THE OBJECTIVES OF MEDICAL EDUCATION,
An Introduction to the Consideration of a Curriculum*

If one considers what the majority of the graduates of our medical schools do in their professional lives, the answer is, of course, that which is termed "general practice." Therefore, the objective of a medical education, it is customarily assumed, is that which will develop the best general practitioner. Of course, the qualities required of him are well recognized, but their relative importance may be a matter for argument; certainly the effectiveness of education upon certain of these is, to a considerable degree, still a matter of opinion.

The quality which every one would place first is that of integrity, both in the usual sense of honesty and also in the broader implications of its Latin derivation, of "wholeness and uprightness." It would also be agreed that this is a peculiarly desirable objective, whatever activity the physician might undertake in subsequent life. That which medical education can do about this on the positive side is, however, all too little. The student in the school of medicine is an adult, contrary to common opinion, and particularly so in respect to the underlying qualities of behavior and conduct. He has already been heavily conditioned by his environment in family, school, and college during those plastic and formative years when these qualities are most readily molded. In a negative sense and indirectly the school can do something by culling out at the start those who are obviously dishonest and by restricting admissions to those men whose primary interest in medicine is an intellectual one rather than one of advancement in a social or financial way. Once in, such changes as may occur for the better or for the worse will result from the example set by members of the medical profession within and without the faculty. The school can, at least, see to it that its faculty contains no member whose integrity in the broadest sense is questionable.

A second objective desired in the ideal physician is that of intelligence, or, better, a proper intellectual ability. Again, every one would agree that

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The objectives of medical education | HARVEY

there must be in a student a basic capacity for learning, but many schools set this very low or indulge in the vain hope that by proper teaching this can be increased to a reasonable level. The latter is not true, in theory or in practice, though the learning habits of work may serve to bring a proper intelligence into action. This occasional occurrence leads to the false hope that many of those giving past evidence of low intelligence accomplishment may be regenerated in the medical school. It is time that schools of medicine stop admitting these, even if this does reduce the size of the student body and the resultant income from tuition.

A third quality, just referred to, is that of capacity for work, and by this is meant, for the most part, not physical but intellectual labor. In this there are two components, one a faculty for sustained work, the other, of no less importance, a faculty for initiating work. These may, for the sake of brevity, be called work endurance and work initiative, respectively. The lack of these in the physician leads to a static attitude where only the acute pressure of circumstances may occasionally force him out of a routine approach, learned in school as a finished thing. Probably the lack of initiative and the absence of a sufficiently demanding intellectual curiosity is responsible for more poor practice of medicine than any other one thing. The ideal physician will be dynamic, continually learning throughout his professional life by virtue of a capacity for work initiative and work endurance.

In relation to this the teaching methods of the school of medicine may and do accomplish much. It is here that the traditional theory of discipline enters in—so strongly that in university circles it is customary to refer to fields of study as disciplines.” Behind this lies the concept that a timed, enforced performance will bring a student into habits of behavior that will persist throughout life and from this has arisen the educational method of enforced attendance at exercises, the controlled systematic coverage of material, the frequent checking by oral and written examinations, and the evaluation, in mathematical terms carried to absurd degrees, of the work done. The student puts his tuition in the slot, jumps in the hopper, and comes out the spout of the machine, a link of sausage even down to the cellophane wrapping of an appropriate degree. That the method is effective cannot be seriously questioned but that the effect is beneficial in respect to the continuing quality of work which the ideal physician should do is another thing, for work so done by command and rote, and so checked, destroys initiative and makes by these associations intellectual work disagreeable. The student becomes dependent upon a continuing obligatory supervision which will be conspicuously absent in his future professional life.
The only situation where such a form of discipline is carried out to a greater degree than in our present educational system is in the armed forces where a primary objective is unquestioning obedience to an always present command. Under these circumstances this is desirable, but in the absence of authoritative leadership such disciplined forces are bewildered and ineffective. So undesirable is it in other respects that the English language has been enriched by the word "soldiering," a behavior that is by no means unknown in disciplinary education.

