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SOME PRINCIPLES OF REFORM IN MEDICAL EDUCATION

BY

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The recasting of medical education, having been a topic of recurrent discussion for many years, begins to show signs of becoming a subject of action, and the two reports recently issued by committees of the Royal College of Physicians on social and on psychological medicine lay down lines of reform that seem expedient to some of our number. It is probably reasonable to assume that the two reports are but the heralds of comparable recommendations in respect of other branches of medicine, and there are signs that the specialists will shortly be on the march at the head of thousands of words, determined to bend the medical student to their will.

The Need for Revision

Few would deny that the methods and content of our present teaching call urgently for revision, but if we were to ask at large, "What are the important defects in the educational diet we provide for the medical student?" we should probably get as many and as diverse answers as there are special aspects of medicine, though we dare not be so sanguine as to anticipate that many of these answers would be the fruit of general ideas on the subject, or that they would dive beneath the surface of the obvious symptoms in search of fundamental faults. We should probably be assured on almost all hands that the student must know more about most of the special branches, and must acquire familiarity with more, and more complex, techniques.

That this is no wild surmise is plainly exemplified in the report on psychological medicine already referred to. This suggests a fully detailed syllabus comprised as follows:

During the Preclinical Years

12 to 20 lectures on normal psychology.
Visits to schools, courts, and factories.

During the Clinical Years

6 introductory lectures on clinical psychology and psychiatry.
53 further lectures and demonstrations on specified aspects of the subject.
Seminars and discussion groups covering the whole field.
Three months' clinical clerking to an in- and out-patient psychiatric department of the hospital.
A short term of undergraduate residence in a mental hospital, or, alternatively, a clinical clerkship in a mental observation ward.
A series of domiciliary visits with a psychiatric social worker.
Finally, a special qualifying examination comprising written, clinical, and oral parts.

The avowed object of this course is "to produce a sound general practitioner and not a specialist in psychological medicine"; but it is admitted that "the proposed syllabus makes demands for a greater share of the time of the medical student."

On the whole, the report on social and preventive medicine is less concerned to formulate an ambitious syllabus, and more interested in a reorientation of some of the teaching in already accepted items of medical training. It is content with a modest allowance of 18 to 20 hours in lectures, and does not demand the 70 or more hours deemed essential by the psychiatrists

for their subject. Yet the report states, "Even so, the curriculum proposed will make further demands on the time of the medical student which can only be met by modification of some other part of the curriculum." It adds later, "The course in preventive and social medicine, as in the clinical subjects, *should become a curriculum.*"

Here we see both reports demanding for their special branches of medicine more time and labour from the medical student, and the casual recognition by one only of them that this is to be made possible by the pruning of "some other part" of the curriculum. To anyone who can read the omens it is clear which way the wind of reform is going to blow. More and more is to be expected of the medical student; no one gives serious thought to assessing the burden he can reasonably be expected to bear, but each branch of medicine vaguely cherishes the fond hope that some other branch will be ready to make the sacrifices essential to the fulfilment of its sectional ambitions, and to the adoption of its private curriculum. Yet, if sectional interests are to be given a free hand, and if we concentrate excessively upon partial aspects of medical education, we shall never achieve a rational educational plan, and the student of the future may well find himself crushed beneath an intolerable burden of uncoordinated syllabuses, private curricula, and easy counsels of perfection.

However, it must be said that quite another view of these reports has been expressed (*vide* Lord Moran, *Times*, Nov. 3, 1943), to the effect that they do not propose "to add a new set of facts that the student must try to remember. They are merely intended to foster a habit of mind, a way of looking at things." No one who has studied these reports and done justice to their diverse merits can possibly accept this gloss, for both of them explicitly propose to lay fresh burdens of factual knowledge upon the student—one of them to a quite extravagant extent. Therefore, if the point of view embodied in these proposals prevails, a medical course will become a long and arduous sentence, and one to which few prudent parents will wish to submit their sons or daughters, and which still fewer schoolmasters than at present will care to recommend to their brighter pupils.

