

Anaesthesia at McGill
“With a Flame of Passionate Idealism”

Edited by

Harold T. Davenport, FRCPC, FFARCS (Eng)

Anaesthesia at McGill

"With a Flame of Passionate Idealism"

Editor: Tony Davenport

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

*The places and years of medical qualification of contributors are listed here.
Their years at McGill are given at the head of their contributions.*

FOREWORD

Gordon Fox, University of Toronto, Canada, 1960

INTRODUCTION

Tony Davenport, University of Liverpool, UK, 1944

- I. Department Beginnings
C. Ronald Stephen, McGill University, Canada, 1940
- II. Basic Research
 - i. Gordon Robson, University of Glasgow, UK, 1944
 - ii. Kresimir Krnjevic, University of Edinburgh, UK, 1949
- III. Clinical Research: The Reflex Arc
Philip Bromage, University of London, UK, 1943
- IV. A Department of Renown
Earl Wynands, McGill University, Canada, 1954
- V. Difficult Years
John Sandison, University of Edinburgh, UK, 1953
- VI. The Endowed Chairs and Lectures
David Bevan, University of Cambridge, UK, 1965
- VII. Basic Training
Deirdre Gillies, University of Edinburgh, UK, 1950
- VIII. The View of Recent Deans
 - i. Maurice McGregor, University of Witwatersrand, South Africa, 1942
 - ii. Pat Cronin, McGill University, Canada, 1959
 - iii. Samuel Freedman, McGill University, Canada, 1953
 - iv. Richard Cruess, Columbia University, USA, 1955

ACKNOWLEDGEMENTS

I wish to thank the contributors and, particularly, Franco Carli who had the idea of producing this book. My daughter Margery has done extensive subediting with technical assistance by Mario Pasquali. Maria Pacelli has for many years been crucial to the running of the McGill Department of Anaesthesia, (*vide* page 39). For this book she has tied up the loose ends, mustered the illustrations, and organized both the printing and financial backing of the project. All this has made my own work less onerous and more pleasurable.

Tony Davenport, September, 1996.

IX. Student Life

- i. Ian Geddes, University of Saint Andrews, UK, 1950
- ii. Ljubomir Ribaric, University of Zagreb, Yugoslavia, 1950
- iii. Michael Cousins, University of Sydney, Australia, 1964
- iv. Octavio Calvillo, National University of Mexico, Mexico, 1969

X. Views from the Montreal General Hospital

- i. Bob Ferguson, University of Toronto, Canada, 1933
- ii. Rob Robillard, McGill University, Canada, 1951
- iii. Ian Metcalf, University of Western Australia, Australia, 1962
- iv. Harry Scott, McGill University, Canada, 1941

XI. Views from the Royal Victoria Hospital

- i. Paul Otton, University of Western Ontario, Canada, 1954 and Art Sheridan, Queen's University, Canada 1946
- ii. Sally Weeks, University of London, UK, 1961

XII. Views from the Montreal Children's Hospital

- i. Tony Davenport, University of Liverpool, UK, 1944
- ii. Jose Rosales, University of Manila, The Philippines, 1949

AFTERWORD The Way Ahead

- i. François Donati, McGill University, Canada, 1979
- ii. Franco Carli, University of Turin, Italy, 1971

NB Although the Faculty of Medicine dropped the diphthong from the McGill Department of Anaesthesia in 1986, it was felt that as it was used for the first 40 years it should remain for this publication and for uniformity

FOREWORD

Gordon S. Fox (McGill, 1966-present), Fellow of the Senate of the University

This book tells part of the story of the development, during the past 50 years, of the McGill Department of Anaesthesia. Beginning with its Chairman, Wesley Bourne, the department has been recognized, both nationally and internationally, as a leading clinical and academic unit. Following its inception, the department quickly became highly regarded, due to the wisdom and foresight of its leaders, and its reputation within Canada and in the international community, for excellence in residency training.

The McGill Medical School has enjoyed a worldwide reputation for undergraduate and post-graduate training. Indeed, for years the anaesthesia faculty has had a high percentage of academic staff drawn to Montreal and McGill from outside Canada, principally the United Kingdom. A number of former residents and faculty were, and are, leaders in Canadian anaesthesia circles and have become department chairmen, either at McGill or at other universities. Our residents, particularly from the decades of the fifties, sixties and seventies when a large number of international graduates were in the programme, are practising throughout North America and Europe. Rarely do I attend a meeting, particularly in the United States, where I do not meet a former resident who fondly remembers Montreal, McGill and the friendly ambience of the various hospital departments and the excellence of their training.

It was my good fortune to have been taught, and to have worked with a number of leading figures in McGill Anaesthesia. I recall meeting Harold Griffith, I learned to do epidurals under the tutelage of Philip Bromage, and I published my first paper with Earl Wynands. Many of the chapters in this book are written by the distinguished physicians who were, or are, my colleagues at McGill. They played a huge role in developing the university and the hospital departments of anaesthesia at McGill. They write as "insiders" with intimate

knowledge of the department and with the perspective of their relationship and vision of the faculty and its members.

In celebrating its first 50 years, the University Department of Anaesthesia is still relatively young in comparison with other specialty departments. There are opportunities for development in the coming years, just as there are many changes impending in the near future. Two of the contributors to this book, Drs Carli and Donati, chairmen of the university departments in Montreal, look into their crystal ball and attempt to give us a picture of our department in the coming decades.

Readers of this book who have some knowledge of the history of the faculty will doubtless find some new and fascinating events recounted concerning the characters who played their parts in McGill Anaesthesia. Others, less acquainted with McGill, will enjoy learning details of the department and its faculty from the individuals who played their roles within McGill Anaesthesia.