Another quality that is highly desirable in the physician is that of "common sense" or, to descend further into the vernacular, "horse sense." Based on superficial empiricism or obtained ex cathedra from the teacher, this is frequently misleading and dangerous. On the other hand, when derived from a properly proportioned integration of one’s knowledge and experience, it is of the greatest importance. Without "surgical judgment" the surgeon is likely to be a dangerous man, and is the more dangerous the greater his facility in technique, and while not so immediately apparent, this is equally true in the other divisions of medicine. That this quality can be taught by disciplinary methods is highly questionable, for its development depends upon a balanced integration of past experience and present situations, with a view to the future; a process which is learned for the most part by experience and example. Judgment is closely allied to that other abstract quality, integrity. With respect to both of these the student frequently is irrevocably conditioned by his family and scholastic environment before reaching the medical school. The best that the members of the faculty can do is to set an example in their own behavior while giving the student the opportunity to exercise his own judgment in situations involving responsibility so that he can learn by experience. Without responsibility involving an intrinsic reward or penalty for good or bad judgment, the exercise is largely meaningless.

Lastly, a quality which is basic in the properly educated physician is that of a faculty for ascertaining the truth (perhaps more strongly expressed in the German "die Wahrheit") or as close an approximation to it as is possible. Knowledge which does not correspond with reality is peculiarly dangerous in the field of medicine and by experience we know that even at its best it is of a changing quality. The ideal physician is not one who has a content of knowledge of a certain vintage, but one who has that of the present moment critically evaluated. Moreover, he is faced constantly, whether in the laboratory or the clinic, by problems soluble only by the "scientific method." Science defined as knowledge and art in the use of it are alike, based soundly only upon the scientific method which alone is constant while
that with which it deals is changing. It matters not whether the problem is confronted in the foundation sciences or in clinical medicine, whether in the laboratory or in the clinic, whether it be with the experimental animal or with the patient, the approach, although the nomenclature may be different, is the same. In the laboratory one accumulates related facts within a field of interest, and by the logical process of induction arrives at hypotheses which one tests by experience or experimentation. From this a further hypothesis may be constructed, and this process may go on indefinitely, in each phase arriving at a closer approximation to the truth. This method was first developed in clinical medicine, but with a terminology of its own. Here, the assembling of facts is the obtaining of subjective and objective data about the patient and from this is derived by induction a tentative diagnosis. From this one concludes by deduction that if this be correct, certain other facts must obtain, which are checked by further observation, or by experimentation, one form of which is treatment. The art of the clinician, as well as that of the investigator in the laboratory, is skill in the application of the scientific method; otherwise it is but a vain and deceiving quality. The scientific method is then a basic, one might well say, the basic motif underlying all learning in the medical school and about this its methodology of teaching should be oriented. To this, if achieved, all else will be added, at least in so far as teaching will do so.

It must be obvious that the scientific method cannot be properly taught by the lecture, or from the book. It is not a static thing such as is knowledge at a given moment, but a dynamic or functional process which is best learned by direct experience. The province of the faculty, clinical or otherwise, is to set an example by actively engaging themselves in the solution of problems by this method and in giving the student ample opportunity to do so himself, for with repeated use of any method comes skill.

It seems apparent, then, that of these qualities of integrity, intelligence, capacity for work, judgment, and skill in the use of the scientific method, none can be best taught by the traditional didactic and obligatory methods. They must all be learned by the student from example and by personal experience gained in the laboratory and the clinic, rather than in the lecture hall and the recitation room. Bring him into working contact with a senior person of integrity, of high intelligence, of great capacity for initiating and sustaining work, of sound judgment, and one constantly employing the scientific method in the solution of problems, and a sound approach will have been made toward the objectives which the school of medicine should have in view.
Many objections will be raised to this thesis, some based upon traditional and fixed concepts, some upon the supposed necessity for teaching masses of students of mediocre quality, and some upon misunderstanding. The last should be corrected in so far as one can foresee the points at issue.

