

The J. C. Richardson Lecture: Prospects for Canadian Medical Neurology

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This, the second annual J. C. Richardson lecture, was given in Toronto by Dr. D. W. Baxter on January 29th, 1975.

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In 1975, medical neurology is a well established, viable, growing specialty in Canada. There are now almost 250 neurologists scattered across the country, congregated largely in the hospitals associated with our 16 medical schools. Neurology is a major component of the undergraduate curriculum in each of these schools, and the majority of schools are approved for postgraduate training in our specialty. The Royal College has certified an average of 18 new neurologists each year for the past five years. In our hospitals we work closely with our internist and neurosurgical colleagues and we receive the support of highly competent teams of neuropathologists, clinical electrophysiologists and neuroradiologists. We believe that we provide a generally high standard of consultation service to our medical and surgical colleagues. We accept direct responsibility for patients suffering from a host of acute neurological problems, but we accept long term responsibility for very few. We do a great deal of teaching at both the undergraduate and graduate levels. In fact, the major role which neurology plays in undergraduate curricula, and the stimulus of postgraduate education, probably have been the two most influential factors shaping the number, work patterns and distribution of Canadian neurologists. Many of us are engaged in clinical investigation, but relatively few medical neurologists in Canada make fundamental research contributions.

Collectively, we meet yearly with our neurosurgical colleagues in the

Canadian Congress of Neurology. We have the capability of influencing decisions which will shape the future of our specialty through participation in local, provincial and national organizations. Specifically, we currently are influencing decisions which almost certainly will determine how many Canadian neurologists there will be two decades from now, what type of work patterns they will have, the extent to which they will provide community service, and, most importantly, how they will rate alongside their professional peers from other parts of the world.

This collective responsibility of neurologists has found its most recent expression in the Silversides Manpower Report. This is a thoughtful statement concerning the future of medical neurology which deserves the support of all of us and on which I have drawn extensively for my comments. Dr. Henry Barnett's vigor in promoting interest and support for the study of cerebral vascular disease is but another example of the type of activity which will influence the work patterns and interests of Canadian neurologists for many years.

This picture of Canadian neurology in 1975 is vastly different from that of 30 years ago, at the close of the Second World War. There were at that time no more than 35 medical neurologists in this country, and many of them had major interests in psychiatry as well as neurology. The Canadian Neurological Society had not yet been formed. There were few formal training programs and the guidelines for certification as a

specialist in Neurology by examination were yet to be formulated. We owe a great debt to the men who nurtured, encouraged, and guided the growth and spread of medical neurology during these difficult years to its current position of relative strength and stability. Dr. Richardson has been on center stage for Canadian medical neurology throughout these 30 years. A short time ago Dr. Richardson's long time friend and colleague Francis McNaughton sent me a copy of his presidential address to the Canadian Neurological Society in 1955. This is a remarkable unpublished account of Canadian neurology from its birth in the early 1900's to 1955. With this paper Dr. McNaughton enclosed a note saying that "Too much emphasis cannot be placed on the role of individuals in our past history, for they provided the leadership and the energy — the driving forces for the rest of us." I can think of no more concise statement to describe the constructive role which Dr. Richardson has played and continues to play for our specialty. A further quotation which Dr. McNaughton gave me seems appropriate to end these introductory comments and to introduce my remaining remarks. "Life can only be understood backwards — but it must be lived forwards."

My principal contention is that medical neurology in Canada will change more dramatically in the next 30 years than in all of its past. Despite the evidence for growth and progress I have referred to, our specialty has lagged behind many others in the development of new diagnostic techniques and treatment measures. In fact, we still deal with a large percentage of our patients in a manner not strikingly different from 30 years ago. We have not yet had to demonstrate our ability to cope with rapid change in a manner comparable to a modern cardiologist, nephrologist or endocrinologist. Today, however, every adult and pediatric neurologist feels the winds of change generated by the remarkable ferment of neuroscientific activity in the past two decades. We look to our next quarter century with well founded

hope and anticipation. Medical neurology probably has no current peer as a career opportunity for young physicians seeking a future filled with change, interest and excitement. This forward thrust of the neurosciences and of medical neurology is of course a world wide phenomenon, and will undoubtedly take place with or without Canadian involvement. We medical neurologists can presumably choose to play the role of passive beneficiaries of the work of others or to be active contributors during these decades of neurological achievement. My premise is that Canadian neurologists will choose to be active participants and that if so we should perhaps look closely at ourselves to see that we are properly prepared to make contributions. The Silversides Manpower Report is clearly concerned with just this problem, but this is a report from neurologists to a federal committee in the full knowledge that government now has the financial and organizational leverage to influence not only our numbers and work patterns, but even our goals. My comments are directed to clinical neurologists in the belief that we too can influence our future in powerful if less direct ways.