It is hard to believe that this is the way of wisdom or of sound reform. It seems to confuse instruction with education, shows little psychological insight into the methods and purposes of education in the true sense, and does not pause to ask the important question of what, in general terms, we wish the finished product of a medical training to be capable. The formulating of a final aim is a necessary preliminary to any scheme of educational reform. Only when we have decided upon this aim can we proceed to draw up the plans necessary to its attainment, having in view the time and the resources available.

If we have in fact reached a wide agreement as to the necessity for change it is because we have been forced to admit defects in the methods and content of our present teaching. Yet we have to bear in mind that as these defects first come to notice they may be but symptoms of more deeply seated disorders inherent in our present methods. If this is so, we shall do no good by patching up and adding to an unsound structure; we must rebuild from the foundations up. To do this we must undertake a thorough and critical analysis of

such defects as have come to notice, for unless we do so we shall find ourselves attempting treatment without adequate diagnosis: a type of enterprise not wholly unfamiliar to us in clinical medicine.

A Criticism of Achievement and Outlook

A critical survey of the house of medicine to-day shows that it is far indeed from being in order. Not the greatest and most justified enthusiasm for recent advances in knowledge, or for the alleviations of human suffering we have seen in our time, can blind us to the existence of many grave deficiencies in our achievements and outlook. We talk very facetiously about the science and art of medicine, but it may be argued that the "science of medicine" is still a somewhat shadowy conception. From time to time this has been pointed out to us by one or other of those rare philosophers who have found themselves in our ranks, but the thought has been too unwelcome for us to listen to those who remind us. Allbutt, Mercier, and more recently Crookshank have all drawn attention to the unsatisfactory state of our science and its neglect of a rational use of language. Thus, says Crookshank, "although the Art of Medicine has been greatly advanced, in many respects, during the last century: although the Practitioners of that Art do freely draw upon the vast storehouse of facts called scientific, to the great benefit of suffering humanity: and although all medical men have some acquaintance with certain sciences of which the province is in part coterminous with that of the Art of Medicine, there is to-day no longer any Science of Medicine in the formal sense. It is true that observation and thought have led medical men to form generalizations which have obtained acceptance; but there is no longer any organized or systematized *corpus*, or formulated theory, which can be held to constitute the Science of Medicine, and (in a now obsolete terminology) to form an integral part of Natural Philosophy. . . . Her Professors and Doctors decline to define fundamentals or to state first principles, and they refuse to consider, in express terms, the relations between Things, Thoughts, and Words involved in their communications to others."*

Again, "though we accumulate what we call 'facts' or records of facts without number, in no current textbook is any attempt made to define what is meant by 'a disease.' . . . In a word, no attempt is made to distinguish between what we observe in persons who are ill, on the one hand, and the general notions we form in respect of like illnesses in different persons . . . in hospital jargon, 'diseases' are 'morbid entities,' and medical students fondly believe that these 'entities' somehow exist in *rebus Naturae* and were discovered by their teachers much as was America by Columbus."

Precision in Language and Thinking

This fallacy of "misplaced concreteness" infests medical writing and leads even in the most distinguished hands to shocking confusion of thought. Two examples of this are cited in the paper from which the foregoing excerpts are taken—namely, the statement that "lethargic encephalitis is altering its biological properties" and that "a disease is only revealed by the symptoms it produces." Yet the two terms "lethargic encephalitis" and "a disease" are no more than general notions or abstractions, and abstractions have no biological properties and can "produce" nothing. It is a human weakness to hypostatize abstractions—often a pardonable and harmless weakness; but that at the fountain-head of medical thought and teaching we should find this grotesque confusion of thought and language, this failure to distinguish between thoughts, words, and things, is an indictment of the state of our science.

It is surely impossible that we should forge generalizations and propound first principles until we have given precision to our language and thinking. Sir Almroth Wright has recently commented pungently upon the poverty of our terminology; but even the most adequate terminology needs to be used in a framework of rational language if it is not to add to our confusion.

