Perspective on Neurosurgery*

Presidential Address

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The title of a paper serves many purposes. It pleases the author, describes the contents, and serves as a cataloguing device. It may, if sufficiently intriguing to the author, keep him geared to his subject. And it may even serve to stimulate the imagination and interest of his audience.

“Perspective” is a good word in our present parlance. It is, in simple terms, the ability to depict an object or scene in such a way that the observer sees each of the parts in proper proportion to the whole. Language is perspicuous when it readily presents to the reader the precise ideas that are intended. An idea has perspective when proportional importance is given to its component parts.

Dr. Dwight Ingle, Professor of Physiology at the University of Chicago, edits an excellent publication entitled Perspectives in Biology and Medicine. David Brinkley presents what he considers proper evaluation of current affairs in his “Perspectives on the News.”

Senator Gale McGee, in the Congressional Record, February 8, 1967,10 says: “... If I may borrow from a currently popular phrase, the preoccupation with ‘gaps’—generation gaps, credibility gaps—may I say that what is threatening to overtake us in the Senate may be the perspective gap.” Senator McGee then offers some suggestions:

“The point of (my) proposal would be to permit each Senator... to literally take a leave of absence... I hope that he might visit the campuses of some of the centers of learning, both in this country and elsewhere around the world, where he could expose himself to new ideas. I would hope that he could climb a mountain, sit on the top, and pontificate with no deadline staring him in the face. I would hope that he could find an island where he could read himself full and then think himself empty, and go through this process again and again, because the members of this body, in these times, are more and more compelled to busy themselves with smaller and smaller details in the legislative process.

“Therefore, I suggest to the Senate once again that we close what is a rapidly mounting perspective gap. It is important that we do not lose sight, within the perspective of the moment, of the scope of the issues which surround us today.”

One earnestly seeks to present a significant address to a distinguished society of this sort, and inevitably he has certain persecution feelings which are well illustrated by Osborn (Fig. 1). He feels that he may melt into the indefinable mass of the desk at which he works so hard, or be buried by the mass of accumulated papers, as Parkinson has shown (Fig. 2 and 3). But eventually he comes to the determination to: “Write only what you know... Write only what you know...” (Fig. 4).

There never was a golden age when men lived happily, securely, without tensions. One of the fundamentals a citizen must grasp is that every age has had its problems, its dangers, and even its moments of desperation. When we read history, events are foreshortened; a century or more of progress may be covered in a sentence or two. This jet age we are now living in is no different. The times are still turbulent and every day brings a new crisis. The fact is that Rome in any age could not be built in a day. We recognize our need to take the long view toward the rapidly changing scene. The key word is “perspective.”

The acquisition of a proper perspective on neurosurgery might well start with statistics. The relatively small size of the Harvey Cushing Society when compared to the American Medical Association, the American College

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established in our memories are without significance to millions of Americans: prohibition, for example, or the five-cent bus fare, or the two-cent postage stamp, the five-cent airmail stamp, the Teapot Dome scandal, Clara Bow, the flaxseed poultice, the horrors of an epidemic of poliomyelitis, or for that matter lobar pneumonia and empyema. Most Americans today cannot remember Pearl Harbor. A very large proportion of people have no first-hand recollection of the Great Depression.

By the middle 1970’s, 65% to 75% of the population will be under 35 years old. The Southwest Research Foundation of San Antonio and Houston says that we will experience such a change in our national population that a complete alteration in our social organization seems inevitable. One of the biggest questions will be: “After puberty, what?” Will the retirement age be lowered to 40 to get rid of the deadwood? As youth comes to the front, the most urgent question is this: “By 1975, can we convince the three-
fourths’ majority to have a decent respect for old age?” This is the prime concern of everyone over 26 years old today!

Neurosurgery has changed, as is evident from the illustration of the growth of the Harvey Cushing Society (Fig. 6). The official attitude of this Society has changed: “In 1937 there was much discussion of the unwieldy size of the growing organization and a proposal was made that active members be retired after seven years but that they be allowed to attend meetings and dine as senior members.” There were 45 members in the Society then.

We can’t return to the “good old days” of 50 years ago, which may not have been so good after all. Those days would have been without the Bovie unit, antibiotics or the sulfonamides, Gelfoam or Oxycel, Pantopaque, angiography, steroids, urea or mannitol, hypothermia, reliable stereotaxic surgery, radiofrequency generator, radiology in its present form, radioactive compounds, dependable shunts for hydrocephalus, and a variety of other developments now available and may others soon to be on hand, without which we think we could not do satisfactory work.