It is notable in the discussion so far that the content of knowledge necessary for the medical student has not been referred to; and this has been intentional, for with a proper educational approach knowledge will be obtained not only during the school experience but as a continuing process thereafter. On the other hand, knowledge gained perforce from the teacher and under the system referred to as the disciplinary type of education has a fixed and dated content, and is of an authoritative and dogmatic nature which inhibits further development on the part of the student. One trained with the primary objective of a content of knowledge imparted from above, under rigid supervision and systematized instruction during a period of four years, is likely to have acquired a revulsion against the learning of knowledge. Particularly is this true of the average man, and it is a credit to our more intellectual students that so many have succeeded in circumventing this deadening effect and in acquiring vicariously a continuing desire for learning.

There should be no misunderstanding to the effect that a content of knowledge is considered unimportant, for that is not the case. It would be absurd to suppose that any process of medical education should not result in an effective content of knowledge, but this may be obtained by a flank rather than by a frontal attack.

It is necessary as a first consideration to decide what an effective content of knowledge may be for the student in his various stages of progress through the school. An approximation to this which is largely automatic obtains in the clinical years. Here, if the teaching is done by an intimate contact with the patient as a problem, the scope of the experience is determined by the frequency of various forms of disease in the clinic, which approximates that which the physician will later encounter. This is the central working focus, around which will accumulate his further experience and this should serve for learning habits of work, for acquiring skill in the use of the scientific method, and for becoming familiar with the technique of exploring the experience of others, that is to say, the use of medical literature. To make this process effectual, direct contact with the patient involving an appropriate degree of responsibility is more essential than the number of patients cared for, though this should be as large as the student can assimilate. It is at once granted that this does not provide a complete and systematic survey of the fields of clinical medicine or in fact of any
particular field. Such is not and cannot be the function of the medical school in its undergraduate years, but rather that of the graduate training where concentration is possible in special activities. The fact should be squarely faced that four years is not sufficient for acquiring a comprehensive and detailed content of knowledge of clinical medicine in all its divisions, and of its basic sciences. Emphasis must be placed upon the acquiring of habits of work and the common method for solving the problems involved; the development of a scientific attitude rather than of a scholastic one.

This does not mean that the student must necessarily be unaware of knowledge outside his direct experience. Means should be employed to see that he undertakes, himself, in his own time and under his own initiative a survey of the various fields, sufficient to make him aware at least of the scope of the problems with which he may be faced. Were there no literature available this would have to be done by the lecturer, as was necessary before the introduction of movable type. Today, with adequate texts, monographs, and current literature the lecturer is put to it to say anything that is not better said on the printed page. The lecture should be limited to work not yet so available, to original and sound points of view not otherwise obtainable, and to inspirational values peculiar to the lecturer, not in his estimation but in that of the student. Under these limitations lectures will be relatively rare, and never obligatory, and the inadequate ones will fall of their own weight.

The more intensive knowledge is better obtained in small groups of the seminar type presided over by a member of the faculty functioning as a commentator, but in which the student does the work. For this, time in which such groups may function must be set aside in the curriculum as elective undertakings, in contrast to the common basic requirements. Approximately one-third of the curriculum hours should be so disposed.

While this discussion has been undertaken from a clinician's viewpoint, it is equally pertinent to the basic sciences in the school of medicine. One cannot make an anatomist, a physiologist, a pharmacologist, a biological chemist, or a pathologist out of the student in the all too short two years available for these studies. But the student can become sufficiently familiar with such fields of study so that a content of knowledge will be available for reference in the future, and above all he can acquire an insight into the method of approach to the solution of problems in these fields. Again, this must be obtained by direct experience in the laboratories, by literally handling the problems and not by lecture and demonstration except within the limitations previously discussed. Here, also, the literature is adequate in
concise or in expansive form, as may be preferred, and the student should be led into the use of this himself, rather than by having it eructated by the teacher, whose ruminative assistance will not be available for him in his future professional life.

