IMPRESSIONS OF POSTGRADUATE EDUCATION IN AMERICA*

BY

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One of the joys of a travelling physician is the great number of rounds, grand rounds, meetings, seminars, forums, and clinico-pathological and departmental conferences that go on in every medical centre. These are full of the enthusiasm of the New World, and may begin at 8 a.m., an hour when many doctors start their work. The discussions are generally excellent and the uninhibited exchange of knowledge stimulating and instructive, particularly if guided by a good chairman. Perhaps the Americans are more extraverted than we are, or their exhibitionism more developed, but they do not hesitate to talk. This conference habit, apart from the value of the hospital staff meeting at frequent intervals, seemed a sure way of keeping up to date on medical progress, and, perhaps, a pleasant substitute for much reading on one's own.

The Graduate Hospital of the University of Pennsylvania

The six months spent at the Graduate Hospital, a centre for postgraduate studies, was an interesting experience of teaching methods in the States. The building itself was a small one, being only 13 floors high with 350 beds. The atmosphere was not unlike that in hospitals in this country, but the pace was faster and the pressure under which the consultant staff worked seemed greater. The junior staff, both interns (house-officers) and residents (registrars), often started their rounds at 7.30 a.m., and the work would proceed without a morning-coffee interval. Nor would there be a pause in the afternoon for tea, but fortunately an addiction to this was soon induced among the staff of the laboratory in which I was working. The number of routine conferences—at least six, if the special ones such as the cardiological, neurological, radiological, etc., are included—that took place each week and to which some outside family doctors would come amazed me.

The general medical and surgical meetings, which nearly all of the staff would attend, were run on the lines of the clinico-pathological conference. The technique of the C.P.C. has been highly developed in the States, and perhaps is at its best in Boston,† where it originated under Richard Cabot. The case is presented by the physician, and as the story is told the radiologist is asked to talk about and interpret the films, the surgeon to discuss the operation he has done, and the pathologist to show any material removed or microscopical sections, and so on. This sequence exploits the interest of the problem to the full. The discussions afterwards are sometimes spontaneous and, if a number of renowned authorities are present, a delight to listen to. Otherwise they are scheduled; the speakers are previously given the details of the patient to be shown, so that their contribution is premeditated and replete with the exact and latest details of the problem.

These C.P.C.s were sometimes replaced by a case protocol, either for variation or when the clinical material became short. Then the residents would select a case from the records in which the diagnosis had proved exceptionally

difficult and interesting. This would be written up in detail and copied on the mimeograph (gestetner) and all the audience given a copy, either at or before the meeting. Certain details, such as the necropsy report—often the only conclusive feature—would be omitted. Someone, perhaps of professorial status, or a distinguished visitor, would be invited to read through the case protocol at the conference and, as he did this, to give his comments on the meaning of the symptoms, the interpretation and completeness of the investigations, and the differential diagnosis. At the end of this he would be told the correct answer, to his mortification or relief. Such problems studied in retrospect were very instructive, and a lively competitive spirit was given to the meeting.

Postgraduate Courses

There are more than 800 courses each year in the States, either to refresh the general practitioner or for the trainee specialist. The Graduate School of the University of Pennsylvania, the first university postgraduate school, ran a full-time course lasting eight months, as part of the preparations for the board certifications, which are the equivalent of our higher examinations in medicine, surgery, and the specialties. The course was, in some ways, unique, and one unusual feature was the method of presenting the basic sciences. These, instead of being treated separately and independently, were carefully integrated, so that physiology, anatomy, biochemistry, pathology, and bacteriology were presented together, as they related to the various organs and systems, such as the kidney, circulation, lungs, alimentary tract, and so on. Sometimes several lecturers shared an hour, so that the physiology, pathology, and chemistry, for example, could be presented in logical sequence. This co-ordinated programme of lectures and seminars required more laborious planning than the usual block system. Yet, apart from its popularity with the postgraduate students, it was highly stimulating and rewarding to the basic science faculty members themselves, giving a broader outlook, not only in teaching but also in research (Comroe *et al.*, 1951). The students separated for the clinical part, according to their interest in internal medicine, surgery, or gastro-enterology. This schedule certainly left little time to relax, as the numerous conferences and rounds were intermingled with some practical instruction in endoscopy, radiological techniques, and laboratory procedures.