Obviously, change and progress have been accelerated by specialization, but specialization by scientists may lead to loss of perspective. And the need for perspective was never greater than it is now for medicine as a whole and for our own field of neurological surgery as we consider it today. We are faced with serious problems of communication among men specializing in neurosurgical research, in neurosurgical practice, and even in special areas of neurosurgical practice.

The divisive forces of specialization create problems for each specialty. The objective of scholarly effort in the sciences is to discover the fewest basic principles that will
provide explanations for natural phenomena. We are not likely to realize goals if we indulge in a myopic concentration on specialized segments. We need men of perspective who can stand back and perceive the whole.

All physicians must have some insight into the vastly important research aspect of medicine, if only because those who practice medicine and those who do research can no longer be kept separate. What affects one affects the other. The passing of the “good old family doctor,” bemoaned by so many, was preceded by the passing of the “good old-fashioned family.” There is no turning back to the days of the predominance of “bedside medicine” or the amateur in science of a century ago. We must make science and scientists, medicine and physicians, an integrated whole.

Professor Moody E. Prior, at Northwestern University, has written, “Every increase in the specialist’s knowledge renders the non-specialist more ignorant. This frustrating state of affairs appears to be the price we are compelled to pay for the extraordinary complexity and sophistication of our learning and of our seemingly immoderate desire to advance knowledge..."

“Training which is confined solely to mastering a highly specialized activity alone creates the technician and not the man who can innovate or give to his particular science or skill a new and original direction. In the present state of learning and technology, the specialist is our chief hope for advancing knowledge and improving practice, but originality is not stimulated by narrowness. The history of learning affords us many instances which suggest that unusual and important developments in the arts and sciences arise often from a stimulus outside the particular art or science itself. The failure to see experience outside the scheme of a limited discipline impoverishes the mind, and so, in the very interests of specialization itself it becomes necessary to provide for breadth in
the education of the specialist—a paradox which is very troublesome to those who are involved in advanced and professional education."

We seek for our discipline strength and a valid perspective of our capabilities. A little dreaming and retirement to the ivory tower on Cloud Nine (albeit an atomic cloud) may be of value (Fig. 7). But we must avoid the temptation to project ourselves as inflated, heroic figures (Fig. 8). To put a false front on a shanty will be of no value (Fig. 9). Only by building a strong structure behind an appropriate facade can our specialty achieve the position it deserves (Fig. 10).

Our goals will not be accomplished by issuing impressive commandments without adequate background and strength. Moses failed at this, temporarily. We will reach no position of importance by opposing progress. The world is increasingly complex, but we are given increasingly complex instrumentation with which to understand and control it, and we should get on with the task.

A friend and prominent minister, in referring to an active woman in his congregation, said: "She was always in the thick of thin things." Neurosurgery must avoid all of the

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**Fig. 6.** Membership of the Harvey Cushing Society, 1932 to 1967-68.

**Fig. 7.** . . . the ivory tower on Cloud 9 . . . (Reproduced from *Think* magazine, July, 1966, by permission of the publisher, and of the artist, Robert Osborn.)
pitfalls of meaningless activity and there are adequate signposts for us to follow. Ours is a relatively young Society and we may be impatient. Physicists in the field of atomic energy have a term "critical mass" by which they refer to the amount of fissionable ma-

terial present in sufficient supply to sustain a chain reaction. We are, I believe, in our present position because we have reached in numbers, influence, and motivation what we might call a "critical mass."

In considering what neurosurgery has accomplished, what it is accomplishing, and what it seeks to accomplish, it would be well to set up a ledger sheet to see the assests and debits of the present position of neurosurgery.

Current Assets

Recognition. Surgery of the nervous system is a definable and widely recognized discipline. It is recognized by medical and lay mind alike, and this was true even in the days before Ben Casey. Who, in any civilized nation of the world, does not know the difference between surgery and medicine, between neurosurgery and cardiac surgery, between obstetrics and pediatrics? Neurosurgery is well defined, and in having that clearly set down, we, who are anxious for proper recognition of neurosurgery and for its deserved representation, are fortunate. It is much easier to devote one's energies to furthering the field of surgery of the nervous system and to obtaining the cooperation of many others in doing so than it is to seek recognition for surgery of the reticulo-endothelial system. The latter may come into its own at some future time but it isn't here yet.
Strong Tradition of Education and Research. Surgery of the nervous system has inherited from its predecessors a tradition of broad education in surgery and neurology and a prolonged period of increasing responsibility in the training period in which men have been equipped to handle independently, with skill and competence, those complex and difficult problems which are the hall-mark of neurosurgery. This field has never attracted those interested in quick or easy training, or those who might see the way clear to relaxing into an easy routine as soon as their training is done. Training programs in the United States have produced in large numbers highly skilled and competent neurosurgeons for the practice of this art. In large measure, these men have been endowed as teachers for they learned the value of scholarship, and, to a greater-than-average degree in medical education, these men have had experience and interest in research.