It will be asked, if the student be left to his own initiative for the acquisition of an adequate content of knowledge, can one be certain that he will do this? In the first place, it should be understood by faculty and student alike, that this is the student’s responsibility. The faculty provides adequate opportunities, sympathetically advises, and outlines the paths along which the student must go, but he does the walking. It is no function of the faculty to provide him with transportation. The tuition is not carfare, but an entrance fee which covers only a small part of the costs of the caravan. It is to the student’s interest primarily, rather than to that of the teacher, that he obtain an adequate medical education, and he should be disillusioned if he supposes that by the deposit of a fee he can transfer the weight of the burden to the faculty.

It is the obligation of the latter, however, to see that these opportunities, costly as they are, are not wasted on the incapable or the unwilling. The correction of such is not a matter of abstruse mathematics centering in the Dean’s office, but of proper admitting to the school in the first place and, in the second, of weeding out the obvious defectives early in the journey.

Another query may be, “Is there no place for examinations in this process?” If the purpose of such is disciplinary and for direct control of the students’ activities, the answer is, “There is no place for such.” Once embarked on his professional life the student will not have an examining board to govern his activities. On the other hand, the examination may be made, if properly conceived and given, an educational adjunct of value. It is of considerable importance that the student have the experience of assembling and correlating his knowledge and putting it down in writing, but for this the questions should be of a comprehensive character rather than mere factual queries. This is of particular educational value at the end of the basic science years and again at the end of the clinical years, if time is left for review and thought in preparation for the examination. Again, the important thing is not the ascertaining of a student’s absolute or relative standing, but rather the subjecting of him to a valuable experience.

This discussion has been centered about the ideal “general practitioner” in order that there may be a starting point upon which all will agree. At the conclusion of it, however, it should be apparent that what has been said as regards desirable objectives in his education and the methods of attaining them is in every respect applicable to the specialist in every field.
of clinical medicine, and to the worker in the field of the basic sciences. In particular, it should be emphasized that the old and still current concept of the necessity for a differing medical education for the prospective clinician and for the future research worker is a bugaboo which this discussion should have done something to lay low.

Education in general, and medical education is no exception, is, as one has said, "a continuing process of growth" which should not cease with the obtaining of a degree. It is a sensitive process, for the most part autocatalytic, which responds favorably to a proper environment. The most important objective of medical education is to see that such growth remains a continuing process throughout the future professional life of the student.

**REPORT ON CURRICULUM**

*Number of students:* The number of students in the School of Medicine is determined by the number of the faculty and by the physical facilities. Inasmuch as the emphasis in teaching should be laid upon direct experience in the laboratory and the clinic, the capacity of the former and the patients available in the latter constitute the limitations of these facilities. Over a number of years it has been learned that a desirable maximum in the two clinical years is approximately 100 students, and the development of teaching personnel has been adjusted to this number. There is no reason for changing this number, and while it is not absolute, the number of students in each of these years should be $48 \pm 4$. In the basic science years the laboratory accommodations have been adjusted to a number approximately 10 per cent higher than this, thus allowing for a certain depletion before reaching the clinical years. This loss per class should be averaged for the past ten years and should be used to determine the maximum number of students admitted, as follows: $48 \pm 4 + x$.

Any substantial decrease in number would be regrettable, not only from the resultant loss of income but, of more importance, from an incomplete use of the present facilities. Any material increase without a proportionate increment in faculty and physical facilities would lead to overloading and mass-teaching methods, as by lecture, with a deplorable lowering of the standards of instruction.

*Admissions:* The determination of the number of admissions is discussed in the preceding paragraphs. The quality of those admitted is of the greatest importance, for this determines the quality of the men graduated which, in turn, determines to a considerable degree the reputation of the school.

Men of high quality will be attracted by a faculty of high ability and reputation and by the opportunities to learn by direct experience in the laboratories and the clinics. It is therefore necessary to seize every opportunity for improving the personnel of the faculty and the methods of providing instruction. In the latter respect the school has a unique opportunity, for the great majority of medical schools are teaching for the most part by methods which are antiquated and inadequate. The opportunity to lead in this respect is immediately at hand and should be grasped at once.

