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MEDICAL EDUCATION IN THE UNITED STATES AND IN INDIA.

WE have received from Major E. W. C. Bradfield, I. M. S. a copy of his report dated Dec. the 13th, 1921, to the Surgeon General with the Government of Madras, after return from deputation to the United States. It is a report which will give those in charge of medical schools in India "furiously to think." "In the United States," writes Major Bradfield, "the conception of a University Medical School includes not only the treatment of the sick and the teaching of the student, but also active investigation of disease. A similar ideal exists in English Schools but it is characteristic of the American spirit that this should be more systematised, more standardised, and if I may say so, more card indexed. In India the need for research has been obscured by the urgent necessity of providing medical relief in a country where the medical profession was almost non-existent; while also the trustees of medical education (Government) in their desire to keep the cost of medical education within a very limited budget have failed to appreciate the fact that a teacher, in order to fill his class with enthusiasm for medicine as a science must himself be a worker."

Major Bradfield's account of the different institutions visited is full of interest. At the College of Physicians and Surgeons, Columbia University, the minimum requirements for admission are a two years course of previous college education, whilst more than 60 per cent. of students admitted have put in a four years' college course and have already taken their B. A. before admission as medical students. Although there are some 700 applications a year for admission, admissions are limited to 100 a year, and the most strict selection practised. Chemistry and the preliminary scientific studies having been already acquired by the student before admission, two years are given to anatomy, embryology, physiology, pathology, pharmacology and allied subjects: followed by two years of medicine, surgery, and general work in the wards and dispensaries. For 400

students a teaching staff of 178 is maintained, including 38 professors. The courses are exceedingly thorough and special attention is paid to biology, whilst special clinics in many different medical and surgical branches are a special feature of the course. Inferior students are steadily weeded out during the course of training, and after passing the M. D. the student is expected to spend at least a year doing interne work before he commences to practise outside. The course on operative surgery is very thorough: and the student is led to human surgery through a course of animal surgery and animal pathology.

At the Presbyterian Hospital in New York the special features are a record room, the unit system and the follow-up-system for patients. In the record room a staff of one head clerk and four record clerks are fully occupied with the filing and keeping of the records for a hospital with only 200 beds. In the unit system every patient is considered as a separate unit, and every note on his case from every department concerned is bound in a separate volume:—a volume which often contains invaluable information if the patient again visits the hospital, perhaps years later. By the follow-up-system every discharged patient has to report on a certain date his state of health: and at a still later date to return for re-examination as to end results. Such terms as "cured" or "improved" are not permitted: a numerical estimation of the degree of improvement being used instead.

From New York, Major Bradfield travelled to Boston. Here at the Massachusetts General Hospital there are 158 doctors on the staff for 334 patients, with 28 additional residents. For the Harvard M. D. course there are 72 whole-time teachers, including professors for 472 students. Classes are confined to 100 students: and practical classes are formed in groups of 25 students each group working under a tutor. All attempts to increase the numbers of students have been vigorously resisted. The requirements for admission as a medical student are a previous degree in arts or science, and two years of completed college work in preliminary scientific subjects, with two modern languages. Set lectures are few: their place being more generally taken by conferences at which the students take as much part as the professors. "The trend of opinion in America is to train the student very

thoroughly in the scientific side of medicine and allow him to acquire his knowledge of the profession during an internship, the holding of which is practically considered compulsory." Anatomical teaching in Harvard does not consist of the dry bones of the subject: it is illustrated with X-ray plates and includes special instruction in embryology. The physiology course is almost entirely practical and the department fully staffed and very well equipped. An interesting feature of several of the Boston hospitals is the provision at the hospital for each of the consultant staff of private consulting rooms with separate entrances, where private patients are seen. By this means the consultant is on the premises and readily available during most hours of the day: whilst he is still able to carry on private practice.

Perhaps the highest standard of all exists at the John Hopkins University at Baltimore. For 360 students there is a provision of 16 professors, 14 associated professors, 70 whole-time assistant lecturers, whilst the clinical staff of the hospital,—numbering about 100,—also teach. 200 teachers to 360 students surely approximates almost to ideal conditions. The requirements for admission are again a university degree, two years of training in the preliminary sciences, and two modern languages.