INTRODUCTION

Tony Davenport (McGill 1951-1966)

In 1823, soon after the Montreal General Hospital opened on Dorchester Street East, its medical staff formed the Montreal Medical Institution. This was to become the McGill School of Medicine six years later. Four men were particularly involved in creating the department. Two had been brought up in Scotland, two in Canada, and all had trained at the University of Edinburgh.

Of the four founders, Dr. Robertson became the first administrative head of the department. In 1854, when the Faculty of Medicine was formed, Dr. Holmes assumed the post of its first Dean. Dr. Stevenson won acclaim for an MD thesis on the repair of his own cleft palate and Dr. Goldwell was famed for having fought the longest duel in Canadian history! During the two decades in which these clinicians were most active, anaesthesia was born and nurtured.

It is thought that the first anaesthetic was given in Montreal in 1847. This was administered by Dr. Nelson, whose name appears on the charter of the School of Medicine and Surgery of Montreal, the forerunner of the Faculty of Medicine of the University of Montreal. The son of a rebel who had been exiled from Canada, he began using ether on patients only after he had experimented with it on animals and then himself. Even so, patients at the Hotel Dieu Hospital resisted the use of anaesthesia for some time.

Over the next 50 or 60 years surgery and anaesthesia were both rudimentary. Procedures were kept as brief as possible, which was just as well in the light of contemporary accounts. In 1888, when the use of nitrous oxide combined with oxygen was just being introduced, Dr. Silk gave one such description in his *Manual of Nitrous Oxide Anaesthesia*. On administering gas to a patient, he writes:-

"the ashy hue of the face deepens to one of marked and gradually increasing lividity, the mucous membranes of the lips become a blue black colour....the eyes become fixed,

the conjunctivae slightly congested and often even at this early stage wholly or partly insensitive to touch....the eyeballs oscillate, the eyelids twitch in a manner suggestive of epilepsy...a sign that a sufficient degree of anaesthesia has been produced for...the extraction of one or two loosely fixed teeth; but if the operation is likely to last longer...with a few more inspirations ...compulsive twitching will extend to arms and legs almost to jactitation...the pupils...widely dilated, the pulse intermittent. I would also warn my readers against relying upon dilation of the pupil as a sign of completion of anaesthesia...as it may suggest the approach of syncope."

In 1872 William Osler, who had been born and bred in Canada, graduated in medicine at McGill University. He was to become the best known doctor in the English-speaking world, as well as a celebrated scientist and clinician. McGill provided the foundations for his illustrious career for, he wrote, "it gave me an opportunity to teach and to work. They believed in me, this helped me to believe in myself, an important asset for a young man."

Writing of the student specialist, he observed that he "may have a wide vision, no student wider if he gets away from the mechanical side of the art and keeps in touch with the physiology and pathology upon which his art depends. More than any others he needs the lessons of the laboratory and wide contact with men in other departments who may serve to correct the inevitable tendency to narrow and perverted vision in which the life of the ant-hill is mistaken for the world at large."

Although Osler only taught at McGill University until 1884, his precepts proved to be lasting. When, in 1907, Wesley Bourne came from the West Indies to study medicine at the university, the teaching of its famous alumnus was still a palpable influence. Within a few years of graduation, Dr. Bourne had decided to abandon his surgical training and turn to anaesthesia — a field in which he was to rival Osler in his importance to medicine.

By the end of the First World War there were a few full-time anaesthetists in some Montreal hospitals but they were little more than assistants to surgeons and had neither the training nor the time for research in the subject. Dr. Bourne, therefore, looked to the Department of Pharmacology for the necessary laboratory facilities and expertise. He was appointed an Assistant Demonstrator in that department in 1915. By 1922 he had been promoted to Lecturer, and he subsequently became a prolific writer.

Many of the contributors to this book, including myself, knew Wesley Bourne and recognised his influential role in the formation of the Department of Anaesthesia at McGill University. He was an enthralling teacher. When I once asked him about his experimentation he dismissed it as "pure inquisitiveness my boy." One of his memorable adages was that what matters is "not the drug, but the man who takes it off the shelf." Although he fostered the academic aspects of anaesthesia, his achievements in the field were only recognised at the university in the last five years of his professional life.

Harold Griffith, the other key figure in this story, was very dissimilar to Wesley Bourne but they were inseparable friends. Born and bred in Montreal, Dr. Griffith did not qualify at McGill until he was 28. Despite this late start, which was due to his war service, he was to change anaesthesia dramatically for the better.

Drs Bourne and Griffith were renowned anaesthetists in North America and even further afield throughout the 1920s and 30s but they both remained minor teachers in their own university. Nor were they permanently on the staff of a major teaching hospital. This neglect is reflected in the authorised history, *McGill University for the Advancement of Learning* by Stanley Brice Frost. So Bourne, the first Professor of Anaesthesia, is not even mentioned. Griffith, who succeeded him in this post, is acknowledged as having "made perhaps the most important single contribution ever made by our Faculty of Medicine to clinical practice" but even this praise is confined to an aside.

There are many such histories of McGill University and its three major teaching hospitals but departmental histories are more rare. As the Anaesthesia Department at McGill has been so influential, its

story is well worth relating. Osler's personal library, in which anaesthesia is the only subject separately indexed, sets the precedent for such special treatment.

In undertaking this review of the last 50 years of the university's Department of Anaesthesia we have decided to use the living voices of those involved rather than a mediated history. Contributors were encouraged to be anecdotal. Such an approach cannot avoid presenting some conflicting views but I hope that this will prove illuminating and stimulating.

As the editor, I am entirely responsible for the choice of contributors to this book, although some whom I would have liked to contribute were unable to do so. The selection of some contributions was, as with those of the students, necessarily random. Unfortunately, it has not been possible to mention many workers who have been crucial to the development and achievements of the department.