* *The Importance of a Theory of Signs and a Critique of Language in the Study of Medicine*, by F. G. Crookshank; being Supplement II in *The Meaning of Meaning*, by C. K. Ogden and I. A. Richards. Kegan Paul and Co., 1936.

At this stage in my thesis it is certain that I shall begin to meet with objections. That familiar phenomenon the successful and euphoric individual who flatters himself that he is a hard-headed and practical man will make his usual and instinctive protest against the use of the intellect by saying that all this talk of language is but a splitting of hairs. Yet even a brief consideration will show that our slovenliness in thinking and in use of language exerts a profound effect upon our teaching. We are teaching clinical medicine merely empirically in terms of "diseases"—save in the case of neurology and cardiology, in which the tendency to think of symptoms and signs in terms of disordered function in normal structures has long been dominant—and not in terms of the range of bodily reactions to a variety of noxae. The student is led to think of illness wholly in terms of largely conventional groupings which are constantly changing, and to believe that "a disease" is a concrete agent that "does things" and produces symptoms. So taught, he is ill equipped to deal with new and unfamiliar reactions or sets of reactions, and cannot handle new and strange experiences as he should. He has to *remember* a great deal, but may *understand* very little of the processes and manifestations of illness. No general principles have been imparted to him. Recurrent changes in terminology and methods add to the difficulties of his task. It has to be admitted that as yet we understand very few diseases fully, and even many common manifestations of illness have so far escaped explanation. There is a rapidly growing mass of facts that yet await interpretation and have not yet been brought under adequate generalizations. This is a time in the history of medicine when new facts are being added to our stock faster than we can—or at least than we do—sort them out or build them into an ordered fabric of knowledge, and much therefore must remain as necessary matter for memorizing.

Added to the accession of new facts, to the unending flux of opinion and terminology, and to the constant arrival of new methods, is a spate of books and journals—good, bad, and indifferent, all competing for the student's attention—carrying on its surface a flotsam of seductive advertising literature on treatment that influences thought and practice far more than is good for medicine. It is in these trying circumstances that the student has to learn, and the doctor to practise, medicine. Of the coherence and more fully reasoned arguments, and of the precise terminology of the ancillary sciences of anatomy and physiology, we see ever less trace in clinical teaching and writing as the mass of unrelated facts and hypotheses accumulates round us.

Nothing is more clear than that we lack both an adequate language—and the rational use thereof—and a body of first principles in medicine, and also the will to provide ourselves with a body of theory based upon these necessities of a science of medicine.

General Principles of Medicine

The plea is therefore made that some attention shall be given to the theoretical aspect of medicine, and to its formulation and teaching, in any proposed reform of medical education. We who are teachers cannot but confess that too few of us have set ourselves to this urgent task; to synthesizing the information at our disposal, and to the elucidation of facts by clear generalizations. We have been too willing to follow the beaten paths of routine clinical teaching, or, when engaged in research, too eager to add to the bulk of raw information, to be willing to pause for thought and to take up the difficult task of developing a general theory of medicine and of eliciting general principles. In short, we have found action—of one kind or another—easier than thought, and it is greatly to be feared that it is in this uninspired frame of mind that we are contemplating a reform of the curriculum.

It is the fundamental defect of our teaching that we have not given the student a firm grasp of general principles, we have not taught him to weigh evidence, to discriminate or to think logically, and we have too often failed to imbue him with that keen desire for understanding that is the essence of true education. We have been content to preoccupy him with feats of memorizing and with the acquisition of an increasing number of techniques.

If, at first sight, it seems unfair to indict the finished products of our teaching with being less than adequately endowed with critical faculty and scientific thought and method, we have only to look round on the medical scene to discover very numerous examples of these basic faults.