"Medicine as taught at John Hopkins is essentially a science and the laboratory is in evidence throughout."

Other Schools reported on are the Cleveland Medical School, the Rush Medical College, Chicago, the Medical School of the Washington University and the Mayo Clinic; but sufficient has been quoted to give the general tenour of Major Bradfield's report. The following abstracts from his summary are too important to be abbreviated:—

Summary.

Any attempt to express an opinion on medical education in the United States of America after a short tour would appear to be presumptuous. Medical science, however, is essentially the same, whether taught in Europe or America, and since a brief study of new and interesting methods cannot fail to be a source of inspiration, I have thought it worth while to compare these methods with our somewhat unsatisfactory educational system in India.

2. Acknowledging, as every thinker must, the advantage of combining the spirit of research with teaching, if a College department is to remain alive and gain the enthusiasm of its students, I was for some

time puzzled to understand why such a very complicated system of laboratory instruction had sprung up in American medicine. No one, at the present time is very satisfied with medical education. The numerous papers and suggestions now appearing in American and British Medical Journals indicate that there are two schools of thought, the followers of one insisting that all medicine should be treated and acknowledged as pure science while others maintain that the profession is an art as well as a science. Probably Sir Clifford Allbutt who in his "New Birth of Medicine" speaks of the new birth as an "enlargement from an art of observation and empiricism to an applied science . . . from a craft of tradition and sagacity to an applied science" gives a truer conception; but such discussions do not meet my difficulty. The opinions I heard expressed by men who have devoted a good deal of thought to the subject of primary education in America were extremely interesting to me and it at once appeared how alike our conditions and difficulties are. "The American school boy suffers from a series of intensive courses, during which he tends to learn a smattering of many subjects and does not master one thoroughly. He has little time to think for himself. He does little home reading and has little help educationally." Compare our Indian students and note how alike the conditions are! Crammed for his School-Leaving Certificate, crammed again for his Intermediate, generally in large classes receiving no individual attention, he has little time to think but thanks to a retentive memory which is almost a national characteristic, he manages to obtain sufficient marks to pass the qualifying examination. His home training is all against the development of scientific thought. Surely if it is necessary to steep the American student in an atmosphere of research and critical observation, the need is far greater with the Indian student.

3. The influence of Colleges like Harvard and John Hopkins on the advance of medical education in the States has been very great, while the Dean of John Hopkins can boast that 60 per cent. of his students eventually become professors, teachers or consultants. The Medical College should be the John Hopkins of Madras, but can we really say that it fulfills such a destiny? Its graduates are expected to provide teachers for the five Medical Schools of the Presidency but such appointments are only filled with difficulty. That the teaching provided at these schools is poor and the students merely crammed with a knowledge which they do not really understand, is the frequent complaint of their examiners. The reasons for this would appear to be that the departments in the schools are lifeless, there is no desire for research or investigation, no knowledge of how to research, and no opportunities for research. Only too frequently the conception of teaching is to repeat to the class at Rayapuram, Vizagapatam or Tanjore the lessons or notes which the teacher has learnt, perhaps long ago, in his college days, the method of Galen's time, which has been perpetuated in the Indian indigenous systems of medicine. It is easy to criticise results but if medicine is not taught as a science or as an applied science at the college, we cannot expect anything but

an empirical art to be taught at the schools. These schools are now producing the majority of practitioners in the Presidency and under changing conditions in India, the College should aspire to a higher ideal than merely that of finding practitioners for a doctorless country. No part of its time should be occupied with training for the inferior L.M.S., or apothecary grades, it should concentrate on the university ideal.

4. To compare American methods of teaching in the various College departments with our own system would be a lengthy matter and require more expert and specialised knowledge than I possess. Following the German system, the American Professor as the administrative head of his department arranges and co-ordinates the work of an enthusiastic band of teachers, who carry out the greater part of the routine instruction.

