with overall Army operation, administration, and methods; thereby providing the framework and pattern within which the physician will operate for the remainder of his Army life. Emphasis is placed on the techniques and procedures involved in the mutual support and assistance of all military branches, recognizing the fundamental necessity for training officers of the Medical Service for duty in the field, with field armies and combat troops. Stated in another fashion, this programme provides an understanding of command, tactical and administrative problems in large-scale military operations, and considers in some detail, augmented by participation in field exercises, the methods whereby sound medical principles are put into practice within the military organization.

Conclusion

Although in this discussion the medical officer has been considered primarily as a student, it should be remembered that the Medical Service has a significant peacetime responsibility, and that during this first 12 years the medical officer has carried his share of these duties. He has had opportunity to demonstrate his ability as a clinician, as a research worker, as a member of the military team, and as a teacher. Conversely, although his days of formal medical education are essentially completed, save for brief periods of intensive instruction on a particular subject, he must remain a student for the remainder of his career, capable of providing medical service under adverse and unfamiliar conditions, often utilizing inexperienced junior personnel; capable of appraising constantly changing situations as a member of a team composed of representatives from all the arms and services; capable of meeting civilian scientists of all disciplines on essentially equal terms; and at the same time continuously accept his responsibility as an educator. His knowledge must extend into multiple fields, and he must always seek an answer in terms of "why" as well as "how." In short, the aim of the entire graduate educational programme of the Army Medical Service is to foster development of physicians capable of approaching Milton's citizen, able "to perform justly, skilfully, and magnanimously all the offices, both private and public, of peace and war."

IMPRESSIONS OF GRADUATE MEDICAL EDUCATION IN THE U.S.A.

BY

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It has become rather the fashion for British medical men to make whirlwind tours of the U.S.A. and then set themselves up as authorities on American medicine and, indeed, on every aspect of life in the New World, ranging from shirts to the economics of the hospital bed, from whether coffee should be drunk before, with, or after the meal to how a president is elected. It is therefore with grave misgivings that I join this impressionist school.

My visit lasted three months and was made possible by the generosity of the World Health Organization and greatly facilitated by the kindly help and supervision of that organization's Pan-American Sanitary Bureau in Washington. The purpose of the tour was to study medical education and to visit laboratories of cardio-respiratory research, in particular those concerned with

methods of the clinical assessment of cardio-respiratory function. Conclusions were therefore, of necessity, subject to all the errors of the biased sample. I visited schools and laboratories of which I already had some knowledge from previous visits, personal contacts, or through the medium of published work. The warm hospitality with which the visitor is everywhere received has to be experienced to be believed. Research records are made freely available. In one laboratory I was given each evening a manuscript of a paper awaiting publication, and the following day one or other of the authors discussed and amplified the results.

Any catalogue of general impressions would be too diffuse and too disjointed to be of value; I will therefore confine myself to discussing what seem to me to be some of the reasons why the Harvard Medical School enjoys such a position of eminence and why such an impressive number of its graduates are to be found in academic posts. In brief, what are the methods of post-graduate training in Boston?

So far as I could detect there was no master plan for the production of a general practitioner, this or that type of specialist, clinical teacher, or research worker, but there was an intellectual atmosphere calculated to make the pursuit of each of the many disciplines of medical practice educative in the sense that the value of evidence is continually debated and assessed. The concept of the educated man as knowing when a proposition is proved is firmly established; so also is the ideal of university education as teaching people to think, to question, and to appreciate the relative insignificance of the known as compared with the unknown.

Undoubtedly an important factor in maintaining this intellectual atmosphere is the very free association between staff of all grades of seniority and students both graduate and postgraduate. During the weeks I spent in the Massachusetts General Hospital (M.G.H.) I was impressed with the easy terms of personal friendship which exerted a profound influence on the outlook of all. Meals were taken in a cafeteria in which chiefs-of-service, senior and junior staff, visitors, and clinical clerks sat down together in the happiest atmosphere of mutual enlightenment. In the many discussions that took place I learned much and had many misconceptions adjusted. In such an environment it is possible to mature quickly and yet to become senior in rank and old in years without becoming dogmatic, pompous, and unreceptive to new ideas. To be surrounded by "nomen" instead of "yes-men" is a fine prophylactic against intellectual senescence.