The accounts of several influential people have also been precluded by the decision to concentrate upon those still living. Only the reports of the clinical services at the three oldest teaching hospitals have been included, although many affiliated hospitals have been as indispensable to the experience of students in the Anaesthesia programme. I am sure that time will expose other omissions but I hope that this idiosyncratic selection will still prove to be of value.

I feel that the solutions to current problems may be adduced from the story of this department and how it has been influenced by certain individuals and circumstances. More general academic concerns are also addressed for, while all departments are unique, they also have much in common. Teaching and research, for instance, are of prime concern to any university department and, in anaesthesia as in other fields, these depend upon post-graduate students.

Unfortunately, undergraduate training in anaesthesia is variable and this has a generally detrimental effect. Involvement in teaching is, therefore, crucial to the standing of the Anaesthesia Department in the Faculty of Medicine. At the same time there is a need to support and encourage basic and clinical research. However, as the history of

McGill University shows, both lectureships and research are dependent on endowments.

A McGill luminary, the neurosurgeon Dr. Penfield, encouraged students to choose a school where they could "meet vigorous young teachers who stand in the forefront of medicine today." With such inspiring teachers the future of Anaesthesia at McGill should be assured. They will continue to stoke what Harold Griffith described as "the flame of passionate idealism" lit by Wesley Bourne 50 years ago.

Bibliography

FROST, Stanley Brice, *McGill University for the Advancement of Learning*, 2 vols. (Montreal: McGill-Queen's University Press, 1980, 1984).

McDERMOT, H.E., *The Montreal General Hospital: The years of change*, commissioned by the sesquicentennial committee for the 150th anniversary, 1971.

SCRIVER, Jessie Boyd, *The Montreal Children's Hospital: Years of growth* (Montreal: McGill-Queen's University Press, 1979).

TERRY, Neville, *The Royal Vic: The story of Montreal's Royal Victoria Hospital: 1894-1994* (Montreal: McGill University Press, 1994).

CHAPTER I

Anaesthesia only came to be recognised as a real specialty after the Second World War. McGill's Post-graduate Course in Anaesthesia, which began in the 1940s, remains unsurpassed. It offered a structured programme of lectures by professors of all relevant basic sciences, general meetings with visiting experts, refresher courses, teaching seminars and examination tuition. Wide, clinical experience was provided by six-monthly rotations to any of nine affiliated hospitals. Ron Stephen's war-time training in anaesthesia was an early, very intensive version of what was to become this three-year course.

DEPARTMENT BEGINNINGS

C. Ronald Stephen (McGill 1942-1943 & 1946-1950)

In the early 1940s Canada was in the throes of the Second World War, having declared war in 1939. I had enlisted in the Royal Canadian Army Medical Corps, like many other young McGill graduates, in 1942. By the summer of that year I was serving as a medical officer in a small contingent which was preparing a tent-camp to house a combined operation force of all three services on Vancouver Island.

On arrival at the proposed site we found the land to be under water, so it was necessary to bide our time for a few weeks. As happens in such circumstances, practical jokes were more or less the order of the day so I assumed one was being played when, at lunch one day, the commanding officer announced that I had been selected to attend a short course in anaesthesia in Montreal, where I had been born and where my wife and infant son were living. It was only when he showed me the telegram that I realized that truth is sometimes stranger than fiction.

So it was that, in late November, I arrived in Montreal with three other officers, Harry Murphy and Harry Robinson, both from Toronto, and Karl Kraft from London, Ontario. Unfortunately I am now the only one of us still living. We were to do a three-month course in anaesthesia, although early conversations had indicated that none of us had expressed any interest in this developing specialty. The army

apparently believed that it needed bolstering in this field, however, so we had been chosen more or less at random.

It was with some trepidation that we met our professors and teachers, namely Wesley Bourne, who was Lecturer at McGill University and Chief of Anaesthesia at St. Mary's Hospital and the old Grace Dart Tuberculosis Hospital, Harold Griffith, who was Chief of Anaesthesia at the Homeopathic Hospital (now the Queen Elizabeth Hospital) and Digby Leigh, who was the Chief of Anaesthesia at the Children's Memorial Hospital. There was probably some apprehension on their parts too as it turned out that we were the first, of what were to be several groups, to participate on this short course.

We were soon shown to be greenhorns of the first order in all aspects of anaesthesia care, but our teachers were equal to the task. For the following three months we were exposed to the most intensive, gruelling, exciting and fearsome work of our young careers. We literally lived and breathed the precepts and practice of anaesthesia.

Dr. Bourne gave us lectures on pharmacology. Under his aegis Art Wilkinson, Chief of Anaesthesia at the Royal Victoria Hospital, taught us the intricacies of spinal anaesthesia with tetracaine, showing us that there were few limitations to its value, even in upper abdominal surgery. Dr. Bourne reinforced this premise by first demonstrating, and then having us perform, high spinal anaesthesia with nupercaine for intrathoracic operations at the Grace Dart Hospital.

Dr. Griffith was like a father to us. He showed us what wonders could be accomplished with the newly-developed cyclopropane. This teaching proved invaluable as, unlike the American Armed Forces, the Canadian Forces overseas had cyclopropane available to them. He also showed us what could be achieved with d-tubocurarine, prepared as Introcstrin, although this drug was not available in the Canadian Army.

Digby Leigh was the youngest, and perhaps the most exciting, of our preceptors. He taught us living physiology — how to maintain an airway and correct obstruction of it, how to determine the planes of ether anaesthesia (children's chests were always exposed during the

induction phases) by observing the gradual weakening of the intercostal muscles while diaphragmatic action was maintained, and how to insert endotracheal tubes atraumatically. He even demonstrated the analgesic potency of trichloroethylene in association with nitrous oxide.

