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THE METAMORPHOSIS OF THE SURGEON

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THE opportunity of making what may be termed a commencement address is fully appreciated and highly valued. Representing a profession which is not notable for its oratorical gifts and which is usually singularly inarticulate, one approaches such a presentation with considerable temerity. There is comfort, however, in knowing that, contrary to the custom in scientific circles, no immediate public opportunity will be allowed for discussion.

It would seem to be a fitting time to appraise certain trends in surgery. Since the beginning of this century, the place of surgery in the whole field of medicine has undergone a profound alteration so that the former man of handicraft has become a diagnostician, a most essential therapist, and an investigator of some merit. During this same period, medicine as a whole has developed to the extent that it must be considered not as one profession but as a number of professions, the intimate relationship of which must be fostered and maintained, for not only are they dependent on each other but they have a common goal. It behooves us to recognize the weaknesses inherent in our method of advance and to avoid pitfalls insofar as our foresight permits.

The American College of Surgeons has made its concern certain standards of attainment for the surgeon and also has worked consistently for the improvement of the environment in which his work is done. Membership in this organization, while a recognition of your capacity, is at the same time an enrollment in a group which has certain aims which you can support and further and for which all of us must plan. Its potentiality depends not upon the establishment of monuments but rather upon the kinetic drive of all interested in the future of our profession. Education, training, and facilities are among our principal concerns. In its officers, board of regents, directors, library, and even its multiplicity of committees, this College has counterparts in our many universities and other schools of education. As in them, our concern is with the search for truth and the pursuit of knowledge, but, in addition, we have the specific aim of turning them to the advantage of the surgical patient. This is our reason for existing. From time to time a consideration of the changes occurring in medicine will affect our course of procedure and our methods of operation.

Our concern must be not only with sound practice, which has grown from knowledge gained in the past, but with plans to further that progress. A clear view of our destination prevents the charm of attractive trails and sidepaths from distracting us on our journey. The beginner in the field of medicine is impressed with the vast bulk of accumulated medical knowledge and is appalled at the prospect of acquiring any considerable part of it. The numerous subjects and courses and the mystic maze of library stacks contribute to a feeling that here is represented a vast fund of medical wisdom, fixed and substantial. His is the task of engulfing and digesting a required amount, so the poor student protrudes a tentative pseudopodium toward it. Like the ameba, the more stimulation he receives the more he will surround, but the quality and rate of his digestion vary considerably. Later in his studies and in practice he realizes that this inherited trust fund of medical bequests from the past is not complete. Often it does not contain the final word and he notes that when any subject is pursued the limits of our knowledge in it are soon reached. There lies opportunity

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for individual and independent inquiry, for exploring unknown territory, and for advancing knowledge. In the accomplishment of this it has been said that fortune favors the prepared mind. Foresight and proper groundwork are essential. As our individual lives are determined by our adaptability to our environment, so in the life of surgery we must consider those factors which bear upon its relationship to the entire field of science as well as to our social organization. The increase of surgical therapy has brought increased responsibility to the surgeon. When we realize that two-thirds of the patients in our general hospitals are surgical patients, our immediate responsibility is obvious; but quite beyond this is the added obligation of carrying forward the progress in a correspondingly large part of the entire field of medicine and of using our opportunity to improve the science and the art of surgery.

You have, in the judgment of your fellows, attained certain standards of knowledge and proficiency based upon the facts acquired by our scientific forebears and the skills of your teachers. It is wholesome for each of us to realize, however, that inheritors deserve little credit and that our followers will appraise us only as creators. Admiration and inspiration come from a knowledge of and familiarity with the great contributors to science in the past. At present, the abilities of any capable surgeon to diagnose and to treat are so far in advance of those attained by the very greatest surgeon of a few score years ago, that we may be tempted to consider the past as a convenient backdrop for the stage upon which we display our accomplishments of today, rather than to derive sufficient stimulation to urge us on to contribute whatever we may according to our capacities.

Medicine progresses through the basic sciences, physics, mathematics, chemistry, biology, and numerous others. It may be likened to a growing stream. The first springs feeding it arose in the far distant past and to their flow additions have come from these many scientific sources. In the last 400 years, comprising the development of modern scientific medicine, the stream has become a great river. As students, we acquire some knowledge of its origin, some familiarity with its substance, and on it we embark as practitioners with equal opportunity. All are carried along to some extent, but we quickly become scattered, and real progress depends upon aptitude and perseverance. In no field of human activity do the voyages of exploration carry more allure. For each there is the opportunity to direct his own course, contribute to his own progress and, in the spirit of adventure, search new horizons.