If we are to fully realize our potential, and to play our proper role on the world scene, then Canadian medical neurology must become a complete specialty, i.e. it must become a discipline capable of sustaining major simultaneous efforts in the areas of patient care, teaching and research. At recent seminars held by neurologists and neurosurgeons at McGill these activities have been represented as composing the sides of an equilateral triangle. The implication of course is that none of these activities is more important than another, and that the length and strength of each side of the triangle should be periodically examined and zealously guarded. This is a valuable concept which probably could be usefully employed by all of our university groups, and which can serve as a guide in assessing the strength of Canadian medical neurology as a whole. Even more important, I believe we can accurately claim to be a

complete specialty only when the sides of the triangle are balanced nationally, and in most of our university centers.

Viewed in this way, the current activities of Canadian medical neurology can scarcely be said to form an equilateral triangle. Rather our activities form more of an isosceles triangle with long equal sides represented by service and teaching, while research forms a very short and unstable third side. This is a highly undesirable situation — for the activities which add length and strength to the research side of the triangle are those which ensure the adaptability, flexibility and productivity of any clinical specialty. Research in that vast no man's land which lies between the interests of the basic neuroscientist and the clinical neurologist, and which is properly the research field of medical neurology, has barely been attempted by Canadian neurologists. I submit that the major goal of all our university leaders during the next decade should be to correct this situation.

There are at least two, and probably more, ways in which Canadian neurological centers could move to increase the volume and quality of clinically stimulated fundamental research in Canada. The first is to place basic neuroscientists under the same roof as medical and surgical neurologists and to ensure their intermingling to such a degree that common research interests develop. That this is a highly effective method of ensuring fundamental neurological research which is often of clinical relevance has been well demonstrated over a number of years at the Montreal Neurological Institute. McMaster has a Medical Research Council, neuroscience group located for practical purposes within the walls of its university hospital. A team of neuroscientists work in the Toronto Sick Children's Hospital, and Laval is moving to integrate the activities of basic neuroscientists and clinicians. Now we hear of the Playfair Neuroscience Research Institute to be established in another of Toronto's teaching hospitals. These are major developments which

Canadian neurologists will watch in the hope and expectation that the activities of these neuroscientists and their clinical colleagues will be productively integrated.

A second and complementary approach aimed at strengthening the research arm of our specialty is to recruit cores of physician scientists in university hospitals. This is the approach which we have tried to develop at the Montreal General Hospital over the past 10 years, and I realize that similar attempts have been made in the principal teaching hospitals of Toronto and other Canadian centers. I am convinced that this is a valid approach which, if more widely adopted, could only result in major benefits to our specialty. Thus, I would like to examine the concept of physician scientist-clinician teams in somewhat more detail.

First of all, how does one recognize the potential productive physician scientist? I would stress the word potential because it is at least five years after he has joined a group that either he or his colleagues will know if he is capable of balancing the various pressures which play on him in such a way that a sustained research effort is possible. On the average he is a surprisingly young man even though his clinical training will have been completed several years earlier. He will have spent several subsequent years in research training, probably has acquired a Ph.D., and will already have demonstrated his ability to do independent research. He leans, perhaps understandably, to a career in the neurosciences, but still shows obvious reluctance to break his ties with clinical neurology completely. He is not interested in clinical research or applied research. He wants to do fundamental research of a quality that will stand comparison with any other neuroscientist. He is invariably aware that the great majority of those who have tried to combine a clinical and research career in the past have failed to make significant research contributions.