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Admission to the school should be based on an evaluation of the applicant's qualities as demonstrated by past performance, not on prophecy as to what he may or may not do in the school or thereafter. Integrity of character stands first, and is, at best, difficult to determine by any method aside from that of being closely associated with the candidate over a long time. Since that is usually impossible, such information may be gained from former associates, in which case it is reliable only if the informer is dependable and the communication personal and confidential. Something can be deduced from a knowledge of the candidate's social and family environment, though it must be kept in mind that economic and social standing by no means signifies integrity, nor does such a lack prove to the contrary. Personal interviews, as at present carried out, should be heavily weighted, but the interviewers must be carefully chosen for shrewd and sound judgment.

Intellectual capacity is of nearly equal importance, and this must be judged by past performance, by psychological testing, and by the interviewer's appraisal, as is being done at present. Any hope that low intellectual capacity can be increased by education should be abandoned. However, it should be kept in mind that an occasional candidate's past performance may be poor, not because of low intellectual capacity but as a result of failure to work or because of faulty habits of study, which may be rectified in the future experience. However, this is on the whole an unsafe hypothesis, and should not be too heavily relied upon.

A well-balanced individual is usually one of good judgment and therefore, other things being equal, is desirable. On the other hand, this standard may be overused, leading to a uniform type, and ruling out the occasional eccentric who may be a man of unusual and desirable potentialities.

It is also of importance to know the objectives of the applicant in studying medicine, frequently a difficult thing to ascertain. Any serious suspicion that the primary motivation is that of financial or social gain should disqualify him. However, it is necessary to guard against the assumption that, because a student comes from a low economic and social level, such is his motivation, and to bear in mind that many of the most able men in medicine have had such a derivation.

There should be, of course, no blanket discrimination as regards sex, creed, or race; on the other hand, it is equally unfair to have an unbalanced distribution as regards these categories, for this involves discrimination also in that it excludes individuals who would otherwise be acceptable. It is safe to say that a proper proportion of the various elements of the population represented within the student body should within wide limits correlate with that of the population of the country as a whole. The policy followed by the school in the past seems a sound one.

*The faculty and teaching:* It is a function of the faculty as a whole to enunciate general policies as to distribution of time and methods of teaching, while it is the obligation of the individual member to accommodate himself to these in so far as his conduct affects other members of the faculty. It is recognized that a teacher can best teach only when he does so in the way he thinks to be the best. This prerogative should be valued highly and so used.

The distribution of teaching as regards allotment of time and of fields of activity must of necessity, in the main, follow the traditional divisions. This is particularly true in the required or basic experience offered the student; in the elective opportunities the instructor has a greater chance for diversity and may follow his investigative interests into fields traditionally foreign to that of his departmental assignment.
Basic experience: There is in every field a certain basic experience, which is common to all activities in medicine, and in this the student should be soundly founded. Were it possible it might be desirable for every physician to be an anatomist, a physiologist, a surgeon, a psychiatrist, et cetera, but this is very obviously not feasible, even were the available time increased without limit, rather than being sharply delimited by four years. Nor does it serve the purpose to overload the working capacity of the student or to resort to forced feeding with the concept that a content of knowledge is the thing. Such efforts are ineffectual in the end and serve only to stunt educational growth.

It seems best to decide at first upon the proper number of basic and elective hours of which the student may be expected to take advantage. This must be done with knowledge that the student must also be left ample time for study, quite apart from scheduled exercises, for fatigue in intellectual effort is no less damaging to efficiency than it is in physical exertion. Thirty-six hours a week for 33 weeks (the scheduled school year) approximates 1,200 hours, which would seem a maximum and is very likely too much rather than too little.

