 'Clinical examination and note-taking of medical cases' (pp. 9–27) and 'Clinical examination and note-taking of surgical cases' (pp. 27–39). Finlayson[17] (p. vii) in the preface mentions that:

> '… the want has often been felt of some volume to which students might be referred for assistance in the study and reporting of medical cases. The methods of case-taking sketched out by various teachers are no doubt useful in their way; but they do not give the amount or the kind of assistance really required in the investigation of a difficult case'.

An identical objective could have influenced the *MMC Manual*[13]. Nevertheless, that a few chapters in the *Manual* do not occur in Finlayson's book needs recognition. The *MMC Manual* includes diagnosis of illnesses and diseases that commonly occur in the warm, humid, subtropical environment of Madras and India. Whereas the narratives pertaining to diagnosis of non-infectious diseases that commonly occur in the subtropical Madras on the one hand and in temperate Britain on the other are nearly identical. These suggest that the *MMC Manual*[13,18] was, in high likelihood, modelled following the Finlayson editions of the *Clinical Manual for the Study of Medical Cases*, with a few new sections and chapters addressing issues relevant to Madras.

The first recognition of viruses was in 1892. In 1898, Martinus Beijerinck (Wageningen, The Netherlands) clarified and determined the virus inducing tobacco-mosaic disease[29]. In the same year Friedrich Loeffler and Paul Frosch, students of Robert Koch, discovered the foot-and-mouth-disease virus in livestock[30]. The yellow-fever virus affecting humans was characterized by the American-army surgeons Walter Reed, James Carroll and Aristides Agramonte in 1901 (ref. 31). Viruses were determined in these studies using Chamberland filters developed by Charles Chamberland, a colleague of Louis Pasteur in Paris in 1894 (ref. 32). Because the *MMC Manual* was published in 1897, Arthur Grant refers to viral diseases, using an archaic term 'vegetable parasitic diseases' (pp. 188–190). Given that little was known about 'human pathogenic viruses' in the late 1890s, this section provides an interesting read (Figure 7).

The debilitating human disease of significant proportions in India – leprosy[33] – and



VI. **Vegetable Parasitic Diseases.***

Of the diseases included in the above classification only some are infectious in the ordinary sense, *i.e.*, liable to be communicated to other persons who are sick or in attendance upon the sick. Under conditions of defective ventilation or overcrowding and general insanitariness, certain other diseases may be so communicated, owing to the increased contagiousness or virulence acquired as a result of such favouring conditions. Special wards should be set apart for the reception of doubtful cases—called *isolation wards*. At the General Hospital, Madras, infectious diseases of all kinds

* "The virus, as the living cause is named, in many instances, produces certain changes at the point of entrance—*initial phenomena*. It is then conveyed by the lymphatics or blood vessels to near by organs in the related lymph or blood stream, or transmitted to the whole body. When the whole body is affected an eruption is sometimes produced (eruptive fever), or the blood is changed in quality (diphtheria), or many tissues are affected simultaneously, or the nervous system notably disturbed. The above are the *phenomena of general distribution* of the virus, or of *infectiveness*. The virus or poison thus distributed may be the living organism, as in tuberculosis or anthrax, or it may be a poison generated by the organism, a toxin or ptomaine, as in diphtheria.

"Phenomena of secondary local distribution are due to local changes in organs affected secondarily. The poison has a special affinity for certain organs, as in whooping cough, parotitis, pneumonia or leprosy.

"In some instances the local phenomena are so marked as to give the disease a corresponding distinctive feature, as in the granulomata" (Musser). The above classification, taken from the same author, slightly altered, can only be regarded as provisional; *e.g.*, typhoid fever might be relegated to class II. The student will find information regarding many of the diseases mentioned under this list in various other chapters of the *Clinical Manual*.

Figure 7. A clip from Branfoot *et al.*[13] (p. 188) illustrating details of what we today know as pathogenic viruses (to continue reading, please refer to the original).

the dreaded disease – cholera – that claimed many lives in India in the 19th century India[34], have been referred to minimally in this *Manual*. On leprosy, references in passing occur (pp. 125, 139). In p. 142, a three-line note on 'leprous eruptions' occurs under 'eruptions'. Cholera symptoms and detection have been described in slightly greater detail than leprosy. However, importantly, Donald Dymott, the author of this chapter, highlights the 'comma-shaped cholera-inducing bacterium' described by Robert Koch[35] from the samples he obtained from cholera patients in Calcutta in 1884. This inclusion impresses as a critical point of knowledge transfer to medical students at MMC.

