OUR TRAINING PROGRAMS AND THE FUTURE OF NEUROLOGICAL SURGERY*

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La vray science et le vray étude de l’homme, c’est l’homme.—Pierre Charron, 1601.

The future of neurological surgery in North America lies in the hands of the members of this Society. This is neither a light nor a simple responsibility. The course of our specialty cannot, successfully, be allowed to find its own way. If the high level of clinical achievement, investigative progress and broad influence upon medicine generally, which our predecessors have set for us is to be maintained, it can be done only by constant effort directed by serious thought and consideration.

It is often difficult to recognize and assume responsibility that has been transmitted to us from older, revered hands. In neurological surgery we have been so very dependent upon the inspired leadership and able guidance of Harvey Cushing, Charles Elsberg, Charles Frazier, Walter Dandy, Max Peet and Alfred Adson, to name only those who are no longer with us. These men have very wisely directed the birth and development of neurological surgery and have maintained its intimate relationship to general surgery, anatomy, physiology and clinical neurology.

The responsibility to continue what they have begun is a complex one. There is no simple or single solution to the proper future development of this field, but the greatest single requirement is now and shall continue to be the providing of young men with stimulating leadership, attractive opportunities to work, to achieve and to grow, and ample time in which to do so.

Certainly the first demand upon us is that we provide competent men, adequately trained in clinical neurological surgery. That is not an easy task. It is not sufficient that we be content to teach young apprentices a trade. Ours is not a static field. No one of us can be satisfied with our present-day accomplishments. It is not enough that we teach only what we already know. We must prepare the future neurological surgeon to make new discoveries, to push neurological surgery to new frontiers. He must be prepared to appreciate and properly evaluate the discoveries and observations of others. He must be sufficiently conversant with the related fields of medicine and surgery that he can adapt and utilize the discoveries in other fields of clinical and basic sciences to his own work.

How can we best fit our residents to develop a better neurological surgery than we have today? We have already recognized that they have much to learn from the neighboring surgical fields, but what are we doing to insure

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that the greatest advantage is taken of the existing opportunities? Very little! We have recognized that these young men should be thoroughly grounded in the basic principles of surgery. But we have either felt that we ourselves are too deficient in our own knowledge of these principles or we have been too lazy to teach them. In any event we have insisted that the prospective resident come to us fully equipped in this regard by a year of training in general surgery. Surely it must be pike-staff plain that if these basic surgical principles are of importance to the practice of neurological surgery then any neurological surgeon worthy of conducting a residency should be thoroughly conversant with these principles and able to transmit them to his pupil. Obviously it would also be possible for the young man to learn these principles at the feet of a competent teacher of general surgery; but, what opportunity does he have to do so? Our present requirement of a year spent in general surgery is seldom a suitable way of attaining the desired end. It is often difficult for the prospective neurological surgeon to obtain the desired one-year residency in general surgery, and when he does obtain it, it is usually one of the poorer, less desirable residencies that he is awarded. It is perfectly natural that the best surgical residencies are not open to these candidates. The leaders in general surgery and the institutions with the best residency programs wish to concentrate their limited time and resources on men who will complete the full training program in general surgery and go on to leadership in that field. Men who spend only one year in a residency neither gain the most from the training nor contribute the most to the program. Thus the prospective neurological surgeon finds it necessary to accept one-year surgical residencies under men who are not particularly competent to teach and who are little interested in imparting surgical principles. These residencies are commonly in institutions prepared to offer a year of experience in the ordinary general surgical operations. Surely we are not interested in wasting a year of our prospective residents’ valuable time in assisting at appendectomies, and cholecystectomies. Surely their time could be far better spent in learning basic surgical principles caring for neurosurgical patients and assisting at operations upon them. It seems most unfortunate that our present requirement fails to provide the training and experience that we all recognize as important while at the same time dissipating a year of the candidate’s time to little advantage.