Perhaps the most important thing this triumvirate of teachers showed us neophytes was that anaesthesia was a specialty which we should be proud to practise and that relief of pain was a fitting endeavour. Those three months proved to be a profound experience.

Subsequently I was away from Montreal, in service, until April 1946. On returning I found that a Department of Anaesthesia had been formed at McGill University in 1945, with Dr. Bourne as Chairman and Assistant Professor. During 1946-47 I was Chief of Anaesthesia at the Montreal Neurological Institute, working with such giants of neurosurgery as Wilder Penfield and William Cone. *[Editor's note - in this year Ron Stephen wrote a paper on neurosurgery anaesthesia and co-wrote one on a new relaxant, Myanesin, with Jacob Chandy, who was to become India's leading neurosurgeon.]*

By 1947 the residency programme at McGill was established, with several participating hospitals. The famous, or infamous, Monday night meetings at the Ciba Building, in the heart of Montreal, were in full swing, with 50 to 60 anaesthetists and budding residents in attendance. Our French-Canadian colleagues participated fully, thanks to the efforts of the aforementioned triumvirate. The format of these meetings consisted of papers delivered by residents, or guest speakers from out of town and other disciplines, followed by free and frank discussions.

As the programme in anaesthesia grew, the potential of this new and dynamic specialty was realized. Dr. Bourne and other leaders recognized that the public ought to be made aware of the advances in the field and they began to use the media to this effect. New appointments to hospitals and to McGill University were announced, as was the use of curare to facilitate operations and increase the safety of anaesthesia. A full-page spread with photographs appeared in one of the French-Canadian newspapers to explain developments and the

advantages of the new anaesthetic drugs. Public awareness became a significant cog in the wheel of advancement.

In the same year Dr. Leigh was persuaded to become Chairman of the newly-formed Department of Anaesthesia at the University of British Columbia in Vancouver. With only three week's tutelage, I became the new Head of Anaesthesia at the Children's Memorial Hospital. The hospital was helping to train residents in the McGill Diploma of Anaesthesia course and residents from Ralph Tovell's programme in Hartford, Connecticut, were sent to spend six weeks on this programme. One of the more illustrious of these residents was David M. Little, Jr. He was to contribute a great deal to the developing organization of anaesthesia through the years and to serve as President of the American Society of Anesthesiologists in 1974.

During a three-year period we were able to demonstrate, with the help of the Department of Physiology at McGill, one of the first techniques for determining oxygen tension in children, using an ear oximeter. We also fashioned a modification in the non-breathing valve, primarily for use with children. [Editor's note - for many years this Stephen-Slater Valve was to be the most widely-used anaesthetic administration system for young children.] In 1950, due primarily to the urging of Dr. Bourne, I assumed the role of Chief of Anesthesiology at Duke University in North Carolina so as to further the cause of anaesthesia below the border.

We were indeed fortunate to see the beginnings, in 1942, of this growth in anaesthesia as a specialty. Its development and maturation were due to the giants already mentioned. The drive, inspiration and dedication of Wesley Bourne, Harold Griffith and Digby Leigh have given us a great legacy and heritage.

CHAPTER II

The McGill Wellcome Chair has been held by the anaesthetist Gordon Robson and the neurophysiologist Kris Krnjevic. Both co-operated with basic scientists and gained respect for their work throughout the medical world, dispelling any doubts about the value of basic science research in the advancement of anaesthesia at McGill. This work will be continued with the appointment of a Harold Griffith Research Professor.

BASIC RESEARCH

i. Gordon Robson (McGill 1956-1964)

The Wellcome Research Chair of Anaesthesia was instituted in McGill in 1956. The undertaking of the Wellcome Trust to fund it for the first five years said much for the status and powers of persuasion of Harold Griffith. It also owed something to Dr. Pask's agreeing to become the first Professor of the department. This was a major breakthrough for the specialty, which was not held in high academic regard, and was almost totally unsupported by British research councils and other granting agencies at this time. Crippsian austerity still held Britain in a ten-year post-war thrall of penury, crippling taxation, food rationing and short commons for academia in particular.

The path of my association with McGill and the Department of Anaesthesia leads back to Drs Pinkerton, Pask and Gillies. Briefly, with the support and encouragement of Tony Pinkerton, with whom I had completed a three-year senior registrarship in Glasgow, Gar Pask appointed me First Assistant in the Department of Anaesthetics at the University of Durham in 1951. Academic appointments in anaesthesia were rare at this time and Dr. Pask was the most scientific of the heads of academic departments and absolutely outstanding in the field, so that this was a most privileged appointment.

Gar Pask was a devotee of Harold Griffith and had spent some months with him in Montreal. It was widely known that, if the research chair in McGill could be funded, he would be the first professor. Dr. Pask's health and personal circumstances changed crucially after he

agreed to take the chair at McGill, however, so he could not take it up. It came as a surprise to me when he recommended to Harold Griffith that I should be invited in his place, a view which John Gillies supported and encouraged.

In 1955 Dr. Griffith was visiting the main anaesthesia departments and societies with a team during the formation of the World Federation of Societies of Anaesthesiology and the organisation of the first World Congress. That summer he came to Edinburgh, where I had moved to a Consultant post in the Department of Anaesthetics at the Royal Infirmary headed by John Gillies, and discussed this proposal with me. First I had to have an interview with Sir Henry Dale, the Chairman of the Wellcome Trust. Fortunately Dr. Pask's insistence on scientific rigour and my own knowledge of the work of Langley made our meeting one of interest and harmony. My having re-read Sir Henry's major contributions to physiology also helped!