This onrushing torrent threatens to overwhelm us at times as we appreciate our inability to familiarize ourselves with its vast extent. Modern scientific medicine is but four centuries old, less than six lifetimes of three score years and ten, and modern surgery is scarcely 60 years of age. The surgeon of the short robe has gone far. Sixty years ago the practice of medicine was in the hands of the general practitioner. Surgery was limited in amount and represented but a small part in the treatment of the sick. Though specialism began in antiquity, surgical specialists, for the most part, did not exist even as late as the beginning of this century. Up to this time it was within the capacity of a well-trained internist to familiarize himself with all the instruments of diagnosis and to acquire the skill needed to use the armamentarium, the cystoscope, ophthalmoscope, proctoscope, esophagoscope, x-ray, and to perform spinal puncture. How impossible it would be in the present day for any one person to familiarize himself with all the available techniques! Since that time, the various diagnostic methods have become so refined and elaborated that today the otologist, the urologist, the radiologist, the ophthalmologist, the thoracic surgeon, the neurological surgeon, or other specialist must be called upon for the complete studies required in the various fields. With these advances the specialists have acquired greater diagnostic ability and can be credited with advancing the knowledge of pathology and physiology as well as operative treatment in their special fields, so that they have made these activities their own. Such developments have rendered the physician of the present day dependent upon the findings of those who have more advanced and specialized knowledge than he possesses, as well as the special technique.

General medicine, as contrasted with surgery, is occupying a gradually narrowing sphere. Such a trend has its implications for the surgeon or the surgical specialist in that he must assume the broad responsibility for the welfare of his patient rather than for a narrowly viewed surgical condition. Only a few years ago the general practitioner saw the beginning of a disease and perhaps was aided in diagnosis by the internist, while the specialist was consulted, finally, only for treatment. At present a specialist is required in diagnosis and many diseases are recognized in their earlier stages. The existence of this development has been reflected in the attitude of the public who, in the presence of an abdominal emergency or of disorders in some particular part, attempt to seek the appropriate specialist directly. It is fortunate for surgery that the acquisition of technical methods and diagnostic skill has led, in the hands of so many, to an interest sufficiently detailed to permit the furtherance of our knowledge in its basic cognate sciences. This knowledge has permitted the operator to metamorphose into the surgeon who considers the operation but one item in the care of his patient and to whom the correct diagnosis, well-judged preparation, and interested and intelligent aftercare are as important as the operation itself and are equally his responsibilities. Attributed to the great surgeon, Lord Moynihan, is the statement that he liked to consider himself a physician who had sometimes to employ surgery to cure some of his patients.

Much, however, may be said of the disadvantages of such a scheme of specialism and it is our concern to meet and correct them. As noted before, the increase in medical knowledge is such that medicine can no longer be regarded as a single profession but must be considered as a number of professions developing from a common trunk. In many communities, for example, general surgery concerns itself largely with little more than the upper two-thirds of the abdomen and the neck. We must recognize, therefore, the growing spheres of activity in all of the surgical specialties and yet remain alive to their consanguinity. The mutuality of interest of these children of common parentage is evidenced in the American College of Surgeons, and the bonds uniting them should be strengthened. All of them have a common aim—the welfare of the patient; but the difficulty of keeping this clearly in mind when specialism has become too narrow is well attested by the numerous pleas of medical educators to treat the patient as a "biologic entity" or a "psychosomatic unit," rather than by isolated organs or parts. It seems obvious that specialism will increase as long as men continue to select and to pursue their special interests, and furthermore that it has become a scientific and practical necessity.

The trend in all of our larger cities is toward greater specialization, and also in many of the cities of secondary size medicine has become narrowly divided. With the increasing number of specialists who are being trained, and for economic reasons as well, it is evident that all of the specialties will be represented soon in still smaller communities. With increasing population and greatly improved methods of transportation, only a few communities will be so small and so remote that they must of necessity be served only by general practitioners. The field of the specialist in the future will lie in the areas which have, within a radius of 15 or 20 miles, a population of 20,000 or more. It seems entirely possible to me that better service may be rendered under such conditions than can be given by the general practitioners now serving these sections.

Both the strength and certain weaknesses of modern medical education, a development of the present century, have become apparent. It is not so long since the aspiring medical man attached himself to a practitioner as preceptor and served as office boy, hostler, assistant, and companion while he carried on his medical reading, and this period was succeeded by a limited course of lectures and the receipt of a degree. A great advance was made when premedical requirements were extended to include chemistry, physics, biology, and languages, and certainly this preparation for medicine has greatly advanced the understanding of the medical student. Combined with a lengthened medical course, including firm grounding in preclinical and clinical subjects and laboratory work, this regimen has resulted in the development of better prepared practitioners.

In more recent years, with lengthening postgraduate training, still higher levels of proficiency are being attained. The benefits and advantages of such an educational plan are too apparent to require special comment, but what may be said of any weaknesses which have developed? It has become plain that such a program of preparation for medicine as is required in premedical work is reasonable for the average student. One weakness, however, lies in the concept that preparation and training should be the same for all men, without taking into account their individual strengths, their individual interests, and their individual aptitudes. In our educational scheme, *breadth* of background has been stressed in preparing our men for medicine. As a result, those entering medical training have achieved this, at least to some extent, while only a few have acquired *depth* of knowledge in any one of the subjects covered.

