BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 26 1950

METHODS OF EDUCATION

BY

J. A. LAUWERYS, D.Sc., F.R.I.C.

Professor of Comparative Education in the University of London, Institute of Education

Last year's educational number of the *British Medical Journal* contained an introductory article on reform in medical education by Professor Melville Arnott, and thereafter a number of distinguished contributors considered, from the standpoint of their own special knowledge, problems which arise in the teaching of physiology, anatomy, biology, chemistry, and physics. Their papers displayed remarkable, indeed surprising, agreement regarding not only general aims and objectives but even regarding methods that deserve adoption. My own experience of teaching in school and university lies outside the field of medicine, and it would be unforgivably presumptuous on my part to criticize medical education or to offer suggestions for its improvement. I am encouraged, however, by Flexner's remark that " medical education presents a problem not of medicine but of education " to compare what is being said about the teaching of medicine with general trends of educational reform.

Those who are concerned with the professional preparation of young people who intend to become physicians or surgeons are faced, like all other teachers, by the effects of rapid social and political change. They face problems which arise through the adoption by statesmen and Parliament of policies the roots of which lie elsewhere than in the sciences. They are expected to deal with vast and growing numbers of students many of whom are insufficiently prepared for advanced or professional work and who come from social strata which a generation or two ago supplied few university entrants. They are puzzled, as we all are, by the rate at which scientific knowledge grows and theories change. They note, often with dismay, that new specialized fields of study constantly crystallize out, while on the other hand the need for an integration of studies becomes ever more apparent.

As for our colleagues in secondary schools, they too meet problems which, at their own level, are homologous with those which we face in higher institutions. They too have to deal with large numbers of pupils coming from homes materially and culturally poorer than those which sent their children to grammar schools thirty years ago—homes, moreover, where there is no tradition of independent reading and usually no trace of a professional outlook. The courses of study pursued in secondary schools have been much broadened by the introduction of new subjects in the curriculum: more modern languages, more art and music, social studies. Thirty years ago, boys usually learnt in science only physics and chemistry, girls only botany; now both sexes learn a little about each of the three, plus a little zoology and sometimes some astronomy and geology. The total time allotted to science, however, is no more than it was. Inevitably, standards of attainment suffer : those who now enter the university are not as well grounded in the basic sciences as the previous generation. Furthermore, all young people nowadays are to an ever greater extent distracted from serious study by the pervasive radio, the call of the cinema, the football pools, and the multitude of mechanized amusements which seduce the adolescent mind from pursuits of more permanent value.

The Student at the University

In framing proposals for the improvement of university education it is well to begin by considering as clearly and vividly as we can the conditions in which our students live and the nature of the attractions with which we have to compete. Many, if not most, of the young people who attend the first- and second-year courses have come from middle-class or working-class homes, and they are anxious to establish themselves in the world and thereby to live up to their parents' expectations. Our examinations are to them primarily a way of obtaining guaranteed social status, together with the appropriate income, rather than tests of scientific or professional competence. Many of these young people are living away from home for the first time and, in addition, they are forced to be very economical. Apart from the relatively small proportion who have rooms in hostels or college, they occupy modest and cramped rooms in what are often noisy houses. For the most part they cannot afford to buy books, while a visit to theatre or concert is a rare luxury. Under such conditions, and in such a frame of mind, wide and leisurely reading is not to be expected : it will be replaced very largely by the " swotting up " of condensed and potted lecture-notes that are thought to be the essence of the course on which the all-important examination will be based.

These young people are often deeply impressed by the surroundings of a university and by the supposed eminence and omniscience of their professors. Of course, very often they hide their embarrassment and lack of assurance behind a deceptive façade of bravura and nonchalance. But it shows itself by their hesitation in asking for help when they need it, by their attempts to hide their ignorance when

it would be better to expose it so that it might be removed, and by the inadequate support they give to general university functions and activities.