These men should not be recruited "to do research." Rather, they should be recruited as members of a

group with the triangular aims of teaching, service and research — and with the clear understanding that they are expected to contribute to all three areas. That their individual work patterns will be biased in favor of research is no more unusual than the bias of another member's time in favor of clinical work or teaching. Such men add remarkable strength to university groups when their activities are successfully integrated with those of seasoned clinicians. They have the ability, which the clinician completely lacks, of taking problems of clinical origin to the research laboratory. They are able to bridge the gap between the basic neuroscientist and the clinician, the patient and the public with incredible ease. They bring to our patients and to our training programs a type of critical thinking and incisive reasoning which few clinicians can emulate. Above all they can research with a degree of competence comparable to the basic neuroscientist whose stimulus for research arises from non-clinical interests.

There are, however, both short-term and long-term difficulties which should be recognized by those contemplating formation of such teams of clinicians and physician scientists. Surprisingly, recruitment does not appear to be a major problem. Young men with all the attributes of the potential physician scientist appear regularly on the Canadian scene — a fact due largely to the vigor of American graduate and research programs. Like all neuroscientists they require space and support for their research efforts. However, as a group they are uniquely qualified to compete for both of these at local and national levels. Perhaps naively, I assume that neither would be insurmountable problems for most of our university centers. The twin problems of work patterns and personal support are much more difficult. I doubt that there can be too much flexibility in the type of work profile offered to a new physician scientist, at least in the formative first four or five years of his career. The great majority of his time must

be made available for research and must be free of clinical interruptions. This block of research time should be of many months duration during which a small amount of well defined, on going, clinical responsibilities in the form of clinics, clinical conferences and teaching activities should continue. Ideally, each year should also include a two or three month period when the scales are tipped almost completely and the physician scientist becomes heavily involved with patient care and graduate teaching responsibilities. Personal support, which most physician scientists should obtain partially in the form of scholarships from national or university sources, can of course be supplemented by clinical earnings. It remains, however, a very challenging task to maintain suitable work profiles and still ensure that physician scientists command an income comparable to their clinician colleagues.

Our own group is only now beginning to recognize the long term difficulties which emerge. They are not precisely of the type we anticipated. We were aware that physicians who spend the bulk of their time in research laboratories run the risk of losing clinical adeptness, or of failing to achieve the type of clinical decision-making skill that comes from experience alone (Petersdorf, 1973). Granting that these are potential problems, our own experience suggests that they can be avoided for the most part with the type of work pattern just outlined. The real problems relate to the shifting pressures to which a physician scientist becomes subject, not all of which are particularly familiar to his clinician colleagues. Many physician scientists, once their research efforts begin to show promising results, again wonder if their greatest contributions would not be made in a laboratory setting where they work primarily with basic neuroscientists rather than with clinicians. These doubts linger, even though over time most physician scientists become increasingly impressed by the obvious ways in which their clinical background, and the clinical milieu in

which they work, influence the direction and vigor of their research in favorable and unique ways. All physician scientists lay their reputation and their future on the line year after year in making major applications to national research granting agencies. Few clinicians would care to follow their example. For some, the pressures of neuroscientific competition seem immense and with them comes the risk that teaching and patient care responsibilities become essential chores which should be dealt with as quickly as possible. For others, struggling perhaps in their laboratories, the more familiar financial pressures, or the desire for recognition as a valuable consultant or as a contributor to university and hospital affairs can be equally disruptive. Further, the work patterns of the successful physician scientist change dramatically over time as he acquires graduate students and finds broader research responsibilities of a national and international character thrust upon him. Any or all of these developments produce intragroup pressures of surprising intensity. We have no ready answers to any of these problems, but are confident that they can be solved. Our group has from its beginning, pooled income from all available sources for both clinicians and physician scientists to university ceilings. I mention this only because in retrospect, this arrangement does seem to have been of considerable help in maintaining the cohesiveness of the group and in lessening the tendency to distortion of work patterns. Perhaps an even more important stabilizing factor has been the constant insistence that the group as a whole, and every member of the group, has triangular and not unilateral aims.

I have detailed these problems not to complain about them, but in the hope that they will evoke discussion, debate and suggestions both from groups who have made similar efforts as well as from those who hope to form such teams. They in no way decrease my own firm belief that Canadian medical neurology would be greatly strengthened by the formation of teams of physician scien-

tists and clinicians in at least one hospital in each of our university centers.