A visit to Montreal and New York was arranged for December of that year. This revealed free Canadian attitudes which were in vivid contrast to those of socialist Britain, in which the depression of the thirties had been followed by a gruelling war and a levelling labour government. Whatever had happened to Canada had not produced such misery and such a dearth of academic opportunity. For these reasons, the offer of the Chair proved irresistible to me and I joined McGill in May 1956.

My new post was a full professorship. There was a structured Department of Anaesthesia under Harold Griffith and Wesley Bourne with 40 McGill course trainees, some with research potential. There was money for the equipment and running costs of a small laboratory, thirty feet by thirty feet, in the old Biology building which was demolished in 1965. This was adequate for one or two laboratory workers. My brief was to pursue basic research and facilitate clinical research and education.

I had a warm welcome from the clinical departments in the teaching and affiliated hospitals and from the Department of Physiology, headed by Hank MacIntosh, whose interest and

co-operation proved particularly helpful. I have no doubt that Hank had been asked to look after me by his old colleague, Sir Henry Dale. His chief laboratory technician, Duncan Cameron, was a compatriot of mine whom I remembered from my student days in physiology at Glasgow, where he had been the laboratory technician who looked after the students. A fledgling professor in a new environment could not have had better fortune.

The department scintillated with Ben Burns, Arnold Burgen, Dick Birks, Kay Terroux, Paul Sekelj and an amenable group of scientific and technical staff. Drs MacIntosh, Burns and Burgen represented an early instance of the "brain drain" as they had worked together in the Medical Research Council in London and come to McGill together. Seeing the firm understanding which these talented basic scientists had of the eventual human and clinical relevance of their esoteric research was a revelation to me. So we began a series of researches based on mutual interest which continued until I left McGill and for years after under the direction of Ben Burns at the Department of Physiology and Pharmacology of the National Institute of Medical Research at Mill Hill in London.

I worked most closely with Ben, a neurophysiologist of the highest academic standing with whom I practically served an apprenticeship. Our first joint work was with the gas perfusion of tissues. We perfused heart and skeletal muscle with a humidified oxygen and carbon dioxide gas mixture and showed that it retained its contractility for many times longer than if it had been perfused with oxygenated Ringer's lactate, the standard physiological laboratory practice at this time. The tissue functioned well and its energy was maintained by small shots of glucose solution fed into the gas perfusion line. It did not become oedematous, as with Ringer's lactate perfusion. We thought this technique might have something to offer to transplantation surgery as a means of preserving organ function in transit.

Peter Welt, one of the anaesthesia course trainees, joined me in the laboratory. He had spent his post-graduate years in the Max Planck Institute in Berlin during the war and had had a good scientific

training. Together with Ben Burns we examined the phenomenon of amnesia, using inhaled low concentrations of nitrous oxide in oxygen. Our subjects were McGill medical students, permission for their participation in non-hazardous research having been informally obtained from the Dean.

We demonstrated that amnesia occurred when the internal time clock stopped, that is when the subject ceased to appreciate the passage of time. At this point there was no loss of past memory. Old events could be recalled and discussed with the totally amnesic subject, whereas immediate memory was of only a few seconds duration. This phenomenon was associated with the raising of all the sensory thresholds. We deduced that time-sense was dependent upon total sensory input to the brain and amnesia resulted from sensory deprivation due to low concentrations of nitrous oxide gas.

Brenda Milner, of the Montreal Neurological Institute, carried out psychological testing on our subjects. I also visited Oklahoma City where Jay Shurley was experimenting with total sensory isolation. His subjects exhibited complete time sense disorientation, most entering what might best be described as the delirium stage of anaesthesia. This research gave pointers to mechanisms of consciousness in clinical anaesthesia. For example it might well explain why patients with much reduced afferent input, due to high epidural analgesia, require very little supplement of, say, nitrous oxide and oxygen to keep them safely asleep. It might also show why curarized patients do not easily return to consciousness without return of muscle power and/or strong afferent input. Perhaps we should have pursued this further but other work and interests intervened.

One of my great pleasures at this time was the visits to the laboratory by Harold Griffith and Wesley Bourne who were full of enthusiasm for our research as this had been something which they had planned for many years. They visited frequently to see how it was going and to make suggestions. In most of my early years I was also honoured by visits from Sir Henry Dale. Being of the "smoked drum" era in physiology, he delighted in the new electronic techniques which I used and was most interested in the replaying of taped experiments

of neuronal activity. As he saw the spikes on the oscilloscope and heard them on the loud speakers it was as if he was present at the actual experiment. His keen mind was not fazed by unfamiliar technology and his comments and suggestions were penetrating and helpful. It was inspiring to have a great physiologist, Nobel Prize winner and member of the Order of Merit sit in my lab and discuss what I had been doing.

Gar Pask was another excellent and penetrating critic whose visits I savoured. On his first visit, about a year after I had started, his initial question was "Where is the coffee?" Being so busy, I had never stopped for breaks, so we had go out and buy supplies before we did anything else. Thereafter coffee was always ready for visitors and I became addicted. In the course of the years I had recurrent visits from Cecil Gray, John Gillies, Tony Pinkerton, Robert MacIntosh, Geoffrey Organe, Manny Papper, John Abajian, Ron Katz and many others. They were a constant source of up-to-date information and the work would have been the poorer without them.

With Michael Houseley, then a graduate student, I began a three year investigation into central respiratory neural mechanisms. Of great interest in this work was our finding that barbiturates produce respiratory arrest by causing the medullary inspiratory/expiratory cycling mechanism to stick in either the inspiratory or the expiratory position, the phase being switchable with the appropriate stimulus. The overall activity of the respiratory neurones was increased by virtue of this continuous activity, despite the observation that breathing had stopped. Our experiments started first thing in the morning and often went on until exhaustion set in at two or three a.m. Then we repaired to Ben's Delicatessen for a smoked meat sandwich before going home. Our work culminated in a doctorate for Michael.