They are to be seen in every aspect of medicine and in every category of doctor, both teachers and taught. One disquieting example is the prevalence of unsubstantiated general notions about ill-health. Thus there are still far too many for whom those ill-defined conceptions, "focal sepsis" and "auto-intoxication," provide a sort of "reach-me-down" explanation of almost every variety of chronic illness. Holocausts of teeth and tonsils have been offered up on the altar of this notion, and there can be few maladies—psychological or somatic—which have not been hopefully, if irrationally, treated by these crude procedures, or by the indiscriminating devastation of air sinuses.

Not less indicative of unsound standards of thought is the tendency to assume that in a given case any improvement that follows the administration of a particular remedy must be directly due to its pharmacological action, and a succession of subsequent disappointments to secure benefit often fails to correct the first and hasty impression or to abate our wishful thinking. Although we are all aware of the *post ergo propter* fallacy, it has all too little influence upon our judgments.

The indiscriminate use of almost every newly discovered product of chemical ingenuity is another disturbing feature of modern practice. Few middle-aged women in ill-health can now hope to escape a course of stilboestrol; the sulphonamide drugs are not always used with conspicuous judgment; and our wholesale employment of vitamin preparations might lead the naive observer to suppose that we have found in them a panacea for a wide range of human ills. Doubtless in course of time a sound balance of opinion is reached in respect of all such remedies, but only after much wasteful use and to the accompaniment of fresh uncritical enthusiasms for yet newer remedies. These are matters we dare not continue to tolerate with equanimity.

A striking instance of the ephemeral fashion in theory and practice is provided by psychological medicine in our day. For at least a quarter of a century, and in a literature of unexampled volume, we have been presented with elaborate, and not always harmonious, hypotheses of the psychological genesis and treatment of psychological disorders, major and minor. We have been encouraged to regard the mind as a sort of *chimaera in vacuo bombinans*, and the personality as an entity standing in no relevant relationship to the brain. Yet within the past three or four years we have been seeing an increasingly rapid flight from psychotherapy in favour of the treatment of psychological disorders by physical assaults upon the brain, in the form of chemically and electrically induced convulsions and of mutilations of the frontal lobes. Here we observe, not a scientifically controlled and recorded experimental approach to a new theory and treatment, but a widespread and too often wholly uncritical and inadequately documented employment of drastic procedures the perils and final fruits of which cannot yet be seen. Psychotherapy, meanwhile, still remains the logical corollary to hypotheses of causation that have nowhere been explicitly abandoned; but none of those who, while "on with the new," are not yet "off with the old" seem to have noticed the antinomy inherent in this therapeutic right-about-turn.

It can hardly be maintained that the prevalence in medical thought and practice of what Tristram Shandy called "hobby-horsical" tendencies, and of the other defects exemplified, can justly be attributed to a mere dearth of information imparted to the doctor during his period of training. They surely arise from those underlying faults that have already been called fundamental, and they cannot possibly be remedied by still further increasing the amount and range of factual knowledge we expect of the student.

Training in the Theory of Medicine

We have been too preoccupied with the vocational and technological aspects of training, and too little interested in the theoretical basis of medicine. We have taught medicine too exclusively as a practical art, and, largely unnoticed by us,

medicine has been passing from the stage of simple observation and of empiricism to one in which theory must play an ever larger part. In our hands, it is true, a great deal of medicine has not reached a stage in which broad generalizations are practicable, and much memorizing of facts remains a necessary task for the student. Nevertheless, we might make this easier for him by emphasizing general principles even in the purely vocational side of his training. By this we refer to clinical observation and the methods of diagnosis and treatment, and to the acquisition of a sound basic factual knowledge of disease. Yet this is clearly not the whole of an educational process, and does not by itself give the student sound habits of training, does not teach him how knowledge has been and is being gained, nor impart the ability to recognize sound sources of information and to reject ill-founded speculation and the wishful thinking that plays so large a part in our therapeutic assessments.