Biological Chemistry is now an important subject in the medical curriculum. Many English Schools have already dissociated it from physiology and appointed whole-time professors; while many of the later advances on medical science have sprung from it.

The teaching of pharmacology by a study of the effects of drugs on animals in a laboratory seems to be called for in a community where the traditions are mainly empiric. The extent to which proprietary medicines are used by our Madras trained practitioners has grown enormously and only a true scientific training and a critical appreciation of the value and limits of actual demonstration can protect the young doctor from the steady bombardment of the unscrupulous manufacturer and his persuasive propaganda. Mr. Flexner with truth says that in this matter the laity have more to fear from a credulous doctor than from the advertisements themselves.

There is much to be said for a plan of teaching which gives to the students a broader view of a subject like anatomy, even though the student does not obtain a deep knowledge of its details. It is surely good that a doctor should have some knowledge, though only an elementary one of subjects like anthropology and embryology, which will deepen his scientific outlook; while much of the minute anatomy, which is now taught is unnecessary as a preliminary towards the study of medicine. Some of our Anatomical teachers appear to think that a minute knowledge of the bones of the skull is as important to the study of medicine as the ancients considered the three humours.

Excepting perhaps the Rockefeller Institute, research and education in America are very intimately connected. The organisation of the Research Department of India as a separate department is a great loss to education.

5. *Cost of education.*—The average tuition fees paid by a student at an American Medical School amount to 250 dollars a year. At John Hopkins the average cost to the college of a student's education amounts to 1,250 dollars a year of which the student pays 250.

A comparison with the cost of medical education in Madras is very instructive and suggests that Madras cannot complain that money is being squandered on medical education :—

Medical College.	Number of students.	Budget for 1920-21 Academical year.	Total average cost per student.	Proportion paid by student.	Cost to Government or College authority.
		Rs.	Rs.	Rs.	Rs.
John Hopkins University	360	4,750	950	3,800
Medical College, Madras	579	3,63,730	628	120	508
Rayapuram Medical School	488	1,20,863	247	64	183
Tanjore Medical School	294	43,845	149	64	85
Vizagapatam Medical School	254	87,424	344	64	280

The figures for John Hopkins are the approximate estimate given me by the Dean and, converted at 100 dollars, are equal to Rs. 380.

6. *Proportion of teachers.*—The number of teachers in all the American Medical Schools in 1910 (and this includes second and third grade schools) compared with teachers at the Madras institutions is as follows :—

Name of institution.	Number of professors.	Number of other instructors.	Total teachers available.	Number of students.	Ratio.
All American Colleges*	3,533	4,828	8,361	23,927	2.9
Medical College, Madras	35	579	16.5
Rayapuram Medical School	22	488	16.5
Tanjore Medical School	14	294	22.1
Vizagapatam Medical School	14	254	18.1

* See Flexner "Medical Education in the United States and Canada."

A too obvious criticism is that the number of teachers in America is extravagant. I cannot quote similar figures from English Colleges; the Calendar of St. Bartholomew's Hospital, London, shows the names of 75 teachers in the Medical School but this does not include the junior grades of demonstrators and tutors.

The Surgery department at Harvard includes the following teaching appointments. Professor of Surgery 1, Professors of Clinical Surgery 2, Professor (Clinical) of Genito-Urinary Surgery 1, and 41 Assistant teachers. John Hopkins employs 8 whole-time teachers and 15 part-time teachers, excluding Urology, Orthopædics and Laryngology, for which there are separate professors. St. Bartholomew's Hospital Calendar shows the names of 11 surgeons teaching the subject but this does not include the teaching of anæsthetics, the surgical specialities or all the clinical teachers, who are available.

At Madras there is one Professor of Surgery and 5 Assistants to the Professor, all of whom have many

other routine duties including interne work to perform. The Professor of Surgery teaches Surgery and all its specialities including Laryngology, Otolaryngology and Syphilology!

During the winter session the hygiene department of the College consisting of one professor and one assistant professor is occupied continuously with classes for 6 days of the week. The classes are scheduled from 10 to 1 practical for Health Offices, 1-30 to 2-30 College Department lecture, 2-30 to 4-30 College Department Practical.