American Board of Neurological Surgery. Boards of certification in medical specialties in this country were brought into being to perform a job which was not being done by the medical schools or by organized medicine. If there has been recent criticism of such boards of certification, is it possible that the critics have lost their perspective regarding the work of the boards? The American Board of Neurological Surgery was one of the early boards, and it has performed ably to maintain the high standards established in neurosurgery before its formation. The insistence of the Board on a certain degree of demonstrable surgical competence has served to fill this nation with a continuing supply of well-trained surgeons specifically equipped to handle the problems presented by the nervous system.

At present, the Board is justifiably concerned with the fact that 30 to 40% of those who have fulfilled the training requirements fail their Board examinations. The Study Commission supported by the Harvey Cushing Society established a written examination to be given before the final oral examination. A report of this Commission is part of our Annual Meeting. We are indebted to Dr. Leonard Furlow, Dr. Howard Brown, and Dr. Leo Davidoff, the members of the Study Commission, for their devotion to this cause.

Training Program Directors. A continuing dialogue between training program directors, as well as between the directors and the American Board of Neurosurgery, is important to the training of neurosurgeons in this country. Initially, a meeting of program directors was called by the Board to acquaint all concerned with the proposed voluntary written examination. This proved to be so successful that the program directors now meet annually before the Cushing Society meeting. The exchange of information, the flexibility with which new ideas and techniques can be introduced in training, the willingness of the Board to accept suggestions from the directors, all represent strength to neurosurgery.

Significant Number of Neurosurgeons. There are over 1,100 board-certified neurosurgeons in the United States, most of whom are in practice. There are about 700 in the process of training or certification, and a relative few who are practicing but not certified. The total reaches nearly 2,000, a significant number of trained surgeons devoting their efforts to the diseases and afflictions of the nervous system.

Five National Societies. Of varying sizes and purposes, the five national neurosurgical societies compose a formidable group that is working through different pathways, but in healthy cooperation for the benefit of all neurosurgery. They were formed over the last 50 years in the following order:

- The Society of Neurological Surgeons
- The Harvey Cushing Society
- The American Academy of Neurological Surgeons
- The Neurosurgical Society of America
- The Congress of Neurological Surgeons

It is essential that these societies know the short- and long-term goals of the others, and a fruitful exchange of information has taken place in the last three years to foster this type of cooperation.

In addition, there are regional societies throughout the nation, and a wide variety of smaller travel clubs and research societies in which the interchange of information is on the most basic level. There are more than 40 societies of neurosurgery of one kind or another.

The Journal of Neurosurgery. Created by this Society more than a quarter of a century
ago, the *Journal of Neurosurgery* occupies a unique position in this country and abroad. It was brought to full bloom by the late Louise Eisenhardt, continually nourished and shaped during recent years by Paul Bucy, and is now so ably sustained and maintained by Henry Heyl. It is a strong asset to neurosurgery from any vantage point. It actually reflects the strength of our specialty for it can publish only the papers it receives; the caliber of manuscripts emanating from neurosurgery in this country and abroad is excellent. Dr. Heyl's success in reducing the publishing time of manuscripts is essential to the proper reflection of this vitality in neurosurgery. The exciting innovations being introduced by the National Library of Medicine, of which Barnes Woodhall is a vital part, will undoubtedly tie in with the progress of the *Journal of Neurosurgery*. Our *Journal*, too, is manageable and flexible; we can be part of an exciting ongoing program.

Research Activities. Research is essential to progress. The spectacular success of applied research during World War II led to the fallacy entertained by many that any problem could be solved by gathering enough scientists and giving them enough money. Great scientific steps originate in the minds of scientists, not in the minds of those who give or seek funds for support of research. Progress can be made by attracting and supporting gifted research men, and then leaving them alone. The narrowness of a discipline is the result of intrinsic pressures to deepen the understanding of the discipline. The pressures resulting in greater breadth are extrinsic, often stemming from society itself, or from other special disciplines. They tend to bring a particular specialty into interaction with other contributing specialties and to broaden its applicability.

There are over 50 active neurosurgical laboratory centers in this country. The largest proportion of these are in academic centers and are supported by Public Health Service funds from the National Institute of Neurological Diseases and Blindness, although there is also strong support from private philanthropy, and from national and state voluntary health organizations. From the point of view of the future of neurological surgery, this represents the greatest strength and the most rapidly growing aspect of our progress. It is also the most difficult factor to quantitate.

