*Cum scientia caritas**

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THE College motto can probably best be translated as "Science with compassion". Compassion has a complex meaning. It includes tenderness and loving care, but this is not all. It also implies a "feeling with" another human being. It is this "feeling with" which enables a doctor to bring to bear on the problems of his patients, information which cannot yet, and probably never will be, obtained by "scientific" methods. Scientific method is subsumed by the chains of reasoning which logically link identifiable and identified causes with effects. This method, and the knowledge which results from it, I shall call "isomorphic."

I have chosen the College motto, *Cum scientia caritas* as the text for this Mackenzie lecture, as it epitomizes Mackenzie's outlook on life, as I hope to show. My main theme will be to examine the way in which, as a profession, we have lamentably fallen short of the sentiment expressed by this phrase. Medicine is a vocation and not primarily a science. This is a fundamental fact, that we forget at our peril. I shall also hope to convince you that the major function of this College should be the reinstatement of the holistic view of medical care which our motto implies, and which was exemplified by Mackenzie's life. We, as doctors, are in business primarily to help our patients solve their clinical problems. This is our vocation. Of course we must bring "science" to this process, but we cannot with any individual patient give up simply because we have run out of the ground of scientific method or systematized knowledge. I will not have to convince you that education which is confined to scientific facts and methods is only half an education. However, I shall hope to convince you that an education which is confined wholly to inculcating a hierarchic, systematic knowledge structure with scientific method as its basis is also inadequate and dangerously inadequate at that.

This knowledge is useless on its own. Only in the context of patients with problems and doctors with the necessary skills to apply this knowledge to their real problems, does it have any relevance.

The life of Mackenzie epitomizes the interaction between scientific, or isomorphic knowledge and the real needs of our patients as expressed in the clinical problems which they bring to us.

Mackenzie's professional life fell into three phases. The first coincides with his life as a busy and effective general practitioner in Burnley. The second phase coincided with his move to London as a cardiologist. The third and final phase was spent in his Institute at St Andrews. However, the basis for the two later phases was laid in Burnley.

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His special interest at that time was cardiology. His work provided, as raw material for this interest, real people with clinical problems. His aim was a scientific understanding of cardiac pathology. The raw data for his scientific model-making were first the symptom and sign complexes presented and elicited from his patients, and secondly, the outcome or natural history of each individual clinical problem. In time he accumulated enough information about the clinical outcome to discern a framework of a limited number of fairly exclusive alternatives, within which he could examine the frequency of occurrence of different symptom-sign complexes. There was nothing new about this technique, but he brought to it the essentials of accuracy, consistency in recording, and pertinacity of recording over time, to build up enough material for his purpose. However, this alone would not have been enough. His creative genius was expressed in the parallel development of his polygraph. This was virtually a machine for interpreting the dynamics of the cardiovascular system. The machine and the recording methods evolved in such a way that the different patterns of activity which were revealed by it, both in the normal subject and in each of the classes of pathological outcome, helped Mackenzie to discern more clearly each pattern of pathological outcome from all the other possibilities. Not only this, but the data from the polygraph enabled him to be specific about the relationship of any one symptom or sign with the detailed pathological changes in structure which accompanied it. In particular, he disentangled the various abnormal sounds and murmurs heard on ausculation and the association of each of these with the pathological changes in the heart valves which were responsible for them.

Mackenzie had achieved this stage in the development of his model of the normal and abnormal cardiovascular system before leaving Burnley. Thereafter, although he continued to use the polygraph for demonstration and research purposes, he increasingly discarded it for clinical purposes. Instead, he relied on elicitating more the signs and symptoms appropriate to each of the clinical syndromes. He developed his skills in this field to a point where he was more certain of, and placed more reliance on, his clinical diagnoses than on a diagnosis based on machine derived data. I do not think I have to elaborate on the moral of this to general practitioners.