7. *Post-graduate teaching.*—By post-graduate teaching in Madras, we mean courses to which men practising in isolated places may return for brief periods in order to catch up with the times. Those partaking attend a few special classes and the departments of the hospitals in Madras and obtain knowledge by watching the work that is being done. An active participation in the work would be a much more valuable method of instruction and in this connection the post-graduate courses outlined to me by Dr. Bevan at Chicago form interesting suggestions. In No. 1 grade course, the post-graduate student spends three years, takes part in the hospital work and teaching and in the end receives if satisfactory a degree of Master of Science. In No. 2 grade, the student spends six months doing hospital duties, for which he is paid while other grades of post-graduate work consist only of watching hospital work, for which fees are charged. Similarly Mayo Clinic employs young doctors for varying periods of 1 to 3 years, at the end of which they may receive an advanced degree from the University of Minnesota.

8. I was interested to find that the same arguments had been used in America against any improvements of medical education as are often heard in India and it would seem worth while discussing them. They are (1) that too few doctors would be produced, while there are still large tracts doctorless and (2) it would eliminate the poor student, a plea that is always advanced when it is proposed to improve the curriculum or character of the Medical School students. The general financial aspect of medical education is a much greater problem and I am not competent to discuss it except to note that as compared with other countries, India is obtaining hers at a very cheap rate.

The first argument is a very important one, since with a population of 47 millions in this Presidency, there are only as yet 2,013 registered medical practitioners or one qualified doctor to every 23,000 of the population. American experience, however, has shown that the doctor whether poorly trained or well trained will not settle in the sparsely populated areas but prefers to settle in the towns. The difficulty of obtaining medical practitioners for the Ceded districts of this Presidency is well known and the figures showing the numbers of practitioners in Madras city and in a city like Kumbakonam are significant. Madras with a population of 522,951 has 380 registered medical practitioners or one qualified doctor for every 1,376 souls while Kumbakonam with a population of 60,735 supports 11 doctors or one for every 5,521. Professor Paulsen in his book on German Universities

quoted by Flexner reported with some astonishment that there was in Germany one doctor for every 2,000 souls. The numbers of newly qualified medical practitioners registering in the Presidency for the year 1920 and 1921 (to October 1st) were 219 and 316 respectively. If we consider there is still a very large demand in India for Ayurvedic and other indigenous systems of medicine, can the argument that improved education will reduce the numbers of medical practitioners seriously be considered?

As regards the second argument Mr. Flexner's remarks on the same plea for American students seem to me worth quoting.

"What are the merits of this contention? The medical profession is a social organ, created not for the purpose of gratifying the inclinations or preferences of certain individuals but as a means of promoting health, physical vigour, happiness and the economic independence and efficiency immediately connected with these factors. Whether most men support themselves or become charges on the community depends on their keeping well, or if ill, promptly getting well. Now can any one seriously contend that in the midst of abundant educational resources, a congenial or profitable career in medicine is to be made for an individual regardless of his capacity to satisfy the purpose for which the profession exists? It is right to sympathise with those who lack only opportunity, still better to assist them in surmounting obstacles, but not at the price of certain injury to the common weal. Commiseration for the hand-spinner was not suffered for one moment to defeat the general economic advantages procurable through machine made cloth. Yet the hand-spinner had a sort of vested right: society had tacitly induced him to enter the trade; he had grown up in it on that assurance; and he was now good for nothing else. Your 'poor boy' has no right, natural, indefeasible or acquired, to enter upon the practice of medicine unless it is best for society that he should."

As a matter of fact, the attainments required by our entire argument are not, as a rule, beyond the reach of the earnest poor boy. He need only take thought in good season, lay his plans, be prudent and stick to his purpose. Without these qualities, medicine is no calling for him, with them, poverty will rarely block his way.

9 That the methods of recording patients' histories and notes in America are very efficient is shown by the very valuable statistics which are now published. The study of the results of our medical and surgical treatment has hardly been attempted in India and is impossible without a suitable clerical staff.