There is another problem which contributes to the weakness of the research side of medical neurology and which demands our attention. The future of Canadian academic medical neurology is firmly linked with the basic neuroscientific community. Most clinical neurologists are aware of the prestigious role which this community plays in national and international scientific affairs. At the moment however the state of communication between our two groups is precarious at best. Clinicians of my age group are probably the principal culprits. Certainly the dramatic developments in neurochemistry, neurovirology, developmental neurobiology, neuroendocrinology, neuropharmacology and many other fields occurred some years after we entered the clinical milieu. The result is that we look on the transformation of old familiar fields such as neuroanatomy with awe. It may be only a slight exaggeration to say that we struggle to understand the neurophysiological articles which appear in the *Scientific American*. We clinicians stay away from lectures by neuroscientists in droves, because "there just isn't enough time". Yet we find the time to attend innumerable lectures and conferences which detail again and again one or another of the clinical syndromes we meet every month. This communication gap is hopefully not quite as wide for younger neurologists. I suspect, however that there are few neurologists of any age who can claim to have any real concept of the neuroscientific work being conducted in their own university, let alone the country. Now I know that every university center does try to deal with this problem but I suspect that new approaches and new initiatives are needed in most centers. The integration of neuroscientists into hospital settings and the appearance of a significant number of Canadian physician scientists would of course help immensely in this regard. So would efforts to integrate basic neuroscientists more signific-

antly into neurological training programs. Further, the problem is as important at a national as at a local level. Relatively few scientific papers are presented at national meetings which Canadian neurologists attend and far too few clinicians go to hear them when they are. Basic neuroscientists, and even I fear physician scientists, have tended in recent years to present their work to forums which clinicians don't even know exist. Recent initiatives which have been taken to try and devise formats for national meetings which would be profitable both for clinicians and neuroscientists deserve our enthusiastic support. If we would write for it as actively as we talk about it, the *Canadian Journal of Neurological Sciences* could play a major role in solving this problem. The success of such ventures would auger well for the future of our specialty.

Many contemporary clinical neurologists would argue that the service activities of our specialty are quite adequate at the moment. It is becoming clear, however, that both the medical community and the public generally are suggesting that neurology should play a broader role. The *Silversides Report* (1975) deals skillfully with the subtle but persistent and probably legitimate community pressures which are beginning to influence our specialty. The public and primary physicians are becoming more and more aware of the useful role a neurologist can play in the diagnosis and management, not only of primary neurological disorders, but also of many systemic diseases. Primary physicians are referring directly to neurologists with increasing frequency and there are even pressures from the public for direct access to neurological care. Neurologists are almost certainly going to have to accept more responsibility for the long term care of patients with chronic neurological disease and for the neurologically disabled. We have probably been negligent in failing to develop the middle level technologies with which our specialty could abound. Our involvement in stroke units, pain clinics, neurological rehabilitation

units and neurological community health care teams will almost certainly increase with all that this implies in terms of an increased demand for more pragmatic treatment measures for the neurologically ill. All of these factors are acting now and all suggest that the demand for neurological care may increase appreciably in the next decade. Should the promise that clinical neurology might expand its frontiers into the borderlands of other specialties such as psychiatry or endocrinology become fact, or should the prospects for therapeutic and diagnostic advances in the management of more classical neurological problems materialize, then these community demands would mushroom. It is difficult to forecast how quickly this expansion of our clinical base will occur, or how such a development would influence the activities of our university groups. That there are opportunities to be grasped is without question. I would hope that at least one of the hospitals associated with each of our universities would choose to play a leadership role in the development of community neurological resources. To do this effectively would almost certainly require the involvement and cooperation of neurologists who serve our larger community hospitals. In fact, such developments would seem almost essential if we move as strongly as I feel we must to increase the scientific and research activities of neurological groups in other teaching hospitals. Even now, most of our university centers use several hospitals for undergraduate and graduate teaching in neurology — and all too often the activities of the neurological groups in each hospital are much alike. The development of multiple hospital units, each with a different neurological orientation would do much to allow our clinical base to expand without sacrificing quality of care, provide a more adequate base for our training programs, and foster the development of neurology's research responsibilities. There will certainly be risks associated with this period of change — whether it occurs gradually or rapidly. I would regret for

example any tendency for peripatetic neurologists to appear, or any moves which would encourage neurologists to work in such isolation that they could not dependably count on neurosurgical, neuroradiological and electrophysiological aid. A more immediate danger is that wholly inappropriate community care-responsibilities might be thrust on particular university hospitals without regard to the contributions they were already making to the academic triangle. Thus, the service side of our triangle is changing, and the forces acting for change are not originating primarily from within our specialty. This only increases the urgency for us to become seriously involved if we are to ensure that our service activities expand in a strong progressive fashion and not in such a weak and haphazard way as to be disruptive.

