Papers and Originals

Postgraduate Education and Society: The Lesson from Medicine*

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Student Revolt

One of the most conspicuous and disturbing events of the last few years has been the students' revolt. This has happened all over the world. The causes are several—dissatisfaction with what the educational system provides, survival of authoritarian or monastic practices, and dismay at suffering and injustice all over the world. The revolts are led by a handful of ardent revolutionaries, dedicated men and women, who are not in general committed to a single and specific cause as the Communists were, but tending to be rather more anarchical. They express the view immortalized by Groucho Marx in "Horse Feathers": "Whatever it is, I'm agin it." These dedicated and dangerous men would not succeed in causing the unrest that they do were there not a great deal for the students to bellyache about.

In the Continental universities, and to some extent this is probably true of the London School of Economics, the contact between staff and students is a distant one. The classes are very large, the student comes in and attends lectures and laboratories, and sits his examinations without ever, perhaps, exchanging a word with his professor. The failure rate and the drop-out is huge. Professors in general are an authoritarian and dictatorial lot. They had to work hard and occupy relatively menial positions and accept small financial rewards until eventually, at a comparatively late age, they succeeded to the chair. It is not surprising that they want a run for their money. In British universities these objections do not apply except in an occasional institution. Nevertheless, in some universities, notably Oxford and Cambridge, some mediaeval restrictions have remained which have proved to be a godsend to the revolutionary, to mobilize student opinion against authority. These restrictions are now on the way out. I must say, looking back, they were so trivial as compared with the enormous advantage of living in a college and being able never to shut your door that I for one am not sorry that they were in vogue when I was an undergraduate.

The students have one great ground for complaint—namely, that the educational system to which they are subjected is out of date. This ought to be the focus of their rebellion, because in the long run this will prove the most important to them and to the society in which they live. Again, it is something for which remedial measures can be devised. It is with this and with the contribution to it that medicine has made that I wish to deal in this talk.

Function or Purpose of Education

Man's behaviour—that is to say his habits, his attitude of mind, and his skills—is determined by two factors: inheritance

and environment, nature and nurture. He acquires his behaviour from learning. Education is a process for accelerating and directing learning. It is self-evident that the function of education is to prepare the child or adolescent for the life that lies in front of him. Learning is quickest in youth but can continue to the brink of the grave. I may be fooling myself, but I think, at the age of 64, I am still capable of learning. I hope so, because I have just started a new job, and if I cannot learn it then disaster is in store.

The initial stages of learning begin at home. In many ways this is the most important, because for many children their characters are already well developed by the age of 5. I have seen this in my own children and I see it now in my grandchildren. The importance of the home is a factor that our social scientists tend to overlook in their search for compulsory uniformity or the abolition of privilege. For if privilege is to be utterly abolished then children must be brought up outside the home as they were, for example, in *Brave New World*. From the home they are sent to institutions specially designed for mass education of the young, schools, colleges, universities, and the like. There the children display their native abilities. The less able are judged not to be worth higher education and proceed to earn their living in society. The more able are picked out and supported by the State so that they can become the leaders of their generation. One would expect that if an educational system had been properly designed it would have been designed so that the able boys and girls received the kind of knowledge and the kind of training in method which would fit them for leadership in the world of today and tomorrow.

Disparity Between the Actual and the Ideal

I never cease to be astonished when I contemplate the difference between what is done and what should be done. The world today differs from that of fifty years ago in many respects. The outstanding difference is change, and especially the rate of change. A doctor who finished his education twenty-five years ago and has learned nothing since is a public menace. The same is surely true of the schoolmaster, the engineer, the administrator, the politician, the banker, the business manager, and so on. The outstanding feature of this change is the scientific and technological revolution and the way in which complicated machines are taking over the work hitherto done by human hands and human brains. Another feature is the loosening of the traditional bonds that link the members of a society; the effects of religion and old customs that had remained unchanged for centuries are rapidly being shed. Communication is increasingly fast. Events in a small island in the Caribbean that would have been insignificant when news of them arrived after a month at sea are now headline news in a few minutes. Leisure, once the privilege of the few, will soon be the lot of all, as automation and machines take over.