Conclusion

The *Clinical Manual for India* by the academic staff of MMC impresses as a landmark volume covering diverse aspects of general medicine, reasonably comprehensively, although its strong resemblance to Finlayson's *Clinical Manual for the Study of Medical Cases*[17] cannot be overlooked. Priced modestly, this book should have served its purpose well; otherwise, MMC would not have prepared and printed four editions in two decades. When viewed as an educational tool enabling MMC students to learn better with greater confidence, this *Manual* leaves an indelible mark in the pages of medical chronicles of India. It speaks about various common diseases and health setbacks then prevalent in India in general and in Madras in particular, and their smart diagnoses. Importantly, it includes information on the then state-of-the-art technology, such as the 'sphygmograph' and various biochemical (indicated as 'physiological chemistry') tests that were popular then. Several chapter authors cite a few contemporary journal articles as footnotes. However, the drawback in such footnoted references is that they are incomplete, lacking the article title, journal name, year of publication, volume number and pagination. Also, no end-list of cited references exists. A striking omission throughout the book is that no description of management tactics for the diseases and other health problems, such as medication and/or surgical options, occurs. Possibly, management tactics were taught separately during either the practical training of students – such as hospital rotations – or the teaching of subjects, such as materia medica and classes on surgery.

The *MMC Manual* also served as a standard book of reference for pharmacopeial formulae used in MGH. In the early years of the 1870s, coinciding with the start of the MB&CM programme and shutting down of the GMMC programme in MMC, medical students were trained in the preparation and dispensation of medicines. George Bidie, Professor of Botany at MMC (1866–70), seems to have published the *Handbook of Practical Pharmacy* for student use, which, unfortunately, is not traceable. Looking at the outlay and contents of the *MMC Manual*, what is inferable is that the students pursuing either MB&CM or LM&S were trained to practice as complete and independent doctors with comprehensive training in pathology, pharmacy, medicine and surgery, and adequately grounded in non-clinical subjects such as human physiology and biochemistry.

As far as we could determine, the *MMC Manual* was the only locally printed study material available to students in an Indian medical college in this period. Perhaps this was the reason why the author of the *IMG* announcement[18] mentions that this *Manual* should be available to students in medical colleges of other presidencies in India.

Notes

1. Arthur Mudge Branfoot trained at the St. Guy's Hospital, London. He entered the Indian Medical Service in 1872. Between 1872 and 1879, he taught Midwifery at the Madras Medical College (MMC). J. Smyth was 'John Smyth, M.D.', who worked in MMC at the rank of Surgeon-Major in the 1890s. He taught diseases of the abdomen and kidneys at MMC. John Maitland, a general surgeon, was the personal physician to Governor Arthur Lawley Wenlock in Madras in 1891. He was the principal of MMC in 1903–1904.
2. It is but vital that we say 'medical students' here, because at this time students also pursued formal diplomas in nursing and pharmacy (Chemists and Druggists).
3. Full bibliography of these books is supplied in the end-list of references in this article (see # 16–18).
4. M D titles were also offered by the University of Madras soon after the Faculty of Medicine was established in 1863. The regulation for M D in the University of Madras Calendar 1877–78 (ref. 14, p. 78):

   'Candidates who have obtained the degrees of B A and M B and C M will be permitted to proceed to the degree of M D without examination, on producing a certificate of having been engaged two years in the practice of their profession subsequent to having taken the degree of M B and C M of this or of some other recognized University. Each candidate must produce a testimonial, signed by at least two Doctors of Medicine that he is in habits and character a fit and proper person for the degree of Doctor of Medicine.'