The third phase of Mackenzie's life was spent at St Andrews. Here he attempted to lay the basis for a systematic extension of his approach to cardiology, which had proved so successful, to medicine as a whole. His philosophy was based on the systematic recording of symptoms and signs of the clinical problems which his patients presented to him and an equally systematic recording of the subsequent natural history. His hope was that patterns of outcome would eventually establish themselves and could then be correlated by cross reference to patterns of symptoms and signs. This cross referencing process would eventually result in the crystallization of new clinical syndromes. This was not achieved in his lifetime, and I believe will never be achieved in that way. This is for several reasons, the most basic of which relates to the absence of some third dimension equivalent to his polygraph. It may be that the auto-analyser is a partial answer; it may be that systematic virology and serology will provide yet further data; it may be that the computer will also play a part. However, I am also sure that Mackenzie grossly underestimated the contribution of his own creative genius to the total process. What was possible for an outstanding genius to do in the relatively restricted field of cardiology is probably not possible in the extended field of general clinical pathology. The field must somehow be broken up into manageable pieces.

There was one other special reason why Mackenzie's own approach failed in this field of general clinical pathology. He had not only a blind spot for the emotional element of disease but a definite prejudice against the idea that emotional factors could ever be involved in disease.

There is strong evidence of this prejudice in his correspondence. About 1914

he was confronted, in correspondence, with good evidence that the heart was not only influenced by the emotional state of the subject, but that the rate was to some extent under the direct control of the intellect. It is ironic that the data on which this hypothesis rested was derived from an experimental approach very similar to the one which he had developed with his polygraph. Mackenzie resolved the intellectual dilemma by terminating the correspondence and never answered the key letter.

However, although Mackenzie rejected intellectually the concept that the emotions could be involved in organic disease processes, this did not stop him from being an outstandingly effective clinician in the handling of everyday problems. We must all have had older partners and have known practitioners of the old school, who took a similar almost contemptuous view of the emotional component of illness and who were yet extremely effective general practitioners. I shall return to this theme later.

I began by saying that "scientific" knowledge is useless on its own. Only in the context of patients with problems and doctors with the necessary skills to apply this knowledge to these problems does it have any relevence.

I want to begin by examining these two main elements. The first is the content of real clinical problems. The second is the content of the problem solving process.

Not only do real clinical problems contain far more than is at present embodied in the structure of scientific medical knowledge, but the real problem solving processes also involve procedures which have not yet been made explicit. It is a fundamental misconception that effective knowledge consists only of what can be symbolized explicitly. The best definition of "science" which I know is a slight modification of the one proposed by Feinstein (1967). He has suggested that "science", as scientific method and knowledge, consists of everything which is both consistently reproducable and consistently transmissible from one person to another. I would add to this the words "in *symbolic* form."

"Science" has to be restricted to information which can be transmitted in symbolic form, for only by achieving an existence external to any human brain can this information be isolated from contamination with human attitudes, beliefs, values, and motivations. I have suggested that this type of knowledge be called isomorphic. All scientific knowledge consists of symbols which must denote specifically and uniquely (that is, ismorphically) each of the identifiable and identified causes and effects in the aspect of reality with which the model is concerned. It must also symbolize isomorphically the steps in the chain of specific interactions between those causes and effects in reality. These steps in the chains of interactions are in their turn symbolized isomorphically in the processes of logical reasoning. Logical reasoning is therefore an established symbolic model for, and reflection of, these different types of interactions which consistently occur between causes and effects in reality.

However, living consists of much more than this. We must beware of being trapped on the intellectual merry-go-round as follows. "Only those things which can be consistently reproduced and consistently transmitted to others in symbolic form are worthy of the designation scientific. Only scientific information is worth transmitting."