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These developments are so impressive that it would have seemed inevitable that a nation which depends, not on its raw materials, but on the way in which it educates its citizens would have made corresponding changes in educational practice. Boys and girls would all have been generally educated as far as possible, for that is the best way to ensure that they are not over-specialized and hence will react to change and will be able, as adults, to develop those interests and skills which they will need if they are to enjoy their leisure. The intelligent boys and girls would all be expected to write and speak their own language lucidly and grammatically, for language is the medium by which facts and ideas are transmitted from one mind to another. If this transmission is to be accurate then the language must be correspondingly precise. They would be expected to have a good knowledge of mathematics, for quantity is an elementary property of things and ideas, and will enter into all the decisions that they subsequently have to make. They should speak and read at least one living foreign language, so that they can communicate with those of different race, language, and culture. They should know the elements of physical and biological science, for the future achievements of science and technology will dominate their lives. Unless they carry into adult life an interest in and an appreciation of scientific method, ideas, and developments, all the great achievements during their lifetime will pass them by.

These are features that we should expect of our educational system, but in fact what we provide for our clever young is almost the opposite. We ask them to choose between the arts and the sciences at the age of 13 or 14. In doing so we ask them virtually to decide their future career, a decision which, at that age, can only be based on ignorance. When they go to the university their education continues the special subject or subjects begun at 14 or 15. The universities discharge them into the world after three years with their education completed—narrow experts in seventeenth-century British history, in French dramatists, in the Greek and Latin languages, history and thought, in a particular branch of mathematics—for example, topology—in engineering, in chemistry, in physics, and so on. As Ashby¹ once said: "A boy who goes up on the classical side and who takes Greats at Oxford has had the most highly specialized education in Europe and is likely to be ignorant of the most elementary knowledge of subjects on which Newton, Faraday, and Rutherford spent their lives." Again, as a professor of mining engineering once remarked to me when I visited the Royal School of Mines: "All my graduates may be excellent mining engineers, but no one will be able to understand their reports because they are so illiterate."

Attitude of Teachers

The fact is that such changes as have happened in British educational practice have not been designed to meet the needs of the child at all. They have been designed for the convenience of the teacher. University teachers accept without question that a university course must last only three years, or, exceptionally as in the case of Greats, four. After that, education is finished. The object is to produce someone who is so proficient in his specialty that he is ready to begin research in that subject. The growth of knowledge has in fact been met not by lengthening education for some but by putting back specialization earlier and earlier into the schools. As the reply from the University of Oxford to the Standing Conference on University Entrance said in 1968:

"Schools respond to the wishes, or rather to the supposed wishes, of university selectors. The selector with the last word is usually a specialist in the subject which the applicant wishes to study at the university. He tends to be most interested in the applicant's school performance in that subject. Another temptation to which selectors in natural science are particularly prone is to respond

to the rapid growth of material in a subject by making increasing demands on admission candidates. Such demands represent the line of least resistance for members of science departments who are themselves under pressure. The Oxford failure rate is very low, and everyone is rightly determined that it shall remain so. Each imperceptible addition to the first degree syllabus is therefore likely to be transmitted to the sixth form in a slight stiffening of the entrance demands. Limiting the content of first degree science courses without lowering the standard is a difficult operation; and it is apt to be impeded by the view that the student who goes on to a doctorate must be turned into a completely trained scientist in six years from his matriculation. Thus the sixth form pupil may be subjected through the influence of university selectors to pressures which can scarcely be helpful to the development of his studies and which may produce a serious distortion in them."