National and International Training Programs. Training programs in neurological surgery are healthy. The recent report of the Council on Medical Education of the American Medical Association indicates that 96% of the positions offered were filled. There is a commendable percentage of highly selected trainees from other countries; American neurosurgery has always had a significant interest in these men.

Representation on National Committees and Organizations. Neurosurgery is represented on the numerous committees of the National Institutes of Health, primarily the National Institute of Neurological Diseases and Blindness. It has representation on:

The Advisory Council
The Neurological Research Training Grant Committees
The Program-Project Committee
Study Sections
Special Committees
The Board of Scientific Counselors of the NINDB.

This representation is growing, and the degree of representation is consonant with requests for support in research and training to this Institute. The programs supported by this Institute include not only neurosurgery, but also neurology (which at present receives the major share of support), neuropathology, neurophysiology, neurochemistry and neuroradiology. The neurosurgeons appointed by the Institute as representatives on the committees and councils have not considered themselves an insignificant minority; interpersonal contacts have been excellent, and valuable experience has been gained for future relationships with the Public Health Service.

The National Institutes of Health have an Intramural Program which includes a neurosurgical service. This Branch of Surgical Neurology has an active research program and a reasonable share of the beds in the 500-bed Clinical Center of the National Institutes of Health. The research production of this Branch of the NIH has been impressive, the men working in this center are of the highest order, and this particular “face” of neurosurgery, which is seen by so many
visitors from this country and abroad, is one which does justice to our specialty. Credit goes to Dr. Maitland Baldwin, who has been the director of the Branch of Surgical Neurology since the beginning of the Clinical Center.

Neurosurgery has been a strong influence in other surgical organizations, particularly in the American College of Surgeons. A significant portion of the scientific program of the annual meeting of that organization, as well as of the numerous sectional meetings over this country and abroad, is devoted to surgery of the nervous system. Recently, the American College of Surgeons has added a representative from neurosurgery to its Board of Governors and to its Board of Regents.

Neurosurgery is well-represented by its armed service consultants. These consultants include Dr. Henry G. Schwartz (Army), Dr. C. Hunter Shelden (Navy), Dr. Edgar A. Kahn and Dr. Robert F. Heimburger (Air Force), Dr. Arthur A. Ward, Jr. (Selective Service), and Dr. Donald D. Matson (Veterans Administration). Most of them form the nucleus of the Neurosurgical Manpower Commission of the Harvey Cushing Society under the chairmanship of Dr. John Russell.

Representation on International Committees and Organizations. One of our most distinguished members, Dr. A. Earl Walker, is president of the World Federation of Neurosurgical Societies, and several other members of the Harvey Cushing Society are officers of that group. They will organize the 1969 New York meeting of the International Congress of Neurological Surgeons. The interest of neurosurgery in the foreign trainee is exemplified by the portion of our annual meeting devoted to discussion of this important aspect of our work.

Neurosurgery through its members has served in many locations abroad, and some of our related societies, particularly the Neurosurgical Society of America and the Congress of Neurological Surgeons, have sponsored individual programs abroad. Our members have served in Kuala Lampur, in Vellore at the Christian Medical College, and the Good Ship HOPE has been continuously served by a neurosurgeon under the direction of Dr. Lester Mount of the agency of the Neurosurgical Society of America. The evidence for cooperation is clear when one realizes that in numerous instances the neurosurgeon serving may or may not be a member of the sponsoring organization.

Dr. William Mosberg has proposed the formation of an International Foundation of Neurological Surgery which it is hoped will be sponsored by this Society when the details of its formation are clearly established. This, too, will aid in broadening this aspect of our work.

Strong Leadership. Many challenges are better faced by “leadership from within.” The discipline of neurosurgery has not been lacking in this regard. Dr. Cushing, Dr. Naffsiger, and Dr. Loyal Davis have been presidents of the American College of Surgeons; Dr. A. Earl Walker is immediate past president of the American Neurological Association; at least four of our members in recent years have been presidents of state medical societies—Dr. Leonard Furlow in Missouri, Dr. Ernest Mack in Nevada, Dr. Frank Mayfield in Ohio, Dr. John Lowrey in Hawaii; and many of our other members have assumed positions of leadership in county medical societies. The immediate past president of the county medical society in Nashville, Tennessee, is our treasurer, Dr. William Meacham. Dr. Bland Cannon has assumed leadership in many areas and at present is on the important and influential Council on Medical Education of the AMA and a delegate to the AMA.