These beginners, who have never acquired the habit of reading or of individual self-directed study and have learned to rely overmuch upon the help and direction of devoted secondary-school teachers who coach with care their promising pupils, are suddenly flung into lecture-room or ward. Occasionally unable to hear what is being said or to see what is being shown, untrained in the art of picking out essential principles from a mass of material, they tend to scribble down unimportant details, often mentioned by the lecturer only by way of illustration.

Of course, the above picture has been painted quite deliberately in rather sombre hues, but it is not, I think, altogether false. Nor need we feel unduly gloomy, nor bemoan the fact that things would be better if they were different. After all, our students are perfectly prepared to work hard and to exert effort if they are shown the way and wisely directed. They are not less intelligent and are probably as devoted as preceding generations. We have at our disposal teaching methods, as well as instruments of communication or exposition, and a general equipment of laboratories and buildings superior to those available to our predecessors. Further, we have the satisfaction of knowing that our methods of selecting university students enable us to get intelligent people from all ranks of society. We shall meet with success if we learn to mobilize and to employ effectively the resources at hand.

Activity Methods

In the effort at adapting traditional university methods of instruction to changed conditions, it may be helpful to study what is happening in the schools and to take account of the views of educational reformers. Not, of course, that this implies that university teachers should copy what is done elsewhere. At most, they must take account of the practices of those who specialize in the process of instruction in order to see whether there are here methods that might be adapted to meet other needs.

Incidentally, it is noteworthy that many of the ideas defended by so-called "progressive educators" and recommended by them for adoption in teaching young adolescents resemble in large measure the practices of the best and wisest university teachers. For instance, "progressives" have long condemned didactic methods—that is, the simple dogmatic exposition of knowledge, by a method involving mainly chalk and talk, to a whole class who listen passively and attempt to memorize, sponge-like, verbal formulations. It is said that this involves enormous waste. First, because human beings learn imperfectly by listening. Their minds have to be activated and sensitized, which happens most easily when they are forced to face and to deal with problem situations. Secondly, because different human beings think and learn at different rates, so that class instruction is too slow in tempo for the more intelligent and too fast for the less bright.

It is evident that such criticism resembles that frequently urged against the lecturing to large numbers of students which is the central feature of most modern universities, and not only in Great Britain. It reminds one, too, of the attacks of Professor H. E. Armstrong, some half-century ago, against the methods of teaching chemistry then current in school and university.

Reformers have urged that the success of a teacher anywhere is to be measured, not by the number of words or verbal formulations which his pupils learn, but by the degree of purposive mental activity which he arouses in them. And in order to arouse this activity they have recommended the adoption of a number of methods and devices, partly intended directly to stimulate purposeful thinking about practical problems and partly intended to individualize instruction—these two being always connected.

The "Project"

Possibly chief among these activity methods is what is called the "project," a scheme of teaching analogous to what the French call the "*centre d'intérêt.*" In its most extreme form a project method implies the abandonment of subject teaching; that is, children should no longer be taught mathematics, science, history, etc., but instead they should study and attempt to deal with a number of comprehensive problems. For example, as a result of joint discussion between teacher and pupils, the class (note: the class, not the teacher) might decide to spend a few weeks or months considering how the public water supply is obtained, purified, distributed, and got rid of; or how their city is governed and the public services paid for and administered. They would divide themselves into groups, to each of which a set task would be allocated or a definite problem assigned for study, again after joint discussion. During the course of the work the pupils would, so to say incidentally, be forced to learn some mathematics, science, history, etc. At the end, when the project is accomplished, the results would be displayed, shared, made public in a series of papers, an exhibition, perhaps a play.

Some years ago many schools, especially in the U.S.A., organized the whole of their curriculum in such a manner. Experience has shown quite clearly, however, that this is going too far. The result is inevitably that the young people do not, when they leave school, possess any worthwhile equipment of knowledge and skill organized in such a way as to make it generally usable. It is now accepted that it is wise to retain subject instruction but that the latter gains in value when the curriculum is enriched by a number of project activities.