Many human activities can be consistently reproduced and transmitted to others in non-symbolic form simply by copying. Thus we first learn to stand, walk, talk, write, and generally use symbolic communication in the first place. I shall call this amorphous knowledge. The amorphous activities thus initiated by copying have their final polish applied by subsequent personal trial and error in real situations. Apprenticeship is the basis for the transmission of amorphous knowledge. You could, for example, teach someone else how to manufacture a flint arrow-head or to shave himself without the use of speech or any form of isomorphic symbolic communication.

Only human beings with the aid of natural language are capable of perceiving

their environment as a set of distinct objects, structures or interacting factors (nouns and adjectives). Only human beings are capable of perceiving environmental situations as sets of different functions or activities of these objects, structures or interacting factors (verbs and adverbs and adverbial phrases). We use language to designate and denote each object in the environment and the processes or interactions in which it is or can participate (Crombie 1971).

We must also recognize that when human beings communicate with one another only a portion of the total information is explicit in language symbols. Isomorphic knowledge, on the other hand, implies that the total information is conveyed by the symbols used and by the symbols only. However, we must never forget that the scientific models, although essential, can achieve nothing unless integrated with the more basic amorphous cerebral processes which more directly link perception with action.

"Factors" in the palpable macroscopic world are usually synonymous with object structures. Intellectual or scientific problem-solving requires the prior existence of a symbol system that consistently denotes one specific factor or object structure by one specific symbol. For example, specific atoms such as hydrogen or oxygen, molecules such as water, more complex inorganic objects such as planets, simple organic molecules, organisms and, finally the complex sub-units of human society such as parliament or university. This also requires the prior existence of a set of models of reality based on the same symbols, where the interacting factors in real situations are symbolized by object structure symbols and their specific chains of interaction in that context by object-function symbols.

Only in this way can a structure of knowledge of the environment, explicitly expressed in symbolic form be constructed. The essence of these models is that they are not only isomorphic with reality at any point in time but they will also consistently anticipate the outcome of events in reality. It must also be obvious that these models must always be restricted to a small set of all the possible activities that could involve the interacting factors. "Pure" knowledge is in essence the indefinite extension of this model making. However, men on the whole have taken the practical view that the most important models will be those that relate to the real problems of man, and medicine should be no exception.

For example, in any scientific description, and many aspects of medical knowledge can be so classified, any individual with a clinical problem can be approached scientifically by identifying all the interacting factors in the clinical problem situation, by referring to suitable knowledge sources for models which will consistently anticipate the outcome of this particular set of circumstances or factors (the prognosis) and finally, by considering the various outcomes which will consistently follow the addition of alternative factors or treatments. The best or ideal treatment is the one which maximizes the benefits to the patient and the community in which he lives.

Let us now look more closely at this clinical problem-solving situation, remembering that our primary aim is to help the patient to ameliorate or cure his clinical problem.

At this point I would like to introduce an actual patient, Mrs P. Mrs P. happens to be a direct human link between myself and Mackenzie, in that we have both had the privilege of being her doctor. She was born in 1887 and lived in Burnley in her younger days. She consulted other doctors but treatment had not been successful. It is not possible now to be sure of the formal diagnosis. It was probably peptic ulceration, but might just have been anorexia nervosa. Of much more interest are the social background of her illness and her comments about Mackenzie. We worry nowadays about the social factors in illness. This may be because they are qualitatively much less significant than

in the past. Mrs P started work in the mills at the age of 11. As she said herself, she was only allowed to work half-time until the age of 13, when she began full-time work, full-time in those days was 60 hours per week. Mackenzie treated her complaint with sensible advice about diet, chewing her food and taking milk frequently. The only medicine prescribed was liquorice powder. She also remembers very vividly that he told her mother to "shut up, woman, and let the girl tell her own story". I think you will agree that Mackenzie never lost sight of the fact that his primary aim was to help his patients solve their clinical problems. So from the vocation of medicine in Burnley in 1904, to our attempt to analyse the content of this vocation.

The clinical problem

First, what is the content of such clinical problems and how should we classify them in terms that are both scientific and practical?