It is perhaps not surprising that this has happened. It was such an easy way out. What is surprising is that what the system is doing to the minds of the young seems to have passed unnoticed. I would love to lead or participate in a revolt of the young and their parents against these monstrous practices. I would like to see education reformed so that boys and girls are helped to enjoy their lives, to profit by them emotionally, intellectually, and economically, and so that society should have the people it needs. It is not surprising that Britain's industry and commerce are out of date, that we do not manage to make a living as a nation, that we suffer from recurrent financial crises. Recent reports on British industry have shown that it is defective for three reasons: (a) in many cases the top management is by amateurs who have received no special training for their job, (b) industry employs far too few scientists and engineers as compared with our competitors abroad, and (c) the engineers and scientists that are recruited into industry are so narrowly educated that they are unsuitable for management and soon become obsolescent. These reports have also noted that Mr. Wilson promised the people of these islands a "white-hot technological revolution." He promised he would drag British industry kicking and screaming into the second half of the twentieth century. He has utterly failed. To my mind no one will succeed as long as they are blind to the needs of education, and particularly as to what the present practice is doing to our best boys and girls.

Example of Medicine

I expect you are all now wondering why I have been saying what I have on the occasion of the opening of this postgraduate medical centre. I wanted to provide a contrast between something of great importance that, as a nation, we do extremely badly and something, entirely comparable, that as a nation we now do extremely well. What we do well, probably better than anybody else in the world at the present time, is medical education. It is done well because medical education has not been left to the whims and self-interest of university teachers. It has been regulated since 1858 by the General Council of Medical Education and Registration of the United Kingdom, now better known as the General Medical Council. This is a statutory body set up with a membership composed of representatives from each of the universities having medical schools, from each of the royal colleges, and a number of independent members. It recommends the courses of study and examinations which are taken by medical students before they are granted a licence to practise independently. It exists to protect the public from ignorant or incompetent practitioners. The General Medical Council reflects the attitude of mind of informed opinion in the field of medicine. That attitude of mind has changed utterly in the last twenty-five years, thanks be to God.

Medical Education

Until twenty years ago medical education was bad and rapidly getting worse. As the Planning Committee of the

¹ *Technology and the Academics*, 1959. London, Macmillan.

Royal College of Physicians wrote: "We are agreed that, quite apart from lack of character and ability that may be avoided by improved recruitment and selection, the average medical graduate has defects which are to be attributed chiefly to the manner of his training. He tends to lack curiosity and initiative; his powers of observation are relatively undeveloped; his ability to arrange and interpret facts is poor; he lacks precision in the use of words. In short, his training, however satisfactory it may have been in the technical sense, has been unsatisfactory as an education." As the law stood a man was entitled to practise medicine, surgery, or midwifery the day he qualified as a doctor. He was legally entitled to carry out the most dangerous operation and to deal with the rarest and most complicated case. To be competent to do so he had to be taught and examined in minutiae in anatomy and physiology and the twelve other special subjects into which the science and practice of medicine is divided. His teachers and examiners at their various stages took their duties quite seriously. The student was overtaught and over-examined. At each stage he sought to fill his crop with a miscellaneous collection of so-called facts which he prepared to regurgitate in front of the examiner. That being successfully accomplished, and his crop being now empty, he was ready to repeat the process.

In some universities he went through no fewer than fourteen departments, each presided over by a professor and each extracting its pound of flesh from the hapless student. Not surprisingly many of those were intellectual skeletons by the end. The whitened bones were devoid of life, intellectually speaking. Education had killed curiosity and initiative. The source of the evil became more and more evident until it was eventually put right by the Medical Acts of 1950 and 1956. The illness of medical education arose from the single cause that it was erroneously believed that education stopped, and must stop, when the student had completed his university degree. Once it was realized that this was untrue then it became possible to liberate the student from his chains and to educate him to a standard of acceptable principles and practice.

The Act that started all this was nearly twenty years ago. That Act made everything possible. Oddly enough it took some years before the implications were begun to be put into practice. In 1961 the Nuffield Provincial Hospitals Trust called a meeting at Christ Church, Oxford, over which I had the privilege of presiding. The Conference agreed as to the vital importance of postgraduate medical education in this country. It was agreed that it should be made easy and attractive for all doctors, whether in hospital or not, to keep in touch with the most recent developments in thought and practice. This meant regional postgraduate centres, each including a library, a lecture room, and a common room. The Trust put over a quarter of a million pounds into starting this off. Since then local effort and the support of the Ministry have developed these still further. This evening we are gathered to celebrate one such.