The Harvard Medical School

The Harvard School enjoys a rich and varied clinical field which includes the M.G.H., the Peter Bent Brigham Hospital, the Beth Israel Hospital, and a substantial part of the Boston City Hospital. A perusal of the staff lists of these hospitals reveals a remarkable aggregation of talent both in profound scholarship and in brilliant discovery, which, combined with an equal excellence in the non-clinical departments of the school, constitutes the biggest single reason why Boston stands high in the world of medicine.

The number of undergraduate students in each year is between 125 and 150, so that clinical instruction can be very personal and individual, in fact during my stay the chief of medical services at the M.G.H. had only three clerks, and they spent their entire working day on the wards. They did not have to rush off to theoretical lectures in the medical school, so that they regularly had their cases well prepared ready for presentation on the day following admis-

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sion. The proportion of interns and residents (registrars) to patients is higher than is usual in our teaching hospitals. The emphasis throughout in both undergraduate and postgraduate training is on a relatively small number of cases thoroughly and carefully studied and fully discussed with senior staff and laboratory colleagues. I think this feature is of importance in relation to postgraduate educational trends in our country.

The teaching hospital with its background of scientific departments and planned research, and its close association with other university faculties, must remain the principal training ground for consultants as well as academic men. It is the only way whereby medicine can retain its right to inclusion within universities and can avoid being solely a technology. It is a right which can never be adequately based merely on tradition but must show continued devotion to the concept of a *studium generale magistrorum et discipulorum*, a society of teachers and scholars devoted to the twin ideals of patient and unremitting research and of systematic and methodical teaching, a society in which the character traits of selflessness, humility, sincerity, and balanced judgment are fostered as well as the valuable but more meretricious qualities of technique, memory, and debating skill. These essential attributes are attainable in the large teaching hospital, but they develop less readily or not at all in the busy routine of the non-teaching hospital, where the consultant-in-training has less opportunity to discuss, to criticize, and to be criticized.

Limited Number of Students

My colleagues at Harvard emphasized that this was a very expensive method of medical education and that the maintenance of such a large staff and extensive laboratories for such a relatively small number of students was a constant source of anxiety to the university and sometimes led to carping comparisons with costs in other faculties. However, there can be no shadow of doubt but that the policy is sound; there can in no country, however wealthy—and the U.S.A. is the wealthiest the world has seen—ever be more than a comparatively small number of schools which can provide an environment so favourable* to scholarship and discovery. Furthermore, such schools cannot easily be created; they grow and mature over many generations, and the essential material is human—a succession of men of character, intellect, and originality. Financial and material support is a secondary acquisition which follows naturally. So often one hears the plaintive moan of what a wonderful place so and so would be if it only had the money, just as good or better than somewhere else where they have such generous grants and munificent benefactors. Such an apologia rarely convinces; support tends to go to the school which knows how to make use of it. The attempt has sometimes been made to foster learning and discovery merely by lavish grants; this often fails because of lack of men capable of using these resources. One cannot grow rich crops by manuring alone, there must be good seed.

Limitation of numbers both of undergraduate and of postgraduate students has advantages far beyond giving opportunity to participate actively in patient care. The free interchange of ideas, the exhaustive debate, and the intimate contact is impossible with large classes. Instead there tends to develop undue emphasis on the theoretical lecture and skilful pedagogy tends to replace the Socratic method. There are schools in this country—and no doubt in America too, although I did not visit any—where the bulk of the instruction is by systematic lectures reinforced often by typescript “handouts,” and where the spectacle of 30 people or more milling round a bed is commonplace. The effect of this is even worse on the teachers than the taught, as it often breeds complacency and sterile dogma. Strangely enough one has even suspected that such a state of affairs is regarded as a peculiar virtue rather than an adaptation to the instruction of too many by too few.

Environment

Certain features of Harvard staff organization contribute substantially to providing this favourable educational environment, features some of which are not applicable to this country. The senior whole-time staff is rather more numerous than in British teaching hospitals, and includes most of the professors and associate professors. Each large division of practice has a chief, such as the professor of medicine who is physician-in-chief or the professor of surgery who is surgeon-in-chief. Such chiefs are responsible not only for the organization and direction of teaching and research but for the proper conduct of clinical work throughout their whole divisions. This tradition is well established and does not seem to interfere with the inalienable right of each consultant to have unfettered charge of his patients. In some hospitals I visited it was the practice of the chief-of-service to take a routine teaching round in each ward in rotation, usually attended by his consultant colleagues whose beds were concerned. The chief-of-service exercises substantial supervision of the work of the residents and interns throughout his division.