Putting the patient with his problem first, that is, his abnormal response to circumstances which may be abnormal or normal, we can classify this abnormal response in two ways. There can be abnormal structural changes or responses on the one hand, or abnormal behavioural or emotional responses on the other. Of course, primary structural abnormalities may also result in abnormal behaviour; for example, the so-called organic psychoses, and on occasions primary abnormal behavioural responses may result in secondary structural changes and abnormalities, the so-called psychosomatic diseases. Also, structural and behavioural abnormalities may have abnormal socio-economic consequences for the patient or others.

However, if we go back to our original starting point, the patient with his clinical problem, we must consider organic or structural components separately from the emotional and behavioural components, if only because they so often occur together. The one dimensional classification of disease which we usually use does not allow us easily to describe any real individual's real illness, unless he has one and only one disease process. In particular, we can describe either a structural or a behavioural abnormality but not both.

The material in table I was derived from a study involving 12 general practitioners in this country and on the continent (Crombie 1963). It included some who believed emotional factors to be of importance in illness and some who believed that they were not of importance. In the event, their scores were all remarkably similar. The main findings were that in nearly 50 per cent of all problems brought to general practitioners, there was an emotional, behavioural or psychiatric component which could not be ignored, and in nearly 30 per cent this factor was of equal or greater importance than the organic component.

TABLE I

ASSESSMENT OF EMOTIONAL AND ORGANIC ELEMENTS IN DISEASE

	I.	*II.*	*III.*	*IV.*	*V.*
Percentage of episodes ..	*52*	*21*	*13*	*6*	*8*

I. An illness all or nearly all organic.
II. An illness, mainly organic, but with some abnormal emotional content.
III. An illness with emotional and organic components in equal proportion.
IV. A mainly emotional illness but with some organic content.
V. An illness all or nearly all emotional.

From this simple study, it is clear that as often as not, both structural and behavioural components are present and no advice or treatment which ignores this can be complete. I believe that this simple situation lies at the base of much of the distortion of our so-called "scientifically orientated" if not "scientifically based" medical education.

Apart from the content of the clinical problem with its often indisoluble mixture of the physical and the emotional, there are also the causes and the consequences

of illness. The causes are often a mixture of socio-economic features interacting with the more conventional aetiological factors. The consequences likewise often have socio-economic components. Margot Jeffreys (1966) has shown in one study in Buckinghamshire that 30 per cent of all social problems were identified primarily in general practice and that about one third of all problems handled by general practitioners had a socio-economic content. Usually, this socio-economic content is the consequence of, or at least precipitated by, diseases rather than the actual cause of disease. However, the multiple causes all converge on, and the consequences however multifarious all rise from, the individual with his clinical problem. All these socio-economic and other features, however scientifically we may denote or identify them have meaning only in relation to the patient with his clinical problem. This is the reason why the general practitioner has survived and why he is unlikely ever to be replaced.

This is the background to a wider assessment of the content of clinical problem solving with its final objective of helping the patient to solve or ameliorate his problem. Only a part of this total problem can be dealt with by methods and techniques which can utilize pre-existing scientific models with their one-to-one equivalence with an actual problem and all its component parts. This one-to-one equivalence must be confined to those parts of the total clinical problem where truly scientific knowledge exists. On the whole this means serious organic disease, and excludes those large areas involving abnormal emotional and behavioural responses and causes with their origin in abnormal socio-economic factors.

Where do we go from here, from this point where by using "scientific" methods, we have established that much of our field of work cannot now and probably never will be a true science? It is here that we should remind ourselves that isomorphic adaptation, with its basis in isomorphic perception, is not the only basis for effective action or adaptive responses. The rest of the animal world other than man bases its whole existence on amorphous or non-isomorphic, adaptive programmes.