Neurosurgeons have done their part so frequently in assuming leadership roles in other important areas of the medical field that we must refrain from naming them for fear the list will become presumptuous, but one need only think of those who have been and are deans in medical schools in the United States and Canada, and the many who function as chiefs of staff of large teaching and community hospitals. These positions are not inconsequential and they contribute daily to the increasingly important role of neurosurgery in our nation.

As can be seen from a compilation of these assets and as one can deduce from a survey of past leadership, neurosurgery, unlike Topsy, hasn’t “just growed.” In this period of rapid change and development, strength has been given to our discipline by the untiring efforts of many committees. Two in par-
ticular have taken a hard look at our specialty and made significant proposals, many of which have already been adopted. I refer to the Liaison Committee of Neurosurgical Societies under Dr. Edwin Boldrey, and to the Mission and Structure Committee under Dr. James Gay. The well-taken suggestions of these two committees will have a strong influence on neurosurgery for many years to come.

**Current Debits**

_Representation on Medical School Faculties._ Neurosurgery is taught in almost all medical schools, and full-time positions of neurosurgery are increasingly frequent in this country. Nevertheless, neurosurgery's standing on medical school faculties is not as strong as it should be. Neurosurgeons spend long hours in the operating room, often at unpredictable times, thereby restricting their ability to serve on committees concerned with long-range planning, curricular changes, selection of medical students, and promotions of faculty. Consequently, neurosurgery has been omitted from many aspects of medical education, not through its lack of effort, but because of its conscientious preoccupation with other important matters.

_Participation in the Association of American Medical Colleges._ One of the strongest influences in medicine today, and particularly in medical education, both at the undergraduate and graduate levels, is the Association of American Medical Colleges. Many matters of importance to us as surgeons are discussed and settled in the workshops and councils of this group. We can show our interest by attending and participating and by letting our problems be known. Otherwise, we may have to be satisfied by representation by some sympathetic sister discipline.

_Representation in the AMA._ The American Medical Association is a huge democratic organization in which many matters of importance are settled by the hard work of people who have devoted much time and effort to keeping abreast of developments. Our specialty is less than 1% of that organization of over 200,000 members. We can be more adequately represented by having a Section of Neurological Surgery, separate from neurology, psychiatry, or surgery. If such a separate section is formed, it will be of importance only to the degree that a significant number of neurosurgeons participate.

_Representation in the National Institutes of Health._ Stronger representation on the councils and committees of the National Institutes of Health is necessary and justified for neurosurgery. This will come about as increasing participation in the efforts of the NIH by neurosurgery becomes evident.

**Future Perspective**

About the time of the formation of this Society, Dr. Cushing gave the Annual Discourse before the Massachusetts Medical Society at the 150th Reunion held in Boston in June, 1931. The title of his paper was "150 Years: From Tallow-dip to Television." Dr. Cushing outlined in the earlier portions of his paper the slow and painful progress towards the development of surgery in the century and a half before, progress that eventually brought asepsis and anesthesia. He said:

"A year before Dr. Holmes had so definitely called attention to the principal cause of puerperal sepsis, a still younger man in the village of Jefferson, Georgia, having accidentally noted the stupefying effects of inhaling sulphuric ether, was undoubtedly the first to employ the drug for the purpose of what we call surgical anesthesia. He published no report of his observations and, even had he realized their significance, he was scarcely in a position to make himself heard. Holmes had an audience but no opportunity to put his views to the test. Crawford Long had accidentally hit upon one of the great discoveries of all times, but he had no audience. And probably neither of them had the crusading spirit and combative vigor necessary to force their views upon a reluctant and traditionally conservative profession.

"In science, credit goes to the man who convinces his contemporaries, not to him who first propounds the idea. The medical world was unprepared for a statement published in 1800 by Thomas Beddoes' young assistant at the Medical Pneumatic Institution set up at Clifton, England, to study the treatment of disease by respirable gases. Humphrey Davy was much excited by his discovery that nitrous oxide was 'respirable'; but no one else seems to have been aroused by his published statement that it 'appears capable of destroy-
ing physical pain and may probably be used with advantage during surgical operations.' Thomas Beddoes unfortunately was not interested in surgery, and it was left for an obscure dentist in Hartford, Connecticut, forty-four years later to put this idea to a practical test, which was checked by the misfortune of a fatal accident. One shudders to contemplate what might have been the setback to surgery had a similarly fatal accident occurred on that momentous October 16, 1846, in the dome of the Massachusetts General Hospital, when J. C. Warren permitted an unknown person to administer by inhalation an unknown drug to a patient during the course of a hurried operation. Can one say that the time happened at last to be ripe for surgical anesthesia or should we grant that Morton succeeded in ripening it?