Nothing could be more important to our specialty than the teaching side of our triangle. Since I know very little about the difficulties or pitfalls of undergraduate teaching in Neurology, I will resist speculating on future changes which might occur in this area. I would, however, like to make some comments about our graduate teaching activities.

Why do we have postgraduate training programs at all? It is probably trite but true to say that we have them because neurologists are proud of their specialty, certain of its potential, delighted to see competent young men and women become fascinated by its mysteries, and anxious to see them adequately equipped to cope with what will certainly be increasingly complex problems in neurology. It is probable that the objectives of most of our training programs require modification. Mirror images of neurologists who completed training in the 1950's and 1960's will have difficulty coping with, let alone contributing to neurology in the next few decades. We must now for example aim at forming neurologists who are much more complete physicians than their mentors — and this will require a broader background in internal medicine or pediatrics than has been

traditional in the past. Trainees must continue to be exposed to the increasing variety of primary neurological problems of all age groups and to acquire the expertise to elicit and interpret neurological signs with care and accuracy. They must also become adept at recognizing the sensitive and subtle ways by which the nervous system reflects the presence of systemic disease. Above all, they must acquire considerable information about the many new and exciting investigational areas of basic and medical neurology which will play major roles in determining neurology's future. They should, at the end of their training, be able to intelligently appreciate and choose between careers as clinical neurologists, physician scientists or neuroscientists.

The next question, of course, is whether our contemporary training programs all have the potential to meet these goals. I suspect that the answer is no — largely because of the small number of neurologists in a few centers, and the lack of involvement of medical neurologists in significant research activity in several centers. Many will realize that the acquisition of approval for graduate training from the Royal College, and the attraction of residents, have been major status symbols sought by almost every university group in Canada. This has probably played a very constructive role in the development of Canadian neurology, but I wonder if this is any longer of such importance. It is clearly outdated to equate the strength of a modern university neurological program with the number of residents training in that center. A much more appropriate status symbol for the future would be the achievement of well balanced neurological groups which were making significant local and national contributions in terms of patient care, teaching and research. I believe we have the breadth of vision in this country to help each other achieve these new goals. We should use our own resources if necessary to survey our neurological centers and to give what collective aid we

can to foster development where this is needed. Should we prove equal to this perhaps utopian goal, then all of our university centers would be suitable grounds for post graduate training, whether or not they chose to exercise this option.

At the present time there are over 75 young men and women enrolled in Canadian neurological training programs. Are we training too many neurologists? Well I don't know but I suspect we are not. There is certainly nothing in the current version of the Silversides Report (1975) or in the soundly based predictions which Dr. Dinsdale (1975) has made of the need for neurologists in Ontario during the next decade that would support a contrary opinion.

Neurologists in Central Canada have particular responsibilities for the future of our specialty. Over 60% of our trainees hold residency posts in Toronto or Montreal, and over 90% hold residencies in Ontario or Quebec. The reasons for this are sociological rather than medical, and relate to the geographical and political peculiarities of Canadian life. It would appear that a large percentage of our young men and women prefer to live and work in Toronto or Montreal at least for a few years of their lives. For those with medical training these years are usually those of their residency programs. There is also a greater tendency for medical graduates from Western and Eastern Canada to leave their home provinces for post graduate training than is true in Central Canada. At the risk of misinterpretation I would suggest that few events short of a second ice age, or of a second Wilder Penfield working out of Moose Jaw are likely to alter this situation in the foreseeable future. Certainly any efforts on the part of our own profession or of government technocrats to change this pattern would be both destructive and transiently effective at best. Several necessities flow from these facts. The first is that a sufficient number of training posts must remain available in Central Canada if we hope to attract the best graduates of all our medical schools into neurology. The second is that there can be little variability

in the strength of the training programs involved — at least in the balance they can demonstrate in their teaching, research and service spheres of activity. Finally, we should try to ensure that there is as little variability as possible in the caliber of candidates accepted into these geographically favored programs. I am not suggesting that there is some prototype of a young physician who is ideally suited to be a neurologist. We all hope that individuals with very different backgrounds, interests and career goals will enter our training programs. Our specialty's future however is so important that we cannot afford to see first class candidates rejected in one training center while less than ideal candidates are accepted in another. I may be exaggerating the potential of this problem but do suggest that it is important to consider devising provincial means for the evaluation and acceptance of candidates into neurological training programs, at least in Ontario and Quebec.