Philip Bromage and I had a productive association in the field of local anaesthesia. We published our work on the concentrations of lignocaine reached in the blood when the drug was administered by all the customary routes, trans-tracheal, epidural, intramuscular *et cetera*. This became the most cited paper in the field for some years. It was important to establish dosages which kept within the convulsive

threshold level so I had taken the utmost pains over the very tricky, complicated and laborious chemical analysis of the blood samples. When the easy gas chromatographic method became available some years later, I was delighted to find our results confirmed.

Hillary Don used a device which I had had constructed, based on a suggestion by Dr. Pask, to estimate lung compliance and airflow resistance in anaesthetized patients. This consisted of a high pressure oxygen source controlled by a solenoid operated jet orifice adjusted to allow the gas to flow into the lungs at a rate of one litre per second for one second. It was triggered at the end expiratory position. The airway pressure recording gave accurate measurements of static and dynamic compliance and airflow resistance without calculation. Hillary achieved a Master of Science with this work.

I eschewed the field of blood gases and acid-base balance, which was the clinical, academic bandwagon of the time. John Severinghaus and other workers in the United States had vast resources while David Bates, Ronald Christie and many others at McGill were doing basic and clinical research in this field.

It would be tedious to chronicle all the work which was centred around our little laboratory but I recall with pleasure collaborating with Werner Ferch and George Mandl in electronics, Paul Sekelj, who fathered the modern pulse oximeter, and Tony Davenport, who was Chief of Anaesthesia at the Children's and achieved an extensive research output in the diverse fields of children's anaesthesia, psychology and basic physiology. Alan Noble and Arthur Sheridan at the Vic kept my clinical skills honed and I was caught up in the constant clinical research interests of Deirdre Gillies and Bill Cullen at the "QE."

My stay in McGill taught me many things. It showed me that it was quite unnecessary to have vast resources to work scientifically in physiology and the physiological aspects of anaesthesia. The basics were required but at a fraction of the cost of, for example, the salary bill for even a minor piece of psychiatric or epidemiological research. I decided not to spend money on a secretary and did the greater part of my "correspondence" by telephone, typing essential documents

and papers myself. I could not accept the outside commitments with which most academics keep their secretaries busy. This saved a major part of the Wellcome grant for research.

One should not underestimate the value of such an approach as an aid to single-minded pursuit of academic goals. My only McGill committee membership was in my last year or two, as Chairman of the McIntyre Medical Centre Building Committee. This was a post which Hank MacIntosh persuaded me to take because I was a minor beneficiary for new space and could arbitrate between the demands of the major departments for space and facilities. Joan Peters provided the secretarial support for this.

Technical assistance, mostly in the form of pieces of electronic equipment made by Werner Ferch, was brought in as needed. The graduate students and I became competent technicians in chemical analysis, glass blowing, micro-electrode making, analyzer calibration and all the tasks required in an active physiological laboratory. This produced assured, educated post-graduates who were able to employ technical help and use electronic equipment with understanding and so make the best use of limited funds for research.

Teaching on the McGill programme for anaesthetists and for undergraduates in physiology was an excellent discipline for me. I had to give demonstrations in the laboratory on fires and explosions, techniques of measurement and topics of basic interest, and to visit the hospitals regularly to assist with research projects. It was an active and enjoyable life with varied interests.

In 1964 I was invited to take the first Chair in Anaesthetics at London University. My decision to take this up was helped by the inability of McGill University to guarantee the continuance of the Wellcome Chair when the Wellcome grant ran out that year. This was not due to any unwillingness on the part of the Principal and Dean but to the Duplessis regime in Quebec. This had threatened to withdraw its support from McGill if it accepted federal money.

On the death of Duplessis his successor, Jean Lesage, almost immediately removed this ban and the university received the federal monies which had accumulated, enabling it to build the McIntyre

Centre and the Stuart Biology Building and to fund the Research Chair. Kris Krnjevic succeeded me in this and took over the new department when the McIntyre building opened. He has since made a great success of this.

My "training" at McGill was, I hope, put to good use in the chair at the Royal Postgraduate Medical School, although the administrative responsibilities in London made a secretary a *sine qua non*. One piece of advice I would be bold enough to hand on to future professors is that good work can only be done if the worker is shielded from outside administrative distractions. Research is a pursuit for those who are single-minded and dedicated to satisfying their curiosity. It should be the function of heads of departments, as it is at the RPMS, to see that nothing intrudes.

I am sure that Kris Krnjevic would agree with this. In McGill we were both in the fortunate position of being able to determine our own activities. Since retiring from the Chair at RPMS, I continue to observe it and McGill from a distance and to keep abreast of all my old friends in Montreal.

ii. Kris Krnjevic (McGill 1964-present)

The first Chairman of the research department at McGill, created in May 1956 on the initiative of Drs Bourne and Griffith with the financial support of the Wellcome Trust, was Gordon Robson. In 1964 he returned to Britain so the position of Wellcome Professor became open at the end of my one year visit to the Physiology Department. Largely at the instigation of Dr. MacIntosh, this was offered to me.

Instead of returning to my position at the Babraham Institute of Animal Physiology in England, I stayed on at McGill. Several factors influenced my decision, especially the prospect of working in brand new laboratories on problems of my own choosing. The surroundings were also congenial to me. Having had a partly francophone upbringing, the then bilingual character of Montreal had a strong appeal.