"The possibility that a man may be able to ripen his own time—which I hasten to add is not a fancy of my own—is worthy of thought..." (Fig. 11).

Since Dr. Cushing himself issued the challenge that "a man may ripen his own time," we, his direct neurosurgical descendants, make bold to suggest that this Society which bears his name may, a little over a third of a century later, be on the threshold of "ripening its own time." Someone has suggested that medical education involving the faculties of the medical schools is analogous to the three-legged milking stool which is well balanced on the legs of practice, research, and teaching (Fig. 12). This concept, doubtless promulgated by an administrator, has conveniently left off that greatest of all time-robbers, administration, which can so easily upset the balance. For a period of time this may have been primarily applicable to faculty members in medical schools, but with the increasing involvement of all areas of medicine in education as well as practice, the likelihood is that all of us will be increasingly involved in administration.

Practice. If our federal government were to
give up "viewing with alarm" various aspects of medicine and issuing castigating remarks about the medical profession generally, and instead were to issue an occasional commendation, surgery in general and neurosurgery in particular might be cited for having foresight in preparing well for future needs in practice.

Our own Neurosurgical Manpower Commission has surveyed this area, and it appears that, except for isolated localities of poor distribution of personnel, neurosurgeons are in adequate supply throughout our nation and the armed services, not only for the present but for practice in 1975.

There will be searching problems, as in all surgical disciplines, as to how best to handle the training of the neurosurgical resident so that he is allowed that necessary period of independent responsibility before he goes into practice. With Title 18 of the Social Security Act already in effect, and Title 19 soon to come, we must continue to work as we have over the past two years, with our surgical and medical colleagues and with the Social Security Administration, to seek those ways in which strong residency training programs can be maintained for the continued production of a high level of practitioner of neurosurgery for the future.

Almost certainly we will live to see the day when our own specialty of neurosurgery will be subspecialized to some degree. This is true in isolated instances at the present time, but is not generally in evidence. There will be future challenges to the training program directors and to the American Board of Neurological Surgery, to the Harvey Cushing Society, and to the other national societies, concerning those ways in which the education of trainees should be guided. Perspective, wisdom, and flexibility will be needed for these future decisions.

Research. Beginning about 1951, discussions were held regarding the position of neurosurgery in respect to federal support of training and research through the National Institutes of Health. The floor discussion at the Harvey Cushing Society meeting in Vancouver in 1952 was strongly against the involvement of neurosurgery in any way with the federal support program. The discussion that same year in the meetings of the Society of Neurological Surgeons in St. Louis was more in favor of a cooperative attitude toward research support.

The decision was reached that neurological surgery would not seek support for training programs, and during these years the greatest bulk of neurosurgeons has been trained, and trained well, largely without federal support. This is obviously a strength of our own specialty.

There have been funds available, as in all areas of surgery, for research and for the training of some men who will devote their time to laboratory investigation for a year or more, with the hope that such men will be attracted into academic fields. The need in neurosurgery and in academic medicine in the next ten years will be for men highly trained in the research areas as well as in the skills of neurosurgery, and increasing support is being given to neurological surgery to meet this need. There are approximately 40 excellent academic training programs in which research in the neurological sciences is being actively carried out, and each of these programs has been encouraged to seek federal support for valid research programs in which men in the training programs may be encouraged to participate. The production of such research laboratories will, in fact, offer to neurosurgery its greatest potential for the future. One would have to be endowed with a small mind indeed and with complete loss of historical perspective not to believe that in another ten years the spectrum of cases which the practicing neurosurgeon will be handling will be different.

One does not want to forget or neglect the important cross-fertilization with other related specialties in the neurosciences: neurol-
ogy, neurophysiology, neuropathology, neuro-anatomy, and neurochemistry. The Director of the National Institute of Neurological Diseases and Blindness has been wise in maintaining a generous admixture of all of these specialties in all the research training committees. This has added much to the maturation and broadened perspective of all of the members of these committees, and has strengthened the position of neurological surgery. The opportunities of visiting numerous centers throughout the nation and seeing individuals at work and the excellent work they are doing offer a challenge that cannot be overestimated.

Some have felt that there has been discrimination against neurosurgery in the area of federal support. But one has only to realize that, before federal support, the important discipline of neurology, caught between the rapid development of the behavioral sciences on one side and neurosurgery on the other, was far along towards extinction. It has been thoroughly rejuvenated, to our great benefit, by the National Institute of Neurological Diseases and Blindness. Neurology has a mandate different from that of neurological surgery. First it has that obligation, as in neurosurgery, to train men fully in neurology for the highest development of teaching, research, and patient care. Secondly, neurology has that obligation to cover a wide variety of clinics in hospitals throughout the nation, including mental institutions, homes for the retarded, rehabilitation facilities, epilepsy clinics, and, with increasing need, the geriatric institutions. The attitude can be supported that a good pediatrician or internist who has six to twelve months of neurology is a better pediatrician or internist than he was before.