The animal which makes an effective choice between running away or standing and fighting does so, not after an intellectual assessment of all the factors, but on an amorphous perceptive analysis of sensory input whose only essential functions are, first, to identify the context as one in which running away or standing and fighting are the only alternatives and, secondly, which of the two alternatives is the most likely to result in survival. I would suggest that much of our own clinical problem solving rests ultimately on similar amorphous mechanisms. For example, in the elderly man with chronic bronchitis who presents with a bad cold and cough, apyrexial but with purulent sputum, the clinical problem is not primarily whether specific organisms or other agents have precipitated his present illness, nor what particular pathological changes of structure are taking place within his body. The primary clinical problem is whether this man with this clinical problem should be advised to do nothing and ignore it, stay at home for a time in an even temperature and rest and so be off work, or any of the above plus a broad spectrum antibiotic. The primary problem is whether or not to use antibiotics.

Of course, scientific isomorphic models identifying causal agents and actual structural changes in the body, if they can be constructed, will provide an isomorphic and completely "scientific" answer to the problem. However, for a variety of reasons of which the time needed to construct this model is the most important, the automatic use of the scientific approach is precluded. If antibiotics are necessary, they must be given for maximal effectiveness, before the clinician can be sure that they are essential.

Cohen (1943) summarized this amorphous approach when he said that "diagnoses are sign posts to action". This must be so, for an examination of the diagnostic terms and labels used by general practitioners to describe the disease processes which they have decided are part of their patient's clinical problems, shows that in less than

five per cent does the term imply an isomorphic, scientific knowledge of aetiology and pathological changes, let alone whether the user was sure that this was so for the individual case in which it was used (Crombie 1966).

We can summarize by saying that the doctor in general practice particularly (but I suspect also in every clinical situation) has to make effective judgments and take effective actions, without the benefit of total isomorphic knowledge. Of course, to this process must be brought the greatest amount of science in the form of isomorphic knowledge which can be mobilized. This goes without saying.

Many of the so-called "short cuts" in diagnosis are simply effective, direct, amorphous pathways, hammered out by the user in the forge of experience. These pathways lead directly from the patterns of presentation of the problem in the form of symptom and sign complexes to the appropriate effective action in the form of therapy and advice.

Once we admit the operational respectability of this process, we can start to be systematic about how we should analyse it and teach it to others. At present, each of us finds these direct pathways for himself in the face of a teaching tradition which expressly and explicitly damns them as bad or at least as "unscientific" medicine. In fact, the only truly scientific approach is to establish clearly the limits of the isomorphic approach in terms of problem situations. This is evaded by the academic approach which, at the moment, takes disease processes as the primary component of medical care. If this is done, then it is completely logical to ignore the amorphous element of clinical problem solving and concentrate on those aspects of clinical problems which concern the isomorphically identifiable aetiological and pathological components of disease processes. This is the scientific "merry-go-round".

One result of this approach has been to stultify any real examination of the components, other than these disease processes, in clinical problems. For example, it is often said that general practice consists simply of the application of the principles of general medical knowledge (that is isomorphic knowledge of disease processes) to the special field of primary care and particularly primary assessment. This enables the whole amorphous field of knowledge of the behaviour of individuals, small groups and societies in relation to disease, to be dismissed as simply a field of application of medical knowledge, where the appropriate skills can only be acquired by carrying out the job. The doctor only becomes effective by discovering the specific characteristics of the community of patients which will form his practice as a community, and of each of the individuals in that community by applying his scientific knowledge acquired during his medical education, in that local situation.

If one starts with the, I believe unwarranted, assumption that all that matters in medicine is isomorphic knowledge, then this is all terribly logical. After all, medical knowledge thus defined is consistent with the original definition which I took from Feinstein. You will remember that this defined science as anything which could not only be consistently reproduced, but also consistently transmitted to others in *symbolic* form. The term symbolic is the important qualification. One can teach another individual something by precept without any symbolic communication by speech or writing. Only by this means can we learn to walk for example. Learning to talk symbolically and even read and write are also learnt largely by precept and copying.