We also need to ask ourselves if our present examination system really is capable of demonstrating that trainees have had sufficient exposure to the clinical and basic science aspects of neurology to prepare them for a productive career. The most obvious problem lies in the inability of our current essay type examination to adequately survey the range of clinical and basic science information which trainees have achieved. Our present oral examinations are rightly designed to test clinical competence, but this is surely only one of several attributes of an adequately trained modern neurologist. Thus, efforts to significantly modify our present examination system should be vigorously pursued. I wish we would hear more from neurology residents about these matters. They have certainly made giant strides in recent years towards improving the quality of life during their transient years of training. If their energetic concerns were turned towards influencing the quality of the discipline in which they will spend the rest of their lives, the results would be nothing but constructive.

Finally, I cannot back away from the opportunity to speculate about the future status of neurology in our medical schools. At the present time, most neurological groups in Canada form divisions of Departments of Medicine. For the vast majority of neurologists this has been a happy and productive, if perhaps protective relationship. Of the many benefits which have flowed to neurology from internal medicine, not the least has been the support and encouragement of the most capable and forward looking physicians in the land who head our Departments of Medicine. Integration of neurology with hospital departments of medicine is an ideal method of ensuring the cross fertilization of neurology with the service and research activities of other medical specialties. Nor can the benefits of ensuring that neurological trainees daily compare their competence as complete physicians with trainees in other medical specialties be underestimated. We must, however, remember that the neurology of internal medicine is but one of many interesting facets of our specialty. In fact, the full development of a neurological internist prototype for neurology would be as ill advised, as threatening and as non-productive as the concept of a neuropsychiatrist was in another era. Thus I would argue that neurology does merit special status in our Departments of Medicine. The background data base which a neurologist requires differs very significantly from the common data base of many other specialties. The necessity of developing as close a working relationship with our neurosurgical, as with our medical, colleagues must be appreciated. The common and often overlapping aims of undergraduate and graduate teaching programs in neurology and neurosurgery must be recognized. Above all, the urgent need for Canadian medical neurology to develop a strong research arm during the next decade should be accepted and receive priority. I believe that all of these can be achieved within a division of neurology though they may be threatened by the understandable desire of

some department chairmen to keep divisional activities in balance. I submit that for medical neurology to remain "in balance" with the many other sub-specialties of medicine during the next few decades would be to grossly shirk our responsibilities and our opportunities.

Many of you will have noticed the minor tempest in recent pages of the *New England Journal of Medicine* concerning this very question of the relationship of neurology to Departments of Medicine. It began with an article of Dr. Petersdorf (1974) last summer in which he suggested that there was little justification for the special status of clinical neurology in American Departments of medicine. This article evoked a reply from Dr. Robert A. Fishman (1974), who presented the case for Departments of Neurology. Dr. Fishman's view deserves our careful attention for his department reflects as accurately as any the stature of neurology as an academic discipline in the United States. Let me then quote the central paragraph of his letter. "Those of us who consider

neurology a medical discipline that has reached a level of complexity, responsibility and maturity that deserves departmental status must emphasize the point that a "critical mass" of faculty and resources is essential to achieve excellence in teaching, service and research. The fact that almost all the medical schools of the country have given neurology departmental status reflects the widespread conviction that neurology requires institutional resources to match its responsibilities. Dr. Petersdorf's minority view would limit neurology's role as a discipline that is essential for the general education of all physicians." Dr. Fishman concludes his short letter with the remark that "neurology has come of age." Most Canadian neurologists would support this view of neurology in the United States.

I hope that the time is not too distant when Canadian medical neurology can also claim to have come of age. A more realistic and not unpleasing view of our present status might be that we have barely reached puberty, that we have a lot

of growing up to do, and that our major excitements and our major accomplishments lie ahead. Our aim must be to become a complete medical specialty making balanced contributions to the health care of our people, to the fund of neurological knowledge, and to the teaching of medicine. When we have reached this goal there will be more Departments of Neurology in more Canadian medical schools.

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