Demands made upon the neurosurgeon have created another problem. Neurological surgeons working in universities, large clinics and the bigger urban centers are able to call upon their neurological confreres for advice and assistance but as the younger men have gone into the smaller communities they have found not only that they have no neurological associates to call upon but that the local medical profession turn to them for assistance in the diagnosis and treatment of purely medical neurological disease. There are many obvious reasons, which we shall not discuss, why a neurological training is of importance to a neurological surgeon, but the simple practical points that have been mentioned here are of themselves sufficient reasons
why we should insure that the prospective neurosurgeon have an adequate neurological background.

Most of us recognize that one of the most valuable parts of the training program of any resident lies in his contact with others training in his own and related fields. The resident in neurological surgery can learn and benefit much from his contacts and discussions with residents in general surgery, as well as the other fields of medicine and surgery. All too frequently, however, our training programs are established in isolated institutes devoted exclusively to neurological surgery, where the residents have little or no opportunity to attend the staff meetings in other fields, the general clinicopathological conferences or the meetings at which research in the basic sciences is presented. This isolation of the student is certainly most undesirable from the standpoint of creating in him a broad viewpoint and knowledge.

I mentioned a moment ago the serious matter of wasting the time of young men in training in neurological surgery. This is probably the most serious matter confronting us. Time and youth are the two things that they can so easily lose but can never regain. The one thing above all others that is essential to the advancement of this or any other field is ideas. And the time when ideas appear most prolifically is when men are young. It is young men with active inquiring minds, unhampered by tradition or the "knowledge" that "it can't be done," who are most likely to bring a fresh, vigorous, worthwhile viewpoint to a troublesome problem. This was again brought forcefully to my attention as I stood last Autumn in the old anatomical amphitheater of Olof Rudbeck at the University of Upsala in Sweden. Rudbeck was one of the many men who have made important contributions to human knowledge early in life. At 18 years of age he enrolled in the University, and almost immediately began his biological investigations which led to the discovery of the lymphatic system and disproved the previously held opinion that the blood is formed in the liver. In April 1652, at the age of 22, Rudbeck demonstrated the lymphatic system which he had recently discovered to Queen Christina in the anatomical amphitheater and in the following month defended his thesis on "The Circulation of the Blood" (De circulatione sanguinis) before the faculty. Although the achievements of Rudbeck are among the outstanding examples of the scientific accomplishments of young men, it is not to be assumed that significant accomplishments are possible only to young men of years gone by. They are still possible if we but give young men the opportunity. However, we can not expect them to make real contributions to our knowledge if we persist in encasing them in educational straight-jackets, demanding that all of their time be spent in primary, collegiate and medical school education until they are 25 or 26 years of age and that they then spend the next five to seven years in a rigidly controlled residency program.

It is, of course, obvious that not all men who are interested in neurological surgery and capable of becoming able surgeons in that field are interested in or will benefit by training and experience in basic research. Such
men should not have research experience thrust upon them. On the other hand, we must not make our requirements so rigid that those who are capable and are interested will be denied the opportunity of such training in investigation. We must never forget that training in research has a two-fold advantage. There are a few men who will make important discoveries and will go on to become leaders in the field of neurological investigation. Unfortunately the number of such men is not great. However, training in basic research is of value not only to these select few. It can be of the greatest value to those who will carry on clinical research and clinical observation. All too many of those who publish on clinical subjects have little appreciation of the scientific method, or its inherent importance in the evaluation of clinical observations. They fail to appreciate the importance of adequate controls, and of multiple observations. They often do not recognize the difference between those statistical variations that are insignificant and those that are valid. The most profitable way in which to correct these deficiencies and to improve the level of clinical research in the field of neurological surgery is to extend the opportunity for basic research under leaders with a thorough understanding of scientific principles. Furthermore, it is of importance to the advancement of neurological surgery that its devotees be thoroughly conversant with developments in the basic neurological sciences and be sufficiently well trained in scientific methods to evaluate and understand the works of others in these fields.