Incidentally, projects nowadays are nearly always proposed and adopted in the form of problems which lead, when analysed, to subsidiary problems. Thus teachers go some way to meet the wishes of H. E. Armstrong, who, it will be remembered, urged that all science everywhere be taught by a heuristic method, modelled on the research work of investigators who attempt to find answers to problems. They go some way, too, to adopt the advice of modern psychologists, chiefly of the Dewey school, who have pointed out that active thinking takes place most easily when a human being faces a real problem of importance to him.

There are, I think, one or two things which can be learned from this experience, remembering that the university analogue to didactic teaching is the lecture. For example, one might suggest that an effort be made to provide for groups of students, even in their first or second year, as part of their general course, some project or other which they could investigate. And, further, one wonders whether the practical work which they are asked to do might not, in a great many cases, be set as the practical investigation of a problem, an attempt to find the answers to questions by methods of experiment, rather than as a simple manual exercise involving no more than the careful following of detailed instructions.

The second tendency, mentioned above, arises from the clear realization that the ability of pupils and students varies between very wide limits and that they work and

learn at very different rates. There is, of course, no doubt that private tutorials—one pupil, one teacher—form the most effective of all methods. The way in which slow learners sometimes manage to pass, after a few months' coaching by a crammer, examinations which they had failed more than once illustrates the point. Again, it is clear that quick learners waste much time listening to lessons or lectures the speed of which is adjusted to the average. However, the cost of a full tutorial system of instruction would be much too heavy, in money and in personnel, to be borne at a time when universities have everywhere doubled in size.

The Dalton Plan

The Dalton plan—the name refers to a town, not to a person—worked out in the U.S.A. some thirty years ago, was an attempt to adapt methods of instruction to the requirement of individualization and to offer pupils the advantage of private attention without having to provide an excessively numerous staff. In essence, the plan consists in the careful preparation of detailed assignments telling the pupils what to read, which experiments to try, which problems to solve. These assignments are worked out together by teacher and pupil, and they provide a plan of activities intended to last for a month or six weeks. The pupil works at his own rate, distributes his time as he wishes among the different subjects, and consults his tutor whenever he meets a real and insurmountable difficulty.

Two points deserve mention. First, that many schools adopted the whole plan in the nineteen-twenties and thirties. Most have now gone back to a modified form of class teaching, devoting, say, only the afternoons to individual work on assignments. The chief reason was that the full "plan" overloaded the staff, even though the weaker pupils still failed to get sufficient attention. It seems that the scheme does not work well if the pupil:staff ratio is greater than about 8:1.

There is here, too, I think, a lesson to be learnt. The old "Oxbridge" tutorial system involved regular meetings between tutor and student, at which the latter read essays and had them thoroughly criticized. It is a system which admirably develops verbal facility and a happy command of language as well as a general interest in a rather vague and woolly philosophy. It is not particularly well adapted to the requirements of science-teaching. Tutors would probably find it well to spend most of the time available in planning courses of reading and laboratory work, taking care that these plans are duly noted down in a diary. American universities are certainly moving in this direction—indeed, many of us tend to think that they have already gone too far in supervising the work of their students, setting them tasks and problems, planning every minute of their day. However, we in Britain certainly have not gone too far and we usually leave our students too much to their own resources.

Social Aspects of Science

In all proposals put forward for the reform of school curricula and for changes in the content of instruction, there is one common factor. It is always urged that the material be selected and taught in such a way as to make evident its social importance. Some, indeed, go so far as to say that subjects or topics which have no social importance should not be taught at all. Now, in part, this tendency arises from the changed standpoint of the psychologists. The old faculty psychology is no longer defended by anyone. Nobody now thinks of the mind as a collection of mental muscles (called attention, memory, criticism, etc.) which are capable of being developed and trained by special exercises. Therefore one can no longer justify formal modes of teaching by urging that they develop powers of memory, observation, criticism, and so on. The justification has to make clear the social or individual value or utility of what is being done. In part, too, the new emphasis on social significance is the result of increased knowledge in the fields of sociology and of the history of science. But probably the true reason lies elsewhere: in the pervasive climate of thought, in the widespread realization that western civilization has to adapt itself to a changed technology and that it has to accommodate itself both to the challenge of Russian Communism and to the new conditions created by the emergence on to the world stage of the Asian nations.