My case so far rests on the establishment of the fact that a large part of the clinical problem-solving activities of doctors, cannot be covered or described in isomorphic terms, yet must be acquired by any individual who is to become an effective doctor.

Medical education

It is also worth examining the present content of medical education. The philosophy for undergraduate medical education in this country is based on the belief that the

purpose of the undergraduate training course is to inculcate the concepts of medical science, concepts which will be common to and the essential basis for all vocational as well as non-vocational situations in later postgraduate life. As a rational corollary to this belief, all vocational training can be postponed to postgraduate phases. This corollary is only rational, if the underlying philosophy is true. I would suggest that it is not true. Notwithstanding the belief of most undergraduate teachers and administrators that they teach medical science, it is surely obvious that all undergraduate training has a large vocational element. For example, the whole process of medical clerking and surgical dressing with its emphasis on systematic procedures for history taking, examining the patient and eliciting further clinical information by radiological and other examinations, is pure vocational training. Simply because it is systematic and scientific in our terms, that is consistently reproducable and consistently transmissible to others, does not mean that it is not also vocational. I would go further and make one other obvious observation. To most of us here as well as to the students in training today, it was just this element of involvement with real patients with real problems which began to make sense of the previous theoretical knowledge of anatomy, physiology, pathology, biochemistry, epidemiology and the other basic medical sciences. This was the cement between the scientific bricks from which the wall of effective clinical knowledge and enterprise was finally built.

The vocational content

If this fact that vocational training is a large and important element of present undergraduate training was simply a blind spot in our perception of medical education, it would perhaps not matter much, but it has had and still has devastating consequences. This hidden vocational content is all related to and also virtually confined to the context of hospital medicine. Because this essential cement hardens in the foundations of the wall, the wall thereafter reflects the *ad hoc* clinical content as well as the ethos, attitudes and expectations and motivations of hospital medicine. It is not overstating the case to say that many of us here today have had painfully to rebuild those foundations before we could be come not only effective practitioners in the community context, but professionally satisfied as well.

While those responsible for medical undergraduate teaching can maintain that there is no vocational content in undergraduate teaching, they can also evade their responsibility to ensure that the essential vocational content that does and must exist has also a balanced content. By balanced content, I mean that the bricks of medicine must be bound together, not only with the cement of vocational problems in the hospital context, but also with the equivalent vocational patterns in the community context, particularly where these differ or are at variance with one another.

The situation which exists here is analogous to the intellectual prejudice of Mackenzie about the amorphous emotional content of illness. He was an effective doctor nonetheless, because the necessary additional clinical programmes on which he relied for his effectiveness were amorphous and not perceived intellectually. Medical education, by its nature, cannot evade the problem by ignoring it.

Amorphous clinical solving is involved in many aspects of good doctoring. To begin with, we have those learning processes where the details and total structure of some aspect, for example both history taking and physical examination, are only completed for any individual doctor by two additional elements to any basic isomorphic model. The first of these amorphous unsymbolized learning processes is learning by copying. This, in its extended form, is what all apprentice training is about. The second of these amorphous processes is learning by trial and error. It is the potential for serious mistakes by the trainee during this often essential part of the learning process, that makes an apprenticeship training mandatory.

You may feel that this is so obvious that it is hardly worth spelling out. However, unless we spell it out, we are not providing a logical argument for the involvement of general practitioners in the medical curriculum from the very beginning. Only by making a logical case for the amorphous cement between the isomorphic bricks can we evade the suggestion that our views are simply subjective and a matter of opinion.

On the other hand, if our view point is accepted as logical, then the need for the threads of scientific, systematic isomorphic medical knowledge to be interwoven with the threads of actual contexts of real problem situations, becomes unanswerable. Since most of the clinical assessment of real problems will take place at the point of primary assessment in the community, it is also unanswerable that a large part of the weaving process must be provided by actual problems in the community setting.