It is also of importance that interest in research into the structure and function of the nervous system be kept alive among neurological surgeons. Only in that way will our specialty remain alive as a vital growing field of medicine. Furthermore, there are many problems in the field of fundamental neurology that can be investigated only by or through the active cooperation of a neurological surgeon. There is no part of the body that varies so widely from that of the laboratory animal as does the human brain. Although studies of the structure and function of the animal brain are of great importance they can only point the way to conclusive human research. No fact found to be true for the central nervous system of lower animals can be finally accepted as true of the human brain and spinal cord until it has been proved true for man. Many parts of the human brain are not duplicated in the brains of dogs, cats and monkeys; many human diseases find no counterpart in lower animals. If these are to be understood it will be only through the study of man himself.

As neurosurgeons we have a heritage from the past and an obligation to the future which we must never permit ourselves to forget. Among our obligations is that of advancing the science of our own particular field. Like those who devote their lives to basic science or to "pure" science we must never permit this obligation to become confused with the question of the practical value of our observations. Truly scientific observations must be pursued for themselves alone.

Recently I have been impressed with the significance of this as I read
the beautiful and detailed clinical and postmortem studies and correlations of Abercrombie in "Diseases of the Spinal Marrow" which was published in 1818, of Andral in his classical description of two cases of subdural hematoma which he observed in 1822, and of William Gull in his extensive studies of the causes of paraplegia which were reported in Guy's Hospital Reports for 1858. These men had no thought of the practicality of these observations. Within the confines of their vision these were incurable conditions and there was no reason for them to hope that they would ever be otherwise. It was not until many years later in 1884 that the first tumor of the brain was localized by purely neurological means and operated upon, and two years later in 1886 that Horsley, much against the advice of many of the leading surgeons of England, first operated upon a tumor of the spinal cord. Yet it would have been impossible to have carried out these operations without these and other earlier studies.

I would be grossly misunderstood if it were thought that I were pleading here for extensive research experience and training in the basic neurological sciences and clinical neurology for all prospective neurological surgeons. That is not the case. My plea is that our requirements be kept flexible so that each candidate may vary his training program to include such of these fields of related activity as he finds interesting and profitable. We will have candidates come to us with a broad training in general surgery, far beyond that which is now required as a minimum. The value of that background should be recognized and such candidates should not be expected to present as full a program of training in other fields as is expected of others. The excellence of such a training program is adequately demonstrated by the outstanding neurological surgeons who received their training as part of the residency in general surgery at the Johns Hopkins Hospital with their neurosurgical training under the guidance of the late Walter Dandy. Likewise, men who have spent their early years in the laboratories of neuro-anatomy and neurophysiology and the clinics of diagnostic neurology should receive credit for that training, provided their neurosurgical training has been at the hands of a competent surgeon. An outstanding example of the value of such a background is the late Clovis Vincent, who was responsible for much of the modern resurgence of neurological surgery in France.

It is no accident that neurological surgery has had leaders of exceptional ability. Men who have been called upon and given distinguished service in fields beyond the confines of our specialty; heads of departments of surgery and neurology, directors of institutes, leadership in our national societies in general medicine and surgery. This is a tribute to their inherent abilities and their broad training and outlook. We have been fortunate in that the men who have constituted our specialty board have wisely recognized the importance of keeping the requirements for certification at a minimal level and very flexible. We must see that they remain so. There are constant pressures upon the board to make their requirements more exact, to introduce didactic courses which the prospective candidate must follow, to define the number
of hours that must be spent in each field. It is not always easy to resist these pressures but it is of the greatest importance that we do so. We must never permit any agency to cast the training of our young men in rigid molds. The future of neurology and neurological surgery lies in these young men, in their activities during their early years and in their training. Their opportunities, their energies and enthusiasms and their years must never be wasted.