Elective experience: The distribution between basic and elective hours must be determined, but it is first necessary to keep in mind the distinction between the two. The basic experience has already been defined, and it is at once apparent that even if all the time were used for this, the student would be left, from the standpoint of content, with a relatively superficial and elementary approach to medicine; he would never have had the experience of sinking his teeth deeply into any one subject. Moreover, the scientific method is best learned in an intensive approach. This means using a part of the time in small fields of interest with a vertical rather than a horizontal coverage. It is best carried out by relatively small groups of students (not over 12) working intimately and intensively with instructor and material in a restricted field. The success of the electives in previous experience has shown their value but the time allotted has in practice been seriously encroached upon. A proper proportion would be two basic units to one elective, or one-third of the time for the latter. The time distribution would then be in a given year:

| Basic experience         | 800 hours |
|--------------------------|-----------|
| Elective experience      | 400 hours |
| **Total**                | **1200 hours** |

The basic experience should not be expanded by leaving out of it essential divisions which are subsequently presented as large group electives. The end result of such manipulation is to increase basic hours at the cost of elective hours, the appearance only of distribution having been maintained. This can be guarded against by limitation of the number of students allowed to take any given elective.

Aside from small-group electives there are certain other educational opportunities, some of which have been scheduled in such a fashion as to suggest that they are required exercises, though attendance has not been taken and in practice they are entirely elective. Such are certain lectures, clinics, and clinical-pathological conferences, and there are many other still more informal opportunities which fall into no definite categories. They are, in fact, admirable, provided there is no compulsion or no suggestion, direct or indirect, of such. They should not be used as a method of
expanding basic hours, nor should blocks of information be deleted from the latter in the expectation that these exercises will fill the purpose. All such should be listed in the catalog as electives which all students may attend when and as they choose. Their educational value, as compared with the direct experience of the basic courses, is little; for the most part they serve to arouse and maintain interest. One advantage of making them completely elective is that when they no longer compete successfully with conflicting opportunities they will fall of their own weight. Those surviving will have been proved to be of value.

Distribution of fields of experience: The distribution of fields of basic experience, according to the traditional departmental and divisional arrangement in the school, is adequate as is the sequence of assignment to these. This consists of anatomy, physiology, and biological chemistry in the first year; of pathology, bacteriology, pharmacology, and certain propaedeutic courses in clinical medicine in the second year; and in the third and fourth years the various divisions of clinical medicine and public health, to be considered more in detail later.

FIRST YEAR

In the first year anatomy has, by tradition, taken the dominant rôle. It was the first of the basic sciences to be taught in the laboratory at a time when precise knowledge was for the most part confined to morphology. This relative position has of course changed and today the functional aspects of the organism have assumed a constantly increasing importance. In many instances these can be better experienced by observation of physical and chemical phenomena susceptible to an experimental approach than as a part of the study of morphology alone. This should not be regarded as a degradation of anatomy but rather as a relative change in respect to the distribution of the student's time. It has, of course, nothing to do with the importance or character of the investigative work done in a department or of the elective time that it may see fit to offer.

A fair adjustment at present would seem to be the assignment to anatomy of 50 per cent of the basic time available, or 400 hours, and to physiology and biological chemistry 25 per cent each, or 200 hours. This is accomplished by utilizing the morning hours from 8 to 12, for 6 mornings a week for the 33 weeks of the school year, one-half of these being assigned to anatomy and one-half to physiology and physiological chemistry.

It should be observed that by doing this blocks of time for the basic divisions are set up in the mornings and that the afternoons are free for elective work. Cataloged scheduling within these blocks is unnecessary, for the arrangement of time, the fields covered, and the types of experience provided are an intradepartmental function to be arranged according to its best judgment. Courses that are offered in the afternoon hours must be entirely of an elective nature and not intended to continue the basic work of the morning. If, however, the student wishes to continue his work in the laboratories into the afternoon, and it is possible to do this, he should be able to do so but under no compulsion, direct or indirect, from the faculty.

However, the noon hour of 12 to 1, and the hours after 4:30 in the afternoon should be left free for the providing of opportunities of the "general elective" type as discussed previously. While not compulsory, some of these will be of sufficient importance so that the majority of the students will wish to attend them at one time
or another. Therefore, they should be open to all students, irrespective of chronological status in the school. This provides an opportunity for the students of the first two years to get some contact with the problems of the clinic, and for those of the clinical years to maintain a contact with the fundamental sciences throughout their experience in the school.