It is often said that undergraduates are not mature enough to integrate isomorphic systematic knowledge with the handling of actual patient problems. On the contrary, I think it is now clear that the process of excluding this personal involvement lies at the basis of much of the frustration of the modern student and simply postpones his emotional maturity. It must explain why a large majority at graduation still see some aspect of "scientific" medicine or hospital based medicine as their personal aim, rather than the, to them, unknown hazards of real doctoring.

Blending the scientific and the vocational

Surely the medical curriculum must reflect this need to present the isomorphic structure of scientific knowledge along with knowledge of these complementary amorphous clinical problem-solving and assessment methods? Surely the isomorphic bricks and the amorphous cement can only produce a satisfactory wall, if used together? Surely patients with their problems should be presented at every possible opportunity with isomorphic knowledge of the problem area? For example, at Memorial University, Newfoundland, students are introduced to patients with problems in their first preclinical year. Sociology, as half of human biology, is taught around an *ad hoc* framework provided by patients with appropriate and suitable problems from the teaching practice. I do not have to stress how in our time, most of us found medical clerking and surgical dressing the first vivid glimpse of what medicine was really about. Further revelations were usually vouchsafed to us during a spell in any casualty department and during obstetric training. That practical obstetric experience is incorporated in undergraduate training today was largely due to the personal influence of Mackenzie.

Nowadays, the main pressures for more vocational and patient problem-orientated teaching, come from general practice on the one hand, and the students themselves on the other. In North America this has now gone so far that it is hardly a caricature of the students' view to present it as "Don't bother us with the theory, just show us how to do it".

Doctoring, like teaching, is a vocation and not a "science". It uses as much scientific knowledge as it can, but it is not confined by the boundaries of isomorphic knowledge. So fundamental is this point that it should surely be inculcated from the beginning of all medical training? Surely, if we do not treat it as a vocation from the beginning of training, we are failing those we teach?

When Flexner appeared on the scene some 60 years ago, it was reasonable to concentrate entirely on a framework of science and isomorphic knowledge as the basis of training, for this aspect was almost non-existent at that time. No one would argue that this framework should not continue to be the basic framework for training now. What can be argued forcibly is that the inculcation of this framework on its own, is to teach only a skeleton devoid of the flesh and blood of the amorphous vocational content. Surely, the fact that the two aspects are indissoluble, that one makes no sense without the other, should be inculcated from the beginning of medical training? The fact that

the amorphous vocational element cannot be transmitted symbolically is no reason for not transmitting it at all. Flexner must be turning in his grave at what has resulted from the implementation of his original recommendation, at the fact that the movement of the pendulum he started is still swinging merrily in the same direction. As recently as 1966 the cry of "back to Flexner" could be invoked to justify even more isomorphically and symbolically transmitted knowledge during medical training (Miller 1966).

Postponing vocational training, in the context of community medicine to a postgraduate place and limiting the content of undergraduate vocational to the context of clinical problems of hospital medicine is having one other effect. This is evident in the way in which postgraduate training and vocational training for general practice is evolving. In vocational training for specialist medicine, the bulk of the training is carried by relatively young men in the registrar grades, in particular during their fourth and fifth postgraduate years. These young men are also carrying a service and often also a research commitment. They are able to function in this way as teachers while in their prime, only because they have had inculcated the necessary isomorphic and amorphous components of scientific and vocational training while still undergraduates. They do not have to spend several postgraduate years in building up this balanced basis for good clinical medicine in their vocational context of the hospital setting. In contrast, during the equivalent postgraduate years in general practice, the bulk of the training has to be provided by teachers already established for some time in general practice. At the moment, few, if any, would be bold enough to suggest that satisfactory vocational training could be reliably and consistently provided by young general practitioners four and five years after graduation. On the other hand, I would suggest that this is a target at which we should be seriously aiming. If the assessment here is correct, this could only be achieved if the vocational spadework for community medicine is incorporated in the undergraduate phases.