A criticism of the course, as of nearly all courses, was that there was too little contact with patients, partly because of the number of students (about 300) and also because of the high incidence of private patients. However, it was otherwise comprehensive and provided a fine scientific background, perhaps reflecting the difference of emphasis in the two countries. In Britain the clinical approach and good bedside teaching are characteristic, whereas in America the laboratory aspect is highly developed. Immediately such an easy generalization is made one realizes that this does an injustice to the many outstanding medical men of the U.S.A. whose clinical acumen is beyond reproach, and to the numerous centres in this country where there is a perfect blend of the clinical and scientific approach.

The Multiple-choice Examination

The courses in internal medicine and surgery finished with an examination. The invitation to me to sit for this, as a control subject, was welcome, particularly as it was of the multiple-choice type. This method of examination, already very widely used in many branches of learning in the U.S.A., is being applied more frequently in medicine. The candidate is only required to put a mark against the correct answer to a question. As an example, a case history is given, with abnormal physical signs, investigations, electrocardiograms, etc., and the following possibilities are suggested: (1) coronary occlusion, (2) dissecting aneurysm, (3) pulmonary embolism, (4) pericarditis, (5) left heart failure, only one of which is the right diagnosis. For the examiners the whole

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†See the *New England Medical Journal* for accounts of these, or the *Postgraduate Medical Journal* for similar conferences in Britain.

problem—and it is a very difficult problem—is in setting the questions; ambiguity, in particular, has to be avoided. Correcting the answers is the examiner's dream, as the papers can be put into a business machine and, by pressing a button, returned completely marked.

I approached the examination with confidence, as the memories of our M.R.C.P. were fresh in the mind. However, before a document of 27 pages, containing 75 questions to be answered in three hours, my self-assurance rather disappeared. The paper covered cardiology, neurology, gastro-enterology, haematology, endocrinology, and, indeed, the whole field of medicine, and took some time to read. This method of testing the candidate's knowledge has several features that are often lacking in examinations. A remarkably broad field is covered, in contrast to the usual six questions. It is fairer to the candidates, and the element of individual luck in getting the right question is lessened. The marking is objective. The examination tests the candidate's ability to think clearly and lucidly, but not his powers of synthesis of thought as is seen in the essay question. Perhaps it also enables the student to pass without being able to write—if a thumb-mark would be accepted! There might be an advantage in combining the two methods in one examination, by having the traditional paper in the morning and the multiple-choice type in the afternoon.

Some Points of Teaching

The widespread use of mechanical aids to teaching is not surprising among a race of such superb technicians as the Americans. It was never necessary to strain to hear a lecturer, as amplifying systems were universally available; there was no lack of good projectors or epidiascopes; fresh pathological specimens were recorded, as "kotochrome" slides and multiocular microscopes were used to teach histology. Coloured television, just being tried, was a striking improvement on television in monochrome for demonstrating operations. The perspective was so much better, and the tissues were more clearly defined. The accuracy of the colour was good. Another outstanding development was the use of televised microscopy in biological teaching and research, where the image of the "vidicon" camera of the microscope was increased in size 20 times or more by electronic magnification. It was fascinating to watch the movements of gigantic bacteria on the television screen. And as a wide range of wavelengths of light could be used it was a useful research tool in studying cell structure, either of organisms or of living tissues.

Professor Boyd's pathology museum must be a delight to every student in Toronto. It is not just the usual collection of dull bottled specimens, but the study of pathology is made stimulating and easier by the use of visual aids such as paintings, diagrams, and models. The material is attractively arranged with case histories, in transparent plastic envelopes, for studying the clinical aspects. To complete the picture there are libraries of coloured photographs of the microscopic details, and miniature radiographs, arranged in vertical drawers and automatically illuminated when pulled out. Professor Boyd introduced me to the paintings of the best-known medical artist in America, Professor Tom Jones, whose art department at the University of Illinois is a fine example of the importance that is being attached to this subject in the States. Large and well-staffed, it was one of several centres of training medical artists. The aim was to produce work of high artistic standard as well as useful for illustration.