Recommendations of G.M.C.

I regard it as one of my greatest privileges to have participated in a programme which has liberated medical education and which, as I say, has helped to make it as good as any in the world. What the General Medical Council now seeks for every registered medical student and practitioner may be displayed by some quotations from its recommendations of 1967. These reveal, incidentally, what an enlightened body the Council now is, thanks not a little to its learned, imaginative, and judicious chairman.

"The Council has defined four educational periods in a doctor's life. The first two are those of Pre-medical Studies and Basic Medical Education. The third is that of Vocational Training for a particular career in medicine; and the fourth, which extends to retirement or death, consists of 'continuing education' after the completion of vocational training." It

accepts the university's requirements for general education, but in its evidence to the Robbins Committee emphasized the importance of both literacy and numeracy to the future doctor. A broad grounding in science, as exemplified by physics, chemistry, biology, and the mathematical methods used in biometry, precede the special scientific requirements of the doctor in anatomy, physiology, biochemistry, pathology, pharmacology, medicine, surgery, and midwifery and their subdivisions. This, the traditional undergraduate period, terminates in the medical degree.

"Basic medical education should give the student knowledge of the sciences upon which medicine depends and an understanding of the scientific method." "Basic medical education should give the student a comprehensive understanding of man in health and in sickness and an intimate acquaintance with his physical and social environment." During this time "the student should acquire and cultivate the ability to work independently." He must "learn how to learn." Universities are encouraged to experiment "to find the means of reducing the congestion in the curriculum; to instruct less and to educate more." "The examination system should be designed so as to apply effectively the principles embodied in the programme of basic medical education." "The Council invites Licensing Bodies and Medical Schools to give consideration to the timing and form of their existing examinations, and to the possible use, to a greater extent than hitherto, of a system of progressive or continuous assessment throughout the student's career." "The pre-registration appointments should complete the student's basic medical education and prepare him for the vocational training which is to follow." This is not at present satisfactory.

"The good habits of study and reflection which (it may be hoped) have already been formed can be irrecoverably dissipated in a year of unresting labour." "It hopes that universities will regard it as a duty, not only to look after the posts (by way of inspection and supervision) but also to look after the persons, that is, the young men and women who are completing their basic medical education in those posts." The Council attaches great importance to continuing education. "It is no longer possible for anyone to obtain a comprehensive medical training during his school years. Graduation has become neither the end of medical education nor the beginning of the end, but rather the end of a beginning." "In medical education, as in other kinds of education of which Plato spoke long ago, what matters most is not the knowledge imparted to a man but what the man himself becomes in the course of acquiring knowledge. The medical student needs not merely to learn, but to understand how to learn, and how to continue to learn long after he has qualified. . . . The prospects of the patient become parlous when the physician has to say to himself, 'Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?'"

"The time will be approaching when it will be necessary to identify programmes of training for each of the vocational branches of medicine (including general practice) and to arrange by an extension of the Medical Act for some form of official recognition to become available (such as the inclusion of names in a vocational register) for individual doctors when they have satisfactorily completed the training-programmes for their selected career in medicine."

Alas, in practice the universities have proved much less liberal and imaginative than the General Medical Council. Perhaps university teachers are more interested in the projection of their own ego than they are in the welfare of the students. In this medicine no more than reflects the greatest of all the sins of universities. As one university remarked in its evidence to the Council: "Established subjects have been reluctant to sacrifice their teaching-time, while new subjects have made substantial demands; in combination, their claims have stood in the way of the Council's avowed object 'to reduce congestion in the curriculum.' Such a reduction must nevertheless remain a

prime objective, but in our view the time for reducing the duration of the curriculum up to full registration does not appear to have come." In my own university, despite the unusual distinction of its teachers, progressive assessment of students has not yet been accepted as either possible or desirable. The risk that the Council foresees is displayed as eloquently as it could be "that in these matters of assessing and testing students a teacher will see and approve the better, but follow the worse course." The time exacted from the student in written examination time in anatomy, physiology, and biochemistry in the reformed medical course is to rise from six to eleven hours. Despite the best intentions change is not always synonymous with improvement.