The McIntyre Centre's new laboratories, particularly the very expensive electrically-shielded recording rooms, were splendid but essentially empty. Only after much scrounging about to eke out the limited funds available for new equipment did experiments get under way. The initial staff included Susan Schwartz, the first post-doctoral fellow and a recent PhD from the Albert Einstein School of Medicine, Annibal Galindo, the first graduate student and a trainee in neuro-anaesthesia from Columbia, Keith Legge, my technician from Babraham and Joan Peters, who had been Dr. Robson's secretary.

A major aim of our research was to get further evidence for the idea that the amino acid GABA was the main inhibitory transmitter in the cerebral cortex. In our first experiments in Montreal, we combined intracellular recording with extracellular iontophoresis of GABA in the cat's cortex *in situ*. At the same time, Annibal Galindo began a systematic investigation of anaesthetic effects on neurons of the primary afferent relay in the cuneate nucleus, the first such study of cellular actions of anaesthetics in the brain.

Other McGill anaesthetists and trainees who followed in Annibal's footsteps were Mary Morris, Michael Burfoot, Rick Catchlove and Octavio Calvillo. Altogether, a total of nearly 90 researchers, ranging from junior trainees, graduate students and post-doctoral fellows to senior visitors, came to work in this research department over the next 30 years. Nearly half were Canadians, although, curiously enough, only one came from Quebec, but there were many others from 16 countries, including Belgium, Britain, China, France, Germany, Ghana, Greece, Iran, Israel, Italy, Japan, Russia, Switzerland, Turkey, the United States and Yugoslavia.

It was, and remains, a very cosmopolitan group. A real benefit enjoyed by our staff has been this exposure to people with widely different training and cultural backgrounds. This has led to friendships that transcend linguistic, cultural and geographical barriers. If, as has been said, young researchers learn more from each other than from their teachers, the variety of experiences available here must have contributed a great deal to the quality of their training.

With only the Director holding a "permanent" position, until 1990 when Dr Glavinovic became Associate Professor, there was a minimum of "establishment" and a rapid turnover of researchers. Because of variations in arrivals and departures, the total complement fluctuated between a high of about 20 and a low of five. With four electrophysiological set-ups available, as well as a separate laboratory for the preparation of animals, solutions, micro-electrodes and a technician's room serving as a mechanical and electronics workshop, space has generally been adequate. Until the late 1980s, a first rate mechanical workshop was also available on the ground floor of the McIntyre Centre.

Thanks, no doubt, to Dr. Robson's prescience when he was involved in planning the building, the McIntyre electronics workshop is very conveniently situated in neighbouring quarters on the 12th floor. This has been a particular bonus for electrophysiologists. Exceptionally able electronics engineers have been in charge of this workshop. For the first decade or so this was Werner Ferch. Since 1975 John Knowles has been quite outstandingly resourceful in designing circuits, making equipment that is unavailable from commercial sources and repairing malfunctioning equipment. Our experiments and productivity have greatly benefited from his ever-willing and imaginative assistance.

Principal fields of study

The main thrust of our research has been in two areas — mechanisms of synaptic transmission, with special emphasis on CNS synapses and transmitters, and the effects produced by anaesthetics and hypoxia, also on central neurons and synapses.

Synaptic mechanisms

To put our research into historical perspective, it is perhaps worth recalling the context in which we began operating. As late as 1964, a recognized expert, A.S. Burgen (*Nature* 204:412), was disappointed by "the failure to elucidate the nature of any chemical transmitter in the mammalian nervous system other than

acetylcholine." Though now universally accepted as the most important excitatory and inhibitory transmitters, engaging the attention of thousands of researchers, at that time glutamate and GABA were not the kind of substances that people expected to be transmitters. Much of our effort was, therefore, devoted to getting further evidence about the nature of central transmitters and their mechanisms of action.

One should also bear in mind that, by the 1960s, many influential electrophysiologists had given up studies on the vertebrate brain as far too complex to permit any significant advances. They had switched to *in vitro* preparations of peripheral or especially invertebrate ganglia in the conviction that only such "simple" systems could yield valid information. This, of course, proved to be false as the "simple" systems turned out to be exceedingly complex while much, in fact, could be learned from the mammalian brain, even *in situ*.

Only some highlights of our research can be mentioned here. The first was the demonstration that exogenous GABA and synaptic inhibition produce indistinguishable changes in the membrane properties of cortical neurons in the brain *in situ*. This is generally seen as crucial in establishing GABA as the main inhibitory transmitter in the brain. The second highlight was the discovery that acetylcholine increases the responsiveness of cortical neurons by reducing their permeability to potassium ions. The notion that transmitters could act by *decreasing* rather than increasing membrane permeability, though now commonplace, was then quite novel. In this particular instance it threw new light on the possible function of cholinergic fibres in the cerebral cortex and, later, the significance of their degeneration in Alzheimer-type dementias.

Anaesthesia and hypoxia

A variety of interesting findings were made. Annibal Galindo showed that anaesthetics potentiate the inhibitory action of GABA. Mary Morris demonstrated that they can enhance synaptic transmission in central sensory pathways. Octavio Calvillo proved that morphine has a powerful action at the spinal level, an idea that went

against the current, general opinion that morphine's principal targets were in the brain.

Another discovery, that intraneuronal Ca^{2+} promotes a high permeability to K ions, not only opened up a whole field of studies on the control of neuronal excitability but also suggested a new way of looking at possible mechanisms of anaesthesia. If the conscious state requires a relatively high degree of neuronal responsiveness to incoming signals, which is promoted by *low* membrane permeability to K ions and, therefore, a very low level of free cytosolic calcium, a significant reduction in Ca^{2+} pumping activity, such as might result from anaesthetic actions, would soon lead to a rise in cytosolic free Ca^{2+} , increase in permeability, diminished neuronal responsiveness and, perhaps, loss of awareness. Like any "unitary" hypothesis, this was probably an oversimplification but it offered a coherent scheme, stretching from molecules to behaviour. That other processes may also be crucial is indicated by our recent finding that volatile anaesthetics suppress neuronal calcium currents, as well as much other evidence.