New methods of giving postgraduate lectures were being tried, and in several States a telephonic postgraduate course could be taken. The county medical society arranged for a private line to be connected to a microphone at its meeting-place, and any doctor who wished could listen on his own telephone. "Listeners," one was told, "are furnished with brochures containing short biographies of the speakers, an outline of each address, reproductions of suitable visual aids,

and space for notes." Even better was the radio programme arranged by the Academy of Medicine in New York. The speakers were well known and the subjects topical. This is an attractive idea for keeping up with recent advances in the comfort of an arm-chair in the evening, but only possible with the numerous radio stations in America—one of the few advantages of a commercial broadcasting system.

Keeping Up to Date

The need to keep up with recent advances seems a feature of the American doctor, perhaps not surprising in a young and progressive country where emphasis is on new and better things. Also the public, more informed on medical matters, and briefed with the latest edition of the *Reader's Digest*, are a source of pressure upon the doctor to read the latest journals, even if only to answer their questions and demands. There are also other reasons for this progressive outlook; such as income-tax deductions when the general practitioner leaves his practice to attend conferences, apart from the prestige gained amongst his patients for doing so. Perhaps the tendency goes back further and comes from habits developed during his training, for the student is encouraged to read the journals. Tuition in the critical study of good medical literature and the technique of keeping up to date may be of more value to the future doctor than many of the memory feats required in the curriculum. The provision of a reading-room in the residents' mess, with shelves containing a selection of the latest journals, is one way of encouraging him at the beginning of his career.

Atlantic City, N.J.

Every American doctor knows Atlantic City, and this article would be incomplete without a mention of my experience of it. It is a seaside resort, within easy reach of New York and other towns on the eastern coast—the counterpart of our Brighton. A city of hotels by the sea, it is an ugly place and vulgar in taste, but superbly fulfils the object of providing every conceivable facility for entertainment. Along the famous Board-walk, a wooden promenade 60 ft. wide and 8 miles long, one can sample sea food or drink at the numerous cafés, buy from the fine shops between them, see a film, have one's blood pressure taken at a stall equipped with a sphygmomanometer, visit amusement arcades, and so on *ad nauseam*.

From the medical aspect Atlantic City is one of the great convention cities, with halls designed and equipped for large audiences and vast hotel accommodation. Meetings of certain national medical societies are held there concurrently, and these medical invasions bring doctors from all parts, flying from Washington on the Pacific coast or motoring on a 24-hour trip from St. Louis. Attending the conferences was a great experience; access to them was made easy, and the well-documented programmes enabled one to select beforehand the communications one wished to hear. It was a priceless opportunity for learning the latest work and for seeing and often meeting the eminent medical personalities of the U.S.A. The technical arrangements, as usual, were perfect, and it was interesting that the Society for Clinical Investigation—the "Young Turks," as they had originally split from a more senior group—had started a campaign to make their slides as simple, clear, and lucid as possible, so that one could see at a glance the purpose for which the slide was intended, instead of trying to decipher in a few moments a mass of detail that the worker himself had spent a year in concocting.

The American Medical Association, holding its meetings there, also ran a magnificent scientific exhibition which is well worth attending. Stalls are arranged by various medical and surgical workers, displaying visually the results of their original work rather on the lines of the Wellcome Museum, London, with reprints freely available and a touch of salesmanship that seems foreign to our British reserve. However, it was a magnificent way of acquiring knowledge

and of great value to the many family doctors who flocked to Atlantic City, partly for a yearly "brush-up" of their medicine and partly as a social occasion.

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MEDICAL PROGRESS AND MEDICAL EDUCATION*

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If we go back to 1900, a date which Singer believes marks as definite a period as any in the annals of medical history, we find medicine still a body of empirical knowledge, based on and developing mainly from the accumulation of bedside observations during life and anatomical studies after death. The laboratory had, it is true, begun its meteoric career in medicine, but we have it upon the authority of Sir Henry Dale that in 1900, when he began his own undergraduate clinical studies, the relation between laboratory and ward was one of "critical aloofness on both sides."