However this may be, the point remains that our students are very receptive to lectures and talks on elementary sociology and on the social aspects of science. It seems that they learn more easily, are more receptive and attentive, when their teachers include references to such aspects in their courses. It would be a mistake to ignore or reject them as futile: their inclusion helps to activate the rest of the material by making it more evidently meaningful. In any case, one should not forget two facts. First, that one becomes a good doctor not simply by learning certain facts and skills, but also by acquiring certain attitudes and habits. Initiation into a great profession, with age-long traditions, is no easy matter. Secondly, as was pointed out earlier, most of to-day's university students come from homes where there is no professional tradition of any kind and where there has been no real contact with professional men and women. Thus, concentrating completely on pure subject-matter, and hoping quite simply that the professional attitude is sufficiently contagious to be caught across lecture desk or demonstration table, may not suffice. More direct methods may be called for.

The Process of Teaching

New inventions, of use in exposition, have always modified the business of teaching: one need think only of the invention of printing—or of the blackboard. The last fifty years have been particularly fertile in such—cheap linotype printing, new processes of colour reproduction, the episcope, the film strip, the moving film, the polygraph which allows easy reproduction of typed documents or even of diagrams and photographs. All these have found their way into class-room and lecture-room, but we have not yet discovered how to use them to best advantage. Potentially, the film is probably the most powerful of all these new media for the communication of ideas and of factual information. But it is also probably the most complicated and, because of its superficial attractiveness, the most prone to misuse. For instance, it is a mistake to use a film for showing the development of an animal from fertilized cell to adult. The whole point of the study is to show how one part develops into another. This study is most easily done on twenty or thirty still photographs, allowing detailed study. With a film each succeeding photograph wipes out the previous impression and the study becomes more complicated, the total idea more confused. Yet many of us would feel tempted to use a film in such cases—and would be disappointed by the result.

There is no room here to discuss the pedagogical problems arising from the use of such visual presentations. It must suffice to remark that their wider adoption, their more successful utilization, will depend upon our finding new ways of teaching. Our traditional methods have relied upon the spoken and the written word, and are adapted to

them. The new ways stem from the oldest of all methods of recording and transmitting knowledge—the drawing, the painting, the hieroglyph. But all of us, through the process of our own education, have been insulated from such direct modes, and many of us find it more difficult to interpret a visualization than a written page—except, for example, those skilled in reading radiographs.

One point arises directly and bears upon the much-discussed lecture-method of teaching. I have already indicated that educators and teachers, in general, continue to believe that the method has value, even though less than was thought. The tradition of university lecturing was established at a time when books were scarce and expensive. They are now cheap and numerous ; and they contain all the facts that are needed. The lecture never was an instrument of great efficiency as regards teaching facts : its value was chiefly in inspiring zeal, in developing a liking and gift for criticism and analysis, in permitting some contact, albeit rather slight, with persons of distinction. The example quoted by Professor Pickering of a brilliant lecture by Sir Joseph Barcroft on the kidney shows that it can do all this. But would it not be wise to distribute duplicated notes, diagrams, photographs to the students wherever possible, thus leaving the lecturer free to concentrate on his proper business and taking little account of whether he is mentioning enough facts ? The students must learn to get their facts elsewhere and in other ways than by scribbling quickly during lectures.