Neurosurgery, on the other hand, cannot train part of a neurosurgeon. It is justifiable to take a general surgeon on a training program and teach him something of the trauma of the nervous system and how to care for it immediately, since this will be his obligation until such time as neurosurgical help can be obtained. But partial neurosurgical training would be inviting catastrophe and turning into public practice men who might not be safe neurosurgeons.

There has been a noticeable and gratifying increase in all neurosurgically-oriented grant requests to the National Institute of Neurological Diseases and Blindness. Bona fide requests of the highest caliber will be the only legitimate avenue through which neurosurgery can expect a stronger voice and representation on the Advisory Council and on the various research training committees, study committees, program-project committees, and other parts of the National Institute of Neurological Diseases and Blindness. There are few contemporary medical specialties to which men come with such enthusiasm as they do to neurosurgery, and the conscientious selection of men who may be leaders in the academic circles of the future is our recurring obligation.

Education. Dr. Francis Murphy's presidential address? concerned itself with undergraduate education in neurological surgery. He tabulated the obvious tendency in medical education to cut the curriculum, to give less time to surgery in general and to surgical specialties in particular, and to give a decreasing role to neurosurgery in the education of the medical student.

There is great institutional variation in the responsibility for undergraduate education given to the field of neurological surgery. The Society of Neurological Surgeons has long been interested in undergraduate education and in residency training. During this year, a cooperative program between the Society of Neurological Surgeons and the Harvey Cushing Society has been carried out in an attempt to obtain meaningful data for future needs and the potentialities of neurological surgery in medical education. The concept of seeking separate departmental status for neurosurgery in medical schools has been presented; this may be necessary in the future, but here again there is great variation between institutions. Neurosurgery derives strength from surgery itself; at the same time, surgery derives strength from neurosurgery and the other related surgical specialties. Possibly in weakening surgery we would be weakening neurological surgery.

Dr. Murphey has made a strong point and his continuing study will be of value to us in these decisions. Dr. Aura E. Severinghaus, at the Conference on Education in the Neurological Sciences at White Sulphur Springs, in November, 1966, said, "Depart-
ments are unofficial administrative divisions of the total body of knowledge designed to expedite undergraduate and graduate teaching and research in all faculties of the university."

This Conference on Education in the Neurological Sciences was an experience which gave all who attended perspective on the educational future. Dr. Paul Sanazaro, another plenary speaker at that Conference, quoted from the Bulletin of the American Academy of Medicine: "The remarkable advance in medical education during the last two decades is justly a matter of pride on the part of the medical profession. This progress far exceeds that which has been made during the two previous centuries. It surpasses, moreover, the advance of any other department of education during the corresponding period." The interesting feature of that quotation is that it was written by Dr. Dodson in 1899.

Similarly, changes necessary in medical education that sound extremely modern were listed by Krusen in his "Present Trends in Medical Education" in 1930. These included "shortening of the medical curriculum, developing core course material, and allocating free time to electives; teaching students subspecialties only in relationship to the general field of medicine and surgery; reducing the number of lecture hours and increasing the number of hours in patient care activities; increasing emphasis on self-education by students; better correlation, coordination, and integration of the various disciplines; eliminating duplication in teaching; improving the teaching in out-patient departments; eliminating long summer vacations; and substituting comprehensive examinations for departmental examinations."

The role which neurosurgery should rightfully take in medical education, including undergraduate, residency (postgraduate), and continuing education, will be directly proportional to the enthusiasm and dedication with which neurosurgeons participate with others in the educational processes. This will have to include membership, inconvenient though it may be, on curriculum committees, promotion committees, admissions committees, and a variety of other time-consuming administrative committees involved in the functioning of a modern medical school and, in fact, of a modern hospital.

The willingness to teach as part of a "core curriculum faculty" may be incumbent upon neurosurgeons. The vast growth of medical knowledge in all fields, and particularly in the neurological sciences, makes it mandatory that all medical education be streamlined to give the student the ability to think and to reduce the number of facts that he must commit to memory. This is not to say that facts are not important. But the number of facts that a student can learn is limited, and the number of concepts he may learn to put together is a much more important educational process. Giving him facts and allowing him to put them together in a meaningful way will result in concepts which he can remember. This is the crucial educational process.