SECOND YEAR

The second year is essentially one of the study of the abnormal, and pathology occupies in it a position corresponding to that of anatomy in the first year. The other subjects involved are bacteriology and immunology, and pharmacology. The essential changes involved are the deletion of the scheduled courses in clinical medicine in this year, and the provision of adequate time for pharmacology and for electives.

The reasons for this change are several. In the first place all the time available in these two years is necessary for the basic sciences of medicine, and particularly so if a proper amount of time is reserved for the elective experience so essential to the proper education of the student. Pathology covers a wide field in abnormal morphology and physiology, while bacteriology deals with living causative agents of disease and the reactions resulting therefrom, and pharmacology with the action of non-living agents, a field that is rapidly changing and assuming new importance.

Certain courses in preparation for the clinical years have been given in the latter half of the second year. These are "Physical Diagnosis," "Clinical Microscopy," and "Introduction to Psychiatry." The teaching of these has been for the most part without contact with the patient on the one hand, and without integration with the related basic field in the preclinical years on the other hand. It would seem wise to bring these into close correlation with the fundamental sciences and with the clinical work; and this can be best brought about by breaking up the courses as given at present, and transferring appropriate sections to pertinent fields with the clinical faculty working with the preclinical faculty in obtaining the proper integration. It is not to be inferred that this is done with the intention of minimizing these subjects, but rather with the thought that they can be better learned in closer correlation with the fields of which they are a part.

THIRD AND FOURTH YEARS

The third and fourth, or clinical, years should be considered as one unit. The allotments of time are conditioned by the fact that the wards and clinics are the laboratories and patients are the subjects. These facilities are available in limited amounts but throughout the year, so that the student body must be broken up into groups which are manageable under these conditions. Therefore, the details of the arrangements must be quite different from those of the first two years, but the general principles underlying the experiences to which the student is exposed are the same.

This group arrangement has the advantage of offering the possibility of utilizing the material and plant for the purposes of learning throughout the year, and thus escaping the traditional attitude of the great majority of educational institutions that their facilities must lie idle for a third of the time. This is particularly appropriate where teaching is, for the most part, a process of learning by experience, and where the faculty by necessity of caring for patients must provide coverage throughout the year.
In order to take advantage of this, it is proposed that the students of the third and fourth years be divided among 8 groups, and that 8 periods of 11 weeks each, of which 3 are elective, be scheduled. This involves the use of the summer months for obligatory periods between the second and third years and between the third and fourth years. From the standpoint of the faculty, some additional attention would have to be paid to the students by those carrying the clinical services during this time, but this would entail no considerable burden.

Some concession would have to be made to those students who now earn part of their way during the summer period, although in principle this is undesirable. It would mean the choice by these of a group in which the elective time fell in the summer period. The assignment to groups should be in the first instance by choice, but it might prove necessary in some cases to give second or third choices. This would not involve any considerable hardship. The sequential progress from one division to another now obtaining could be maintained, although it is not of great importance. As for elective time, it would be provided in adequate blocks of completely clear time rather than piecemeal and in too little amounts as at present.

The one field that does not fit into this arrangement is that of public health, which at present is scattered throughout the week. It is suggested that in the fourth year this subject be given Wednesday mornings throughout the year, increasing thereby the time available and permitting the arrangement of its functions, within this block of time, as seems best to the department. This would involve the decrease of the Out-Patient Department time for medicine, pediatrics, urology, and orthopedics by one-sixth, but would retrieve for general use time now scattered in the afternoons of several days each week.

Electives: With the relegation of some educational opportunities now scheduled as required to the elective time and the provision of one-third of the total school time for electives, classification of the purpose and types of these is indicated. They will fall into three groups: (1) the seminar type, (2) the general conference type, and (3) the project type.

The seminar type does not differ from that which is being offered at the present time. At its best it provides an opportunity for the student to acquire additional experience in a concentrated field, either directly or by exploration of the literature, preferably both. If these are large groups, greater than 12 students for instance, or if the instructor is the active exponent and the student the passive recipient, the purpose is largely defeated. In general, the larger the number of electives offered the better, in order that there may be a greater diversity of selection. On the other hand, there should be no obligation in the number or character elected by the student. The list offered should be periodically reviewed and those not taken by a significant number of students over a period of time should be dropped from the catalogue. Likewise, new electives should be submitted for approval. This might well be the function of a special committee of the faculty as well as that of suggesting new electives when and where there seems to be a need for such.