The Training of Teachers

I have left till last one of the most puzzling and difficult questions of all : whether university teachers need and would profit from special training in methods of teaching and in education. On the one hand, it is clear that the lack of teaching skill, and indeed common sense, of many brilliant research workers involves great waste of time. I remember listening to the lectures of a mathematician, whom I admired and still admire as a man of remarkable genius. I feel convinced I would have learned more had I been able to hear what he said : unfortunately he usually talked to the blackboard and not to his class. Again, I would have liked to copy down what he wrote on the blackboard : unfortunately he always stood in front of what he wrote and wiped it off immediately. I have often wished that someone had given him a few words of advice at the beginning of his lecturing career.

On the other hand, young university teachers know very well that their future career depends mainly on their research work and has very little to do with their teaching prowess. Many tend to regret, as an interruption to their serious scientific work, the need to teach young beginners. To suggest that they should set aside a year or six months would be felt by them to be quite intolerable, and in any case futile. Again, there is involved here—albeit in a very limited way—the principle of academic freedom. No university teacher will consent to have the content of his courses discussed or considered by others—except in the most general way.

Now, what in fact would it be well for the beginner in teaching to know ? I suggest that he would be helped by knowing about the instruments (episcope, film projector, and so on) used in visual education and about the educational techniques involved in their use ; that he would profit from advice about good methods of lecturing and of demonstration and that he needs criticism of his own methods so that he may remove his defects ; that he would find it helpful to learn something about the psychology of the adolescent and young adult as well as about the process of learning ; that he would enjoy the opportunity of discussing with men of experience the problems which he meets in his teaching work.

I venture to suggest, therefore, as a modest start : (*a*) that to every young beginner there be offered the opportunity of having an experienced teacher attend his lectures for a term or for a year. This experienced person would then discuss with him the method of arranging his lectures and his actual teaching : suggesting how best to introduce his topic, how to frame and word the problems, what aids to use, how best to demonstrate experiments, questions of voice production, and so on. It would be best if this adviser or critic were not himself an expert in the branch or subject being taught, for it would then be quite plain that there was no question of finding fault or of spotting mistakes. Possibly one might use for this purpose university teachers beyond the age of retirement : many would be glad to undertake so useful a job. (*b*) It would also be, I believe, highly advantageous if heads of departments made a point of calling together their staffs regularly to discuss various educational and pedagogical problems. Knowing how pressed for time all university teachers are everywhere, and realizing only too well how many committee meetings professors are expected to attend, one hesitates to suggest yet one more weekly or fortnightly meeting. Yet the advantages would be great, and it is not impossible that in the end time might well be saved. (*c*) Lastly, it is not inconceivable that week-end meetings of staff, say in one of the many conference homes now available, would be appreciated by all. At such meetings it would be possible occasionally to invite a psychologist or an educationist who might expound current views on some educational problem or tendency or on some new technique of teaching.

In my view, it would not be either wise or practical to attempt to go further than this at the moment. Indeed, some may find it slightly ludicrous to suggest forms of training for university teachers, remembering how many brilliant teachers there have been who have never had any training and who lacked all systematic psychological knowledge. One notes, however, that fifty years ago secondary teachers were never trained and had no systematic courses in education : now nearly all spend a year in a University Department of Education and, for the most part, enjoy this period and consider they have profited from it. In addition, one should not overlook the fact that the means and techniques now at the disposal of and used by university teachers are numerous and complex. In this situation it is unwise simply to trust to memory, to the powers of adaptation and imitation, or to native common sense. Something more is needed if the resources available are to be fully mobilized and wisely employed for the improvement of university education in general and of that highly important part of it which is medical education.

The Ministry of National Insurance announces that foreign students who come to this country during their vacation and take up temporary employment related to the nature of their studies will not be required to pay National Insurance contributions until they have been continuously resident in Great Britain for 26 weeks. They will, however, still have to pay Industrial Injuries Insurance contributions. Apprentices coming from other countries will also be excused from paying National Insurance contributions if they have not reached the age of 25 when they take up employment here in work which is related to their work abroad and the employment is not expected to last, and does not in fact last, for more than three months. These changes have been effected by the National Insurance (Residence and Persons Abroad) Amendment Regulations, 1950.