It is the practice in the M.G.H., and I believe in most American teaching hospitals, for the consultants to have direct charge of beds for only a proportion of the year—for example, nine months on and three months off; this applies both to whole-time and part-time consultants, including the chiefs-of-service. This has many advantages, the main one being that it gives an opportunity for research work unfettered by routine responsibility. The arrangement also permits of a large consultant staff. It should be emphasized that during the time a consultant is “off the wards” he still retains a close connexion with the hospital patients in the private block, seeing cases in consultation with his colleagues, attending “grand rounds” and clinico-pathological conferences, working in his laboratory, teaching in his special subject, such as cardiology, and eating in the hospital cafeteria. There is nothing rigid about the system; the proportion of time spent “on and off” the wards seems to be a matter for mutual arrangement with the chief-of-service, dictated largely by the relative claims of research, private practice, and the adequate discharge of the corporate duty of the staff to the hospital and medical school. I suspect that this system goes a long way to explaining how it is that American physicians are able to complete such substantial research while satisfying the demands of a large consulting practice and a senior hospital appointment. Arrangements are completed for a year or two ahead so that clinicians can plan their work well in advance.

One crowning advantage of the system is that it precludes the development of the isolated unit or firm; there cannot occur the state of affairs which I heard described some years ago in reference to a teaching hospital as “a collection of cottage hospitals sharing a common kitchen.” I firmly believe that there is nobody so wise or accomplished that he needs no supervision. I do not mean the authoritarian control of the bureaucrat but the friendly supervision of professional colleagues, senior and junior, an environment in which one feels free to ask and to be asked such questions as, “What are your reasons for that statement?” “Have you considered this alternative explanation?” or to say, “I don’t know, can you tell me?”—an environment in which the only unforgivable sin is to bluff or bluster. Such a relationship is implied in the concept of a university and not only has the effect of developing a high level of knowledge and understanding but has a powerful influence on the development and maintenance of qualities of leadership and loyal service. I felt that such an atmosphere was well developed at Harvard and in other centres in America; indeed, it prevails in most of our teaching hospitals and wherever intelligent, enthusiastic, and warm-hearted men band together to serve to the utmost and thereby get the best out of life.

The Clinico-pathological Conference

I now turn to more specific details of teaching organization. The M.G.H. is known the world over as the birth-place of the clinico-pathological conference, or C.P.C. as it is known. Begun in a small way by Richard Cabot around 1910, it gained stature in the 'twenties and has developed into a powerful educational influence which is emulated throughout the New World.

Thursday at noon is the high-spot of the week at the M.G.H. The pathology lecture theatre is crowded, everybody is there, distinguished emeritus professors, clinical staff, research staff, students, visitors, nurses, and scientists from the near-by M.I.T. (Massachusetts Institute of Technology) specially invited to shed light on the problem under discussion. Two cases are shown, and the technique of presentation has the invariable precision of an ancient ritual. The principal performer (P.P.)—as often as not a visitor—has been provided two days beforehand with a cunningly composed summary of the clinical record of a patient who has either come to post-mortem examination or who has yielded at operation a trophy of surgical pathology. Every member of the audience finds a copy of this record on his seat. An essential qualification for the principal part is ignorance of the case apart from the summary provided. For the first 15 to 20 minutes the P.P. discusses this summary, culminating in a succinct diagnosis with a prediction of the anticipated pathological changes. Colours must be nailed to the mast, evasion or equivocation is as heinous as cowardice in the gladiator. The P.P. then stands down. After a few minutes' discussion the pathologist demonstrates the specimens by means of epidiascope and micro-projector. The P.P., and in lesser measure everybody there, is then wiser and usually humbler. Dictaphones have recorded every word, and in a few days the performers receive typescripts of their discussion; these are edited and in due course are published in the *New England Journal of Medicine*. Often the proceedings have a high dramatic quality.