   The above, was applicable only to holders of B A and M B&C M titles. For others not meeting the criteria, an M D could be earned through an examination after completing five years of training in a chosen field of medicine and duly certified by at least two senior M D holders of high reputation.
5. What is indicated here as the 'General Medical Council of Great Britain and Ireland' should be read as the 'General Council of Medical Education and Registration of the United Kingdom', which was a statutory body established through the Medical Act of 1858 in UK. It was popularly referred as the 'General Medical Council' (GMC). GMC controlled medical education, licensing of doctors, and maintaining 'good' medical practice in the UK[35].
6. Charles Sibthorpe joined the Madras Medical Department as an assistant surgeon in 1870. He came to Madras after qualifying as a Fellow of the King and Queen's College of Physicians (F.K.Q.C.P.), Dublin[36], that later metamorphosed into 'F.R.C.P. of Ireland'. He was the resident surgeon ('Resident Medical Officer' today) at MGH during 1875–1880. Sibthorpe taught pathology in MMC. He was an elected Fellow of the University of Madras and a Member of the Royal Irish Academy. He was elevated as the Surgeon-General, Madras Medical Department in 1894, and was awarded the 'Companion of the Bath' in 1894. Sibthorpe wrote and organized the second (1883) and third (no date available) editions of the *Clinical Manual for India*. He retired from active service in 1900.
7. In the 19th century, the terms 'materia medica', 'pharmacopoeia', 'dispensatory', and 'codex' were used interchangeably to refer to a document that included the formulae outlining the ingredients, their values, methods of preparation, and use as medicinal substances[37]. Many such documents written in the 18th, 19th, and early 20th century India exist[38].

8. Five-year long Graduate of the Madras Medical College (GMMC) diploma programme existed in MMC between 1847 and 1867. The new university degree programme MB&CM (equivalent to the modern MBBS; five years of study) replaced it in 1867. A four-year long LM&S (Licentiate of Medicine and Surgery) also existed in the junior medical department of MMC, which persisted until the early decades of the 20th century.
9. Christopher J. McNally lectured on topics in materia medica in MMC in the 1880s. He wrote the *Sanitary Handbook for India with Special Reference to Madras Presidency*[27]. In the 1883 edition of the *Manual*, Charles Sibthorpe spells McNally as MacNally.
10. The 'rupee–anna–paisa' coinage existed in India until 1957. One rupee consisted of 16 annas; one anna of six paisas.
11. Robert William Cockerill was later the Deputy Surgeon-General of the Madras Medical Department. Edward Forster Drake-Brockman joined Madras Medical Department as an Assistant Surgeon in 1869 and was mostly attached to the Madras Eye Infirmary (MEI), Egmore. He served as the relieving superintendent of MEI during 1873 (May–December) and 1875–77, and Superintendent during 1884–92. For more details on the medical work and science of Drake-Brockman, see Raman and Raman[39].
12. The personal website of a practising cardiac surgeon in Richmond, Virginia, USA, indicates that he won 'Sibthorpe Prize in Surgery, Madras Medical College' during his study time in MMC in the 1980s. However, the list of medals and prizes published by MMC does not include the Sibthorpe prize, nor is it listed in the website of the Tamil Nadu Dr M. G. R. Medical University, Chennai, to which MMC is presently affiliated.
13. Cyanotype prints were done through contact printing on light-sensitive papers, first developed by John Herschel in Britain in 1842 (refs 40, 41).
14. Alexander Hunter, a medical doctor with an artistic passion came to India to practice medicine in 1841. He established the country's first art-training school, the 'Madras School of Industrial Art' in 1850. Hunter will also be remembered for establishing the Photographic Society in Madras. Hugh Cleghorn (1820–95) was another Scottish medical doctor who taught in MMC in the 1850s. He pioneered forest management in India.
15. Highly likely the professors and students at MMC used the Cammann binaural stethoscope (for fascinating images of a few Cammann models of the 1900s, see Dittrick Medical History Center's webpage – https://artsci.case.edu/dittrick/2014/09/25/listening-to-the-body-stethoscopes-in-1900/; accessed on 12 April 2020), since today's popular Littmann brand came into existence in the 1960s. Binaural stethoscopes were used throughout the world from 1851, although monaural stethoscopes were also used by clinicians in the early 1900s.
16. James Finlayson (1840–1906) was a physician in the Western Infirmary, Glasgow (WIG), UK. As a lecturer in Clinical Medicine at WIG, he published the *Clinical Manual for the Study of Medical Cases*, an edited volume, in 1878, involving the participation of his colleagues: William Gairdner (WIG), Alexander Roberson (The Royal Infirmary, Glasgow, (RIG)), Joseph Coats (WIG), William Stephenson (University of Aberdeen), and Samson Gemmell (RIG). Revised editions of the *Manual* appeared in 1886 and 1891. The same physician-colleagues of Finlayson contributed to the revised editions as well.

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