The introduction to the basic sciences contained in a premedical course involves no great familiarity with the subjects; it requires, in fact, the minimum which will permit an understanding of the courses which follow. Men have varying interests and the medical profession attracts men of widely different types of mind. We recognize that progress in medicine is dependent on the increases in knowledge arising in such basic sciences as physics, chemistry, and the biological sciences and the application of such knowledge to medical requirements. Yet we have not encouraged the admission to medical college of those who have depth of knowledge in these sciences and who are familiar with recent progress in them. The mathematician, the well prepared physicist, the able chemist, or the psychologist who is attracted to medicine finds great fields of application for his knowledge, but these opportunities are closed to those of us not so prepared. Can we not offer inducements to attract such men into medicine?

An analogous situation appears in postgraduate training. During the early days of modern surgery, late in the last century, the immediate necessity for the budding surgeon was a knowledge of anatomy, for surgery is applied anatomy. Such knowledge is an essential part of the equipment of the surgeon, for without this local geography at his fingertips he would be an unwelcome explorer in the human body. During the early period of surgery, then, anatomy was stressed; the entrance into the profession was by the anatomical route. During this time, the details of operative approach and exposure, technical advances, and instruments adapted to the task were the common contributions to surgical progress. As more general agreement developed on the anatomical aspects of these procedures, and with the adoption of accepted methods, attention broadened from the exclusively anatomical viewpoint, and the importance of surgical pathology was recognized, then emphasized, and now has become incorporated as a necessary and most highly valued part of the training of the modern surgeon. This is said with the full knowledge that even now preparation in this subject is too often woefully inadequate, for its importance cannot be overstressed. As additional background for surgery, our best graduate training schools also insist upon a period spent in the experimental laboratory, which ordinarily implies training in some branch of physiology. Not a little of the prominent place that surgery now occupies is due to the recognition of the necessity for and insistence upon such training in this triad of preclinical subjects for men who expect to become surgeons. These fields are receiving attention and opportunity is not lacking for contribution in them.

A point that I wish to make, however, is that our present scheme of premedical and medical education and graduate training tends to be standardized to the point that we cannot always take full advantage of the capacities and special aptitudes of the men entering our profession. I wish to emphasize again that the advance of medicine depends upon the contributions made by the application of fundamental knowledge coming from the basic sciences and that, while our men entering medicine have some breadth of knowledge with a smattering in each of many subjects, only a few enter with a sufficient depth of knowledge in any one of them to utilize their information in the application of the recent advances to medical needs and medical advancement. Although our plan of premedical training has resulted in a vast improvement in the quality

of medical practice, I cannot but feel convinced that the progress of medicine as a science, in contrast with practice, would have been furthered even more had we admitted to our medical schools men who had majored in one of the basic sciences and had acquired depth of knowledge in some one branch, as well as sufficient breadth in several, to utilize fully their medical teachings. Our profession will be immeasurably advanced if we can induct into it men with profound knowledge in physics, psychology, chemistry, mathematics, and each of numerous other fundamental sciences. To men in medicine who have a special interest in one of these fields there is great promise in furthering that knowledge, for the applications to medicine of recent advances in science lag many years behind, far longer than they need to do if this intimacy of interest can be attained. Many of us can recall occasional instances in which an engineer or chemist became interested in medicine and, with his eyes thus opened, his energies permitted vast dividends in accomplishment which are impossible to those not so prepared.

Likewise, in the field of graduate training in medicine let us not attempt to standardize the preparation of all men and restrict them to certain minimum requirements in any specialty. Anatomy, pathology, and physiology are stressed, and rightly so, but for the student of particular ability and some special interest, let us be in a position to encourage what may seem to be an immediate divergence from his ultimate aim, for by such means progress will be assured. In the fields of biochemistry and bacteriology, how many surgeons can we name who have sufficient basic knowledge of these subjects to prosecute investigations intelligently? Yet the opportunities for the surgeon to apply such detailed knowledge are on every hand.

Not all of us have an absorbing interest in a basic science or a preclinical subject. Most of us find more appeal in the recognition of disease and our ability to treat it. The able clinical surgeon can, by thoroughness and careful study of his cases, contribute largely to surgical progress. His observations and inquiries point the way for experimental and laboratory investigation.

I urge, however, that there is a smaller number with special talents whom we must endeavor to recognize and encourage. I refer to those who may be induced to enter medicine after having had training in a basic science and also those who, in the period of graduate training for surgery, may be induced to separate themselves temporarily from clinical work in order to ground themselves deeply in one of the preclinical subjects. We are familiar with the contributions from the anatomist surgeon and the surgical pathologist; physiological contributions of the first order have come from experimental surgeons. Equally great opportunities lie ahead for the well trained surgeon who is also a biochemist, a bacteriologist, or an immunologist. Let us foster, where possible, the development of such men. Great store may be laid by them and from such sources will surgery be strengthened. Experience has shown that an intimate relationship of the departments representing various sciences mutually strengthens and aids each. It has likewise shown that when these viewpoints are brought together in the mind of a single person, the possibilities of the application of such knowledge to medicine and surgery are greatly enhanced and hastened.

The artist may express his thoughts and his emotions through the deftness of his hand; the scientist, by experimental methods, brings forth the children of his brain; by his acts the humanitarian evidences the greatness of his heart. To each of us, as a surgeon, belongs the great privilege of membership in the profession in which, as in no other, are combined all of these qualities of head and heart and hand.