There are many problems to be overcome before this can be achieved. There is first the entrenched position of the teachers of the non-vocational and most isomorphic and scientific aspects of medical knowledge. It must be clear that a balanced medical education containing an increased vocational content can only be achieved at the expense *initially* of some reduction in the details of the isomorphic content, though not of the principles; this in turn can only be achieved by reducing the actual teaching time spent on these isomorphic subjects. I do not think that I am being cynical if I suggest that one way out of this impasse, one way of reducing the time spent on teaching isomorphic detail, in the context of an inevitable expansion in student numbers, would be to maintain the present establishments in terms of money, staff, buildings and equipment of the non-vocational department, but deploy these resources on twice the number of students for half the present curriculum time and detailed content. The curriculum time thus liberated would then be available for vocational type training in the community context outside the walls of the medical schools. There is no doubt that a reservoir of good hospital vocational training exists now in non-teaching hospitals and I have confidence that a similar reserve is available in the community based services as well. Not only are the potential teachers available, but the buildings and equipment appropriate to the teaching of clinical medicine in the context of the community outside the hospitals are also becoming available.

In some ways a thirst for scientific isomorphic knowledge could be interpreted as a desperate attempt to find an objective, non-emotional, unbiased basis for a "world view" uncontaminated and distorted by local or schismatic greed, selfishness or passion. This was the intellectual motivation of such men as H. G. Wells. However, such an approach is doomed to sterile failure unless the quest for this isomorphic knowledge is not only guided but ultimately determined by the adaptive needs of man and his group systems. This really brings us back to the beginning of the circle. Science can

never be an end in itself or a primary "good". It can only be the handmaiden of social and adaptive needs. It must always be a secondary means to these more primary ends.

Doctors, and particularly general practitioners, have a special part to play in guiding the development of modern society. I believe that doctors, who have to help people with problems often when no isomorphic knowledge or method exists or where help from these sources has been exhausted, embody a philosophy for all men. Our work if we are effective doctors ensures that we remain painfully aware of those problems or aspects of problems for which isomorphic scientific answers are at present unobtainable. We cannot, by retreating behind the "pale" of some speciality, slough off our responsibility for providing some help.

I believe that we are at the beginning of a new era in medical education, an era which will begin by an explicit recognition; that medicine is a vocation, a vocation to which one brings at all times the maximum science; that it will be explicitly recognized that all training from its earliest phases has always contained a vocational content; that vocational content has been and will continue to be essential if any student is to acquire his basic knowledge for subsequent practical application; that the vocational content must be balanced from the beginning of training and contain a reasonable mix of the contexts in which the vocations of medicine are practised. Only in this way will we ensure that students bring to their postgraduate training an ethos, a set of values, expectations and motivations appropriate to all the different vocational fields.

This is where we return to the College motto, *Cum scientia caritas*. If we enlarge the meaning of *caritas* as "compassion", to include the concepts of total amorphous perception of any problem situation in its entirety, the unsymbolized and unsymbolizable as well as the scientific and isomophically perceived elements, then we are also emphasizing the need for this awareness to be included in our education as well as in our vocational activities. In this we only follow in the steps of Mackenzie who, however amorphously he perceived the situations, based his life's work on the same principle.

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THE COLLEGE OF PHYSICIANS

It is confidentially reported that a general meeting of the Medical Faculty will shortly take place, to petition Parliament for the establishment of a "College of the Faculty of Medicine" on a new and more enlarged scale; to rescind the old and obsolete laws of the present college; and to join the Medical, Pharmaceutical and Surgical professions into one and the same college, so that there should be no distinction between physician and surgeon; just as it is now at Paris and at Edinburgh: since it is the general opinion of all that the separation of these three branches is injurious to all, and is the real reason why it has become the fashion to employ the Apothecary who unites all three, to the almost total exclusion of the Physicians who profess but one.

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