The general conference type of elective includes a group of important educational opportunities which are conducted on the conference level. The conference phase here may well be between various members of the faculty. The Clinical Pathological Conference, the Neurological Study Unit, the so-called Grand Rounds in Surgery, and the noon-day clinics are examples of this. Where such degenerate into lectures their
potential value is for the most part inspirational, and it should always be remembered that but few members of the faculty have a facility of this nature. In no case should the student be given the concept that such conferences are systematic and offer an all-inclusive coverage of a basic field or are in any sense obligatory. On the other hand, such general conferences should, if physical facilities permit, be open to the student body as a whole. In this way, the student in the preclinical years may at his own discretion get a feeling of the significance of the fundamental sciences in clinical medicine.

The project type is at the present time exemplified by the thesis. This is another educational opportunity but, like the examinations to be discussed later, it is an opportunity for the student to organize a field of knowledge in a comprehensive manner. It differs from the seminar and general conference types in that this field is a vertical rather than a horizontal one, intensive rather than extensive. As such it is a legitimate requirement for graduation and should be used to a greater degree than at present in the evaluation of the student.

The opportunity for doing work of the project type should by no means be confined to the thesis. The investigation of various problems and the study of advanced techniques should be encouraged in every department of the school. In no other way can the use of the scientific method be better taught, and this is the major objective which should run throughout the instructional facilities offered to the student.

Examinations: The function of the examination is too commonly supposed to be that of determining the content of knowledge which the student contains at the moment, with the purpose of passing him if adequate and of failing him if inadequate. When given in course and at frequent intervals, it becomes a disciplinary measure for ensuring that the student does from day to day his job of absorbing information. It may be then an interesting game played with the faculty, in which the objectives are to mislead the latter into overestimation of the contestant's knowledge, and to acquire just the adequate amount for passing and no more. The primary objective becomes the passing of the examination, not the acquiring of an educational experience. As long, however, as degrees are a necessity and licensure obligatory, the examination remains, faulty as it is, the only possible way of ascertaining accomplishment. It can, however, be made an educational asset when properly conceived and given, and it is as such that the process should be critically examined.

The examination should be of the comprehensive type, that is to say, it should cover not courses or limited fields of experience, measured either by content or by time, but rather should be so comprehensive as to enforce the correlative and systematic review of these as an educational experience, difficult to provide otherwise. From this viewpoint the examinations as given at the end of the preclinical and the clinical years are satisfactory.

The examination should be given without reference to the teaching, and the teaching should be carried out without reference to the examination. Teaching should be directed at providing an educational experience not at preparing a student for an examination, and "refresher courses" have no place in the curriculum. The examination should be likewise directed primarily at being an educational experience and not for the purpose of passing or failing students. If both teaching and examining are so conceived there will be no serious lack of correlation, and the detection of superior or inferior students will be only incidental to the process.
The mechanics of providing an examination governed by these principles are not important. The written examination, using broad questions requiring integrative correlation rather than factual memory, is sufficient to innervate the educational objective. The actual questions might well originate in the various faculties concerned in the fields covered, but they should be assembled, correlated, and integrated by a "rewrite committee" which would provide the final version. The evaluation of the papers should be carried out as at present; perhaps the whole matter could be best handled through a "committee of the school," with subcommittees for the two examinations.

Again it should be emphasized that the objective of the examination is not that of discovery of inadequate or exceptional students. For this it should not be necessary, for these should be sufficiently conspicuous in the daily contacts of the students with the faculty. The inadequate student should not be admitted, but if admitted, should be detected early in his school experience and discarded. If he eludes these checks, he should be discovered incidentally in the first comprehensive examination and not allowed to continue.

With the educational experience of the student based upon the principles herein presented and guided by a curriculum such as that which has been suggested, there is reason to hope that the graduating student will be better equipped to assume his responsibilities to medicine.