Much also remains for the universities to do in supervising pre-registration appointments, and particularly in providing an advisory service in postgraduate appointments to its own graduates; and we have seen neither teaching nor examination practices match the changes in ideas that have occurred in educational leadership. "New wine" poured into "old bottles" is not a remedy for instant success. Nevertheless the attitude of mind has changed, and in circles which are less conservative than universities that change of attitude has found practical expression, as in this institute whose opening we celebrate today.

Lesson from Medicine

May I return to my original theme? As we have seen, the key to the liberation of medicine was the recognition that educa-

tion does not, and should not, and indeed cannot, end with a university degree. That degree should not be the end, it should merely be the end of the beginning. This is not a new idea. Winston Churchill remarked to the undergraduates at Bristol University in 1929: "The most important thing about education is appetite. Education does not begin with the university and it certainly ought not to end there." Education in Britain can be shaped to help our young to lead enjoyable, satisfying, and useful lives, but it will be so shaped only when this elementary truth has sunk into our masters and the British public. If we established graduate schools for the advanced study of the arts and the sciences, and if we established graduate schools to train technocrats and all the managerial classes, through business managers, insurance agents, to local government officials, then it would be possible to liberate the undergraduate curriculum and to stop once and for all that hideous Solomon's choice that we exact from our young. They will no longer be asked to abandon the arts or the sciences on the brink of puberty and thus deny themselves for the rest of their lives participation in half of the intellectual ventures in mankind.

If we furnish the stimulus, the opportunity, and the facilities for self-education throughout life, schoolmaster, business man, engineer, and those who conduct our public affairs can remain *au courant* with changing knowledge, thought, and practice. The leisured can use their leisure with profit and enjoyment. But none of those things will come without a changed attitude—a realization that school and university are merely phases in a life-long process of self-education. How long, O Lord, how long?

Analgesic Nephropathy. Clinical Course after Withdrawal of Phenacetin

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Summary: Of 14 patients with analgesic nephropathy 11 were followed up for 9 to 88 (mean 36) months after withdrawal of analgesics containing phenacetin. Ten of these 11 are still alive and have improving, static, or very slowly declining renal function. Analgesic withdrawal is therefore worth achieving even in the presence of advanced renal failure. Careful prolonged follow-up is required to prevent or detect relapse and to deal with the complications of prolonged renal failure, particularly bone disease and acidosis.

Early diagnosis is life-saving in this condition. Attention is drawn to the diagnostic value of sterile pyuria, but the best screening test for the condition is careful interrogation of all patients with chronic renal disease of unknown aetiology; analgesic intake is rarely denied if asked for specifically.

Introduction

Prolonged high intake of analgesic mixtures containing phenacetin causes interstitial nephritis and papillary necrosis, resulting in tubular dysfunction, decrease in glomerular filtration rate, azotaemia, and death. The progressive events that

follow experimental papillary ablation (Lucke *et al.*, 1968) might lead one to expect an inexorable downhill course in this disease even if the nephrotoxin were withdrawn. Our experience suggests, on the contrary, that the disease can be arrested at a very late stage and emphasizes the importance of diagnosis even in the presence of apparently terminal renal failure.

Our total experience of analgesic nephropathy is presented in the accompanying Table; illustrative case histories are presented below and in Figs. 1–4.

Case 1

A 34-year-old woman was admitted to hospital in January 1962 with a history of nocturia for several months, and malaise, vomiting, epistaxis, and acidotic breathing for two months. She had taken barbiturates in excess for two years, and we later obtained a history of excessive intake of compound codeine tablets for headaches over six years. She was oliguric and clinically azotaemic,

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