The first C.P.C. I attended on this visit was remarkable for the fact that the P.P. built up a convincing case that the patient who had survived the removal of a large tumour of the ileum was suffering from hydatid disease of bone, despite the fact that a hydatid had not previously been recognized in a native of Massachusetts who had never left the State. This diagnosis was right, and it was no lucky guess but a masterpiece of deductive reasoning. The *American Journal of Medicine* carries reports of precisely similar C.P.C.s held at the Barnes Hospital at St. Louis. It is not without reason that the American Specialty Boards (which on the basis of postgraduate training, experience, and examination grant recognition) in assessing hospitals as suitable for postgraduate training attach great importance to the regular and efficient conduct of C.P.C.s. There cannot be much wrong with the place which has a well-attended weekly C.P.C.

The only criticism I heard of this exercise was that it might have an inflationary effect on the pathologist, with whom always rests the last word. I am quite prepared to hear of the introduction of the reverse exercise in which the pathologist becomes the P.P. and builds up a clinical picture on the basis of morbid anatomical findings, the clinician then revealing the truth.

The "Grand Round"

Another function of great educational value is the "grand round," which in each department is held each week. At these, two or three cases are presented, usually by the intern or resident, but sometimes by a student. Often the cases illustrate some current problem, and after the presentation a staff member discusses them for 20 to 30 minutes. These presentations are carefully prepared and great pains are taken to ensure that the persons best qualified contribute. For instance, I heard the surgical therapy of mitral stenosis

discussed by a famous cardiac surgeon. On another occasion Professor Howard Means, although retired from the active staff, returned to discuss myxoedema, while in a problem case in which beryllium poisoning was suspected a representative of the biological division of M.I.T. contributed. Apart from *ad hoc* guest lectures by visitors these "grand round" discourses were the nearest approach to the theoretical lecture I found in the Harvard Clinical School. I am sure they are wise in avoiding set courses of theoretical lectures. These are so apt to degenerate into an uninspired reiteration of information which can be more easily obtained from a textbook. The systematic lecture owes its origin to an age in which books were rare and costly, and its perpetuation is an adaptation to large classes. I confess to being somewhat addicted to theoretical lecture courses, but I hope to rid myself of the habit, substituting for them more clinical lectures and discussion groups.

Ward Rounds

The value of any particular educational technique is in direct proportion to the extent of the student's active participation. This principle was particularly well illustrated in the professor's ward rounds at the M.G.H. Each new patient was visited, and the clerk presented the history, which was then discussed, with particular reference to possible diagnosis; the clerk then detailed the physical examination, which was checked by the professor, and again the diagnosis was discussed. The clerk added the laboratory tests such as urinalysis, E.S.R., blood counts, etc., which he had performed himself in the side-room. Finally, and only after the fullest possible picture had been built up from the clinical data alone, were the specialist examinations such as x-ray films and blood chemistry admitted. I was greatly impressed by the emphasis placed on the simple clinical methods of history-taking and physical examination. I saw no tendency whatsoever to rely unduly on the esoteric laboratory tests. I have no doubt that fault exists in the U.S.A. as it does in this country; all I can say is that I did not see it either at Harvard or in any other school I visited.

The standard of presentation at ward rounds, conferences, etc., was extremely high. Whether it be a student, intern, resident, or senior staff member it seemed a point of honour to make the least possible use of notes and to present data in a succinct vivid style.

The amount of really excellent research in progress was very impressive, and I detected absolutely no trace of any antagonistic separation into "good practical doctors" and research-minded physicians.

Enthusiasm

Perhaps the most impressive feature was the intense enthusiasm. Everybody seemed determined to pack as much as possible into each day. Work often began at 8 a.m., and the whole organization was in top gear well before 9 a.m. and continued to far into the evening. All residents—that is, registrars—lived in, not so much because it was strictly necessary for the care of patients but because of the obviously valuable clinical experience and its mutually educational effect. While I was in Boston Professor Barry Wood, of St. Louis, spent a week at the Peter Bent Brigham Hospital as guest physician-in-chief, living in the hospital with the resident staff. These are practices we would do well to emulate.

In conclusion I must emphasize that, although I have confined myself largely to experiences in Boston, I found in my briefer visits to many other clinical centres, such as Rochester, N.Y., the Trudeau Foundation, the Mayo Clinic, Minneapolis, New Orleans, Birmingham, Ala., Duke University at Durham, N.C., Johns Hopkins Hospital, University of Pennsylvania Hospital, and the Presbyterian and the Bellevue Hospitals in New York, the same invigorating intellectual climate and excellence of clinical practice.