10. It is noticeable that in all recent college buildings, allowance has been made for future expansion. It is recognised that a subject, which at the present time is looked upon as pure abstract or academic science may be later of vital importance to the study of medicine and require a large expansion of buildings. The expansion of X-rays and Biological Chemistry in their application to medicine are examples. The Unit system of building at Harvard is a useful method of college architecture.

11. Madras might with advantage copy American methods of publishing every year a scientific bulletin containing papers from all the institutions in the Presidency.

12. The awarding of prizes for original work as is done in America rather than for examination skill encourages students to think for themselves."

There is no escaping the conclusion that what counts in medical education is quality and not quantity. Few will claim that in India present day standards are high enough. Unless the philanthropists of India come forward, as those of America have done, to help to solve the problem, it is unlikely that funds will ever enable India to approach the standard detailed by Major Bradfield. Yet there is perhaps no one single problem in India of more vital importance to-day than the future of medical education in his country. The medical schools of India are overwhelmed with the numbers of applicants for admission. Classes are overburdened and individual tuition goes to the wall. Professors are driven by the expensiveness of living in the larger Indian cities; to devote much of their time to private practice, to some extent, perhaps, at the cost of their professorial efficiency. On the whole, whilst the necessity for the improvement of present day teaching of medical undergraduates in India is vital, the readiest way to improve the standard of medical education in India lies with the Schools of Tropical Medicine. If these schools will but set determinedly before them the highest possible standards of medical education: if official provision plus public and private generosity secure their future: if the right men be but selected for their staffs: then we have, in such post-graduate schools in India, centres where medical men can be taught in a manner approaching to the conditions in the larger American Schools, and themselves becoming the teachers of the young generation in the Indian Medical Colleges.

THE LATE SIR PATRICK MANSON : THEN AND NOW.

THE death of Sir Patrick Manson,—“the father of tropical medicine”,—on April the 9th, 1922, cannot but bring home to every medical man in the tropics the real and tremendous strides which have been made in the study of tropical diseases in a single generation. A cynic, whom we have recently had occasion to consult professionally, is of

opinion that most men leave the world its debtor rather than its creditor, but Sir Patrick Manson was one of those pioneers whose labours future generations will come ever more and more to realise and to value.

The son of a Scottish landowner, and born in 1844, Manson graduated from Aberdeen in 1865, and in 1866 went out to Formosa as doctor to a group of merchants and missionaries. His attention, in the midst of the busy round of a general practice in the tropics, was soon called to many and curious cases of unexplained disease. A Chinese clerk, suffering from dropsy from head to foot and with a failing heart, consulted him. Thinking the case was one of cardiac disease Manson prescribed cardiac stimulants. The next day the patient was dead. Some years later he came across cases of what was apparently locomotor ataxy in Chinese soldiers. A few of them died suddenly: some with oedematous symptoms of sudden onset. The young tropical practitioner went to his English textbooks for help, but found in them no assistance. He suspected trichinosis, but microscopic examination of the fatal cases failed to reveal infection. Suddenly he realised that he was confronted with epidemic beri-beri: a disease whose full etiology is not yet understood: but whose importance in the tropics taught him that a medical education in the British Isles, however complete, is insufficient for the practice of medicine in the tropics.

In Formosa he constantly encountered cases of elephantiasis: a disease whose etiology was then but little understood. In that day parasitology was an undreamt of science. The connection of insects with disease had been a fruitful theme for speculation for centuries; indeed Susruta, in the 6th century before the Christian era, had had visions upon the subject. But what an esoteric philosopher may see in an ambrosial vision, or a latter day critic in a cloud of tobacco smoke, requires something more than imagination for confirmation; it needs diligent, earnest and impartial investigation of facts, and the accumulation of experimental evidence.

In 1790 Abilgaard had discovered that certain helminthic parasites of the perch pass part of their life cycle in water fowl, whilst Leuchart between 1858 and 1869 had established the fact that metaxeny,—or alternation of hosts,—affects human as well as animal