If these intellectual aims are to be realized we shall need teachers with a special interest in disease as a whole rather than in individual patients, who will teach on clinical material primarily to display and exemplify general processes of disease. They will have to concentrate upon the making of generalizations and the weaving into a pattern of the many and at present largely unrelated strands that make up the general body of medical knowledge. It becomes increasingly difficult for the independent clinical teacher engaged in private practice to undertake this task as it deserves and requires, and its pursuit may well be the main function of those whole-time academic teachers who are already established in some of our medical schools, and whose numbers will surely have to be increased in future. It would be naive indeed to suppose that a man's capacity for generalization and interpretation can ever depend primarily upon the sources from which he derives his living. Practising physicians who are clinical teachers may in the future, as they have in the past, give us some of our most penetrating generalizations. What is suggested is that we shall choose our professors of medicine from those who have given some indication of their capacity for and interest in general ideas, and that in virtue of their status and freedom from the harassing conditions of private practice they will be free to devote part of their talents undisturbed to the building up of a theory of medicine. This essential task in the building of ordered knowledge will have in future to receive its due share of academic recognition if men are to be encouraged to undertake it; for the transmuting of information into ordered knowledge is a task not less difficult, or less essential, than the acquisition of new facts: a consideration to which in this generation we have been strangely blind, as the present chaos in medical thought sufficiently witnesses.

Pruning of the Curriculum

In addition to this rebuilding of the very foundations of medical education, there can be no doubt that an urgent need is a quite ruthless pruning of the range and amount of factual knowledge we expect of the student. These must be cut down. We cannot rationally expect that the newly qualified doctor shall be the complete obstetrician, paediatrician, psychologist, orthopaedist, and expert on hygiene and social medicine.

There will doubtless be a chorus of protest that no one does expect this; yet if we assess the separate opinions of specialists upon what they want for their own branches this is precisely, by implication, what they do seem to expect. A modern full-dress textbook of medicine, surgery, or obstetrics will show how extravagant our expectations already are. These subjects must be stripped to their essentials, and further knowledge upon any one of them acquired after graduation. If new matter is to be introduced into the curriculum, some of the old must go, so that the final reformed scheme asks even less factual knowledge than we now demand; but what we do ask of this kind must be more fully co-ordinated and coherent, and informed by sound general principles. Notions of the critical importance of their own special aspects of medicine that may be urged by enthusiasts must not be allowed to rush us into a new and even worse crowding of the curriculum than we at present see.

For example, in the realm of psychological medicine the content of both normal and clinical psychology is highly charged with controversial matter: conflicting hypotheses

compete for recognition as generalizations of the facts of observation, and these "facts" are not always clearly distinguishable from assumptions. Psychology is in a ferment, and we must not plunge the student into the fermenting-vat. The exponents of this field of medicine must first put it in order and lend it coherence before psychological medicine can hope—or ask—to take its proper place in medical education. This is not to say that the present place taken by it in the curriculum is adequate, but to suggest that a wise infusion of medical education by the principles of psychological medicine demands something more fundamental than the compilation of a long list of titles of lectures and appointments to be crammed into an already overloaded course.

Essentials of Reform

Similar considerations must determine and limit the requirements of other special branches of medicine. Each must be subordinated to the balance and moderation we wish to see in a new scheme of medical education. In short, the essentials of reform in medical training may be summarized as follows:

(1) A carefully thought out pruning of the amount of factual knowledge we seek to impart, ruthlessly undertaken in order that

(2) the student may be enabled to develop a more thoughtful and critical attitude, and a deeper understanding of the causes and manifestations of disease.

(3) An explicit recognition of the necessity of a leaven of theoretical medicine, side by side with its vocational aspects, and the provision of a category of teachers who shall develop it.

To these ends every branch of medicine must be prepared to make some sacrifices, so that we shall turn out thoughtful and discriminating graduates, capable of handling the unending flow of new experiences that must come to them in the practice of their profession, and capable also of independent judgment. On this sound stock we can always graft a higher order of knowledge in any desired branch of medicine.