It is important to try to see the physician's aims at that time through his eyes. If he honestly pursued his calling—and most did—he regarded himself not so much as a curer of disease but more as one whose duty it was to help the patient by assuaging his symptoms and easing his mind. Nature was the Great Healer, the physician her handmaiden, ardent in his study of her ways, and skilled in anticipating her intentions; ready to perceive the first signs of recovery and to point them out with hope; quick to recognize the harbingers of evil so that he might prepare for a fatal outcome he could not avert. Perhaps he was sometimes a little pompous, but he was usually sincere, sympathetic, and genuinely interested in his patient's welfare. It is doubtful if he ever stood higher in the public esteem than at that time. His remedies were, almost without exception, empirical and based on bedside experience and tradition. Some were, by chance, effective—mercury, digitalis, and quinine are examples; some, such as salicylates and morphine, were valuable in the relief of symptoms; a few were soundly based on scientific experiment—for instance, thyroid extract, first used by Murray in 1891, and diphtheria antitoxin, discovered by von Behring in the same year.

Throughout the next 50 years the gap between laboratory and ward has grown less and less, and the methods of experimental science have, as Sir Henry Dale has said, "so permeated medicine that it has itself become almost an experimental science."

[The lecturer then surveyed briefly the advances of chemotherapy and immunology, and the new knowledge of vitamins and hormones.]

*An abridged version of a lecture to the Section of Odontology, Manchester Medical Society, given on February 25, 1952.

Perhaps more important, on account of its scientific implications, is the tremendous change in the approach to diagnosis which has come from advances in technical and laboratory medicine. The vast contributions of radiology and of the clinical laboratory to diagnosis are only aspects of this change, which goes down to the roots of medical diagnosis. In chest diseases, bronchoscopy, bronchography, tomography, and thorascopy have greatly helped the growth of chest surgery. In heart disease, angiocardiology and cardiac catheterization have taught us much about the physiology of disease processes and have led to the more precise diagnosis of those cardiac lesions that can be attacked surgically. The introduction of electrocardiography in the earlier years of the century, and its growth towards the stature of a science in the past 10 years, have helped in the diagnosis and understanding of coronary disease in particular. In neurology, air encephalography, arteriography, and electroencephalography have given important aid to the development of neurosurgery. In gastroenterology, radiology has proved especially valuable and gastroscopy and sigmoidoscopy have helped in accurate diagnosis. Studies in electrolyte and water balance, with the extensive laboratory facilities they imply, have proved of great therapeutic importance in many medical and surgical conditions. The list of advances is endless, but all I wish to do is to give scale to the extent of the change.

The Scientific Attitude of Mind

The effect of these changes upon the attitude of mind of the doctor has been profound. In the old days a physician went round his ward and, on the basis of empirical experience, issued authoritative opinions which none could gainsay. If the chief said a patient had Fallot's tetralogy, to all intents and purposes he had, for nothing short of a post-mortem examination could alter that label. It may have meant little in practice, but it lent to medicine the atmosphere of an authoritarian art. Criticism and independent thought and judgment were stifled. To-day it does not matter very much what the chief says, the merest houseman may confound his careful clinical argument with a little sheet of paper from the laboratory or x-ray department. That is all to the good; the heavy cloak of authority is cast aside, and the spirit of free criticism enters and vitalizes the atmosphere. Considerable intellectual readjustment has been required of the doctor now that scientific proof of the diagnosis is expected, if at all possible, and the treatment is based, at least in part, upon scientific grounds, often, as with antibiotics and anti-coagulants, requiring careful laboratory control to make it effective and safe. So great has been the change that we may well wonder whether our ways of thinking have kept pace with the growth of our technical armamentarium, and whether our use of medical science is any better than the use of the weapons of science in general in the modern world. Do we rule them, or they us?

There is something more in this change than the mere introduction of scientific remedies and diagnostic tests to assist the operation of the medical art, for art it remains, as I hope to show. There is the need, and even the necessity, for the adoption of scientific habits of mind by clinicians. It has often been held that the introduction of science into medicine has led to a loss of the old skill in diagnosis by the unaided senses. There is a much greater danger than that—the danger that the clinician will fail to appreciate just how to use the scientific aids to medicine; that he will attach more importance to them than he should, and tend to regard them as penny-in-the-slot methods of getting a quick answer. Unless he adopts scientific habits of mind he will tend to read too much into the precise scientific data presented to him. To take a simple example: we know that when certain