The neurosurgeon will be called upon increasingly to contribute to the continuing education of physicians at all levels. This will include educational courses for the general practitioner, the general surgeon, the internist, the pediatrician, and perhaps physicians in other fields. This is not a new obligation, but will be a growing one in the future.

These efforts must be directed toward the upgrading of practitioners of neurosurgery in all modern techniques. The morning sessions, so-called "breakfast sessions" introduced in the last three years, were planned for this purpose. This Society and other national societies are obligated to devise those ways in which men in practice may maintain their skills and have access to modern techniques. A strong system of educational courses can be patterned in the cooperative effort, and the Harvey Cushing Society should offer this leadership.

Administration. Reference was made earlier to the three-legged milking stool, so evenly balanced on "Practice," "Research," and "Teaching." Pictured in Fig. 13 is a bona fide dean putting in the "administrative fourth leg"—a much wider and longer leg—which naturally upsets the balance of the previously stable three-legged stool (Fig. 14).

For all those who are involved in hospital and medical school administration, recognition of the great obligation of administration is nothing new. If medical people, including
neurosurgeons, are not involved in the detailed planning of a new building, someone else will be involved, and it may turn out to be less than adequate for the neurosurgeon. There is no substitute for the time spent on committees in making decisions which vary from house officers’ appointments to long-range planning over the next ten years.

For neurosurgery to take its rightful place

Fig. 13. A fourth leg is added to the milking stool by Dr. Manson Meads, Dean of the Bowman Gray School of Medicine.

Fig. 14. The administrative fourth leg upsets the balance.

Fig. 15. The neurosurgeon as supreme commander (artist, Dr. Ernest Craige).
at the council tables, the neurosurgeon will of necessity have to so organize his time so that he can make himself available for such administrative duties. Moreover, he needs the abrasive influence of such committee meetings, for they serve to round off the rough edges quickly, making him a more docile soul, gentler, and more placable.

Thus we see that in the evolution of all these educational and administrative problems, including the obtaining of research grants, the appointment of trainees, and numerous other areas, the neurosurgeon has been diverted from his traditional role as unquestioned supreme commander and tyrant of the operating room to the soft-spoken, studious member of the neurosurgical team. This is gratifyingly depicted in Dr. Ernest Craig's drawings (Figs. 15 and 16).

The complexity of administering a society such as the Harvey Cushing Society increases exponentially. The official board of the Harvey Cushing Society has had under consideration for some time the need at some future date to employ a full-time executive secretary. This will be a continuing consideration. The work of this is made easier, of course, by the facilities offered to us by the American Medical Association, the numerous county and state medical societies which handle so many of the problems of ethics in practice, the American College of Surgeons, and the Association of American Medical Colleges. We must utilize the facilities of these societies to an ever-increasing degree.

Summary

The perspective of Dr. Cushing was nowhere more evident than in the following two paragraphs:

"Every generation is prone to overvalue its own accomplishments and to feel that it
has lived through the most eventful era in history. So it is music in our ears to be told that this recent half-century has seen the greatest progress of all. Not everyone is entirely happy about it, for with standardization and mass production and the mechanical robot has come a vast deal of unemployment, and any day some new machine or centralized control may throw still more of us out of work. But despite the talk, there is nothing new in this. Five centuries ago countless scribes and illuminators were obliged to find other jobs because of that robot, the printing press with its movable type, an unwelcome invention which transformed their world far more than has the gas-combustion ones.

“Nevertheless, science and those who apply its discoveries have in these recent years provided us with an amazing hodge-podge of novel and revolutionizing things to which we are obliged to adjust ourselves whether we wholly like it or not. The telephone, the incandescent lamp, the dictaphone and the typewriter, the automobile and the aeroplane, the x-ray and radium, wireless messages and vitamins, motion pictures and television, have come, for better or for worse, permanently to change our very manner of thought of life and of living. From Zeppelin to sub-
marine, the most fanciful imaginings of Jules Verne have been outdone in fact. All that remains is for the cow to jump over the moon, and she may be expected to hop off any day now that two Belgian physicists have found the stratosphere to be so accessible and such a pleasant place when you get there.”

The need for perspective is real and we should be able to achieve it. We have reached the stage of critical mass. We can sustain an ongoing effort of manageable proportions for we have numbers, talent, motivation, and influence. Our strengths and weaknesses have been honestly faced. The tasks for the immediate year have been underscored. We can in fact ripen our own time. As Dr. Charles Kidd has indicated, the criterion of success is not necessarily in the solution of all problems but in the creation of productive new problems and the facing of these with realism. To ripen our own time will call for continuous involvement (Fig. 17).

References