The considerations put forward in this article, and thus summarized, will be familiar to all readers of Sir Thomas Lewis's volume of addresses entitled *Research in Medicine*. In these the fundamental principles of medical education, and the qualities and outlook of the teachers of medicine, theoretical and vocational, are discussed more amply and with more authority than I can command. No one who bears any responsibility for the reform of medical education can rightly ignore the principles laid down and expounded in these addresses.

Conclusion

There are, of course, other aspects of the total problem of medical education not dealt with in this summary expression of a point of view: for example, the type of general education best fitted for the future medical student; the status and categories of teachers we shall need; the better organization of clinical teaching, and the necessity for a drastic reform of our present chaotic and purely vocational examination system. In respect of the last-named, the gross disorganization of the precious last year of the student's clinical training by the quarterly instalments of the Conjoint Finals would defeat any system of teaching.

In short, the problem is a most complex one, and can be solved only when we have formulated the general principles of a reform of the curriculum and of our methods of teaching. The immediate and urgent issue here raised is the necessity for avoiding another patchwork and compromise revision of medical training and the swamping of the student by the addition to his burdens of fresh requirements from new branches of medicine, or from old branches that have taken new names and adopted new slogans. It would be folly to assume that this danger does not exist. The increasing and inevitable specialization in medicine has called into existence sectional interests nearly all striving for what they regard as adequate recognition for themselves, and it is the growth and momentum of these interests that may well threaten the drawing up of a new and rational plan of medical education.

In 1932, in the columns of this *Journal*, Dr. Charles Wilson, as he then was, wrote an article, entitled "The Student in Irons," in which in clear and admirable terms he laid bare

the defects of the content and methods of our teaching of the medical student. Therein he presented, more lucidly than I can hope to do, the aims that should inspire us in any reform. A brief citation from that paper may be allowed.

"It is nowhere denied that we ask impossible tasks of students, who are bewildered by hours of listening, and that we stamp out the habit of reflection by a ceaseless drill. And this is done in the name of education. . . . So strange an anomaly may set us thinking how we are come to such a pass. The blunt truth would appear to be that the handling and revision of the curriculum are based on a misconception of what we can and ought to attempt in a medical school. The one purpose of the student's years is, it seems, not to train and test habits of thought, but to collect and store a set of facts, as squirrels hoard the nuts on which they hibernate. . . . It may be conceded that such a policy was reasonable when medicine was a slowly progressing science that did not greatly alter in a man's lifetime. To-day it leaves him bankrupt when he has scarcely begun. The little he knows is soon antiquated, and he cannot keep up with a rapidly changing science, for we have so contrived to educate him that he cannot educate himself. . . . We trust neither his industry nor his capacity. He must be driven into different pens for every hour of the day, along with a drifting flock that presses now this way and now that. And this, if I may be allowed to change a metaphor, in the hope that he may one day recognize a disease because he has seen it before."

Surely, this analysis goes far more deeply into the problem than do the two reports we have considered, and shows a recognition of the total requirements of a medical education that is absent from them.

If now we are to content ourselves with a so-called reform that attempts no more than to fit still more into the medical course on the pretext that medicine is enlarging its scope, we shall have betrayed the medical student of the future, and shall have failed to do what is now possible to build a science of medicine with its own body of first principles and its own grammar.

PETHIDINE AS AN OBSTETRIC ANALGESIC A REPORT ON 150 CASES

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Pharmacology of Pethidine

Pethidine (also known as dolantin, dolantal, and demerol) is the name given by the General Medical Council to the hydrochloride of the ethyl ester of 1-methyl-4-phenyl-piperidine 4-carboxylic acid, which was synthesized in 1939 by Eisleb and Schaumann in a search for atropine derivatives. The chemical relationship of pethidine to atropine is seen in the following formulae:

Unlike morphine it is a relatively simple compound, although on close inspection of the formula some remote chemical similarity can be discerned between pethidine and morphine; thus both possess a piperidine ring.