Finally, the important role of cytosolic Ca^{2+} in the control of K permeability triggered our interest in the cellular events by which hypoxia, and hypoglycaemia, cause an almost instantaneous, but reversible, suppression of neuronal activity in some parts of the brain, notably the hippocampus. These investigations are still ongoing.

Conclusion

This cursory survey of work published in over 260 articles is intended to give some idea of the variety of our research over the last 30 years. We hoped to achieve a better understanding of cellular aspects of brain function and anaesthetic mechanisms. Though never a large group, nor richly endowed, this research department has had some major successes in identifying the principal excitatory and inhibitory transmitters in the mammalian CNS and the Ying Yang opposite actions on K permeability and excitability produced by cytosolic Ca^{2+} and cholinergic activity — all topics of paramount significance for brain function.

In retrospect, it is clear that sometimes we "barked up the wrong trees." Too much emphasis was placed on extracellular K as a major cause of primary afferent depolarization and on GABA uptake as the principal mechanism of "fading." Rather than dismiss bicuculline as an effective GABA antagonist, we should have realized that bicuculline-resistant IPSPs indicated a second type of GABA receptor, now well known as the GABA-B type. Though we first reported a potentiation of GABA effects by an anaesthetic, we did not recognize that this is a general property of anaesthetics that may be an essential feature of the anaesthetic process. We also failed to realize that the bicarbonate flux through inhibitory channels, which we first observed, makes inhibition sensitive to CO_2 and pH changes and therefore may have functional significance, as demonstrated by Kaila. And so on! Clearly, one could have done better.

Relations with the McGill anaesthetists

Although it was set up originally as an autonomous research department with its own space and university budget (Robson, 1964), anaesthesia research did not operate in a vacuum. We had strong historical links with the McGill Department of Anaesthesia and the hospital-based groups as well as our neighbours in the McIntyre Centre, especially the Physiology Department. While he was Chairman of this department, the late Dr F. C. MacIntosh had helped to obtain support from the Wellcome Trust and he provided the initial working space.

My own relations with the then Chairman of McGill Anaesthesia, Dr R. G. B. Gilbert, were very good. He recommended and encouraged the first two graduate students, Annibal Galindo and Mary Morris. I participated in the Residency Training Programme, the Summer Refresher Course and staff meetings. Similar active collaborations continued when Dr. P. R. Bromage took over. He was himself involved in research and he very much wanted junior colleagues, notably Michael Burfoot and Octavio Calvillo, to get involved in research here. Thanks to his support, the latter went on to complete a full programme of research for his PhD.

Unfortunately, such positive and fruitful interactions progressively lapsed over subsequent decades. I believe it was the intention of Drs Gilbert and Bromage that, when these young anaesthetists had completed their PhD work in this department, positions with a major component of research time and appropriate facilities would be made available to them in the McGill system. This did not happen. Had it done so relations would indubitably have continued and grown on a strong basis of common interest. As such expectations proved illusory, the disappointed trainees either had to leave McGill or take up appointments in a basic science department.

In the United States, where academic anaesthesia had been almost non-existent, a great effort and some outstanding leadership have succeeded in developing several very powerful anaesthesia research groups which now stand at the forefront of American basic science. Unfortunately, in the McGill system in particular and Canada in general, there has been little success in establishing a broader-based and more securely financed research endeavour to give comparable opportunities for a satisfactory career combining major involvement in high-level research and clinical work in anaesthesia. Future prospects look brighter, however, with the appointment of a new, forward-looking Chairman, Dr. Carli, and a new Harold Griffith Professor in the offing.

CHAPTER III

Clinical research is vital to the development of better medicine but too little of what we do to patients is based on its results. Owing to lack of scientific principles, many clinical investigations are fallible or would have been better conducted as audits, risk management or medico-legal studies. True clinical research is inherently laborious and frustrating but should be properly understood by all health care staff. Therefore McGill must strive to provide the time and the facilities for the few talented and dedicated research-minded workers.

CLINICAL RESEARCH: THE REFLEX ARC

Philip Bromage (McGill 1956-1976)

All cellular organisms, unicellular and multicellular respond to incoming afferent signals that elicit specific outgoing, or efferent responses. In animals, we call arrays and loops of these signals "reflex arcs." During the past 50 years the central developmental theme of clinical anaesthetic research at McGill has revolved round one side or the other of the human reflex arc. This essay will highlight just three strategic points on the human network of reflex arcs at which our research has influenced ideas and changed the course of anaesthetic history and, to a certain degree, the course of surgical history as well.

The Wellcome Department of Anaesthesia Research in the McIntyre Building has concentrated its search at the microcellular level, while the clinical Department of Anaesthesia directed its efforts at the whole-body level in animals and humans. While the qualitative contributions of these two departments have been uniquely powerful, the quantitative progress of clinical anaesthesia at McGill has been glacial, and low in quantitative yield compared with some other great medical institutions south of the Canadian border. To understand the reasons for this bleak state of affairs one must see the department in the wider context of the university institution and the medical habitat in which it has operated for the past half-century. A basic cause of weakness lay in the physical structure of the Anaesthesia Department, plant size, dispersion and funding strategies. None of the nine

teaching hospitals had sufficient mass to provide a concentration of all, or even the majority of the anaesthetic sub-specialties for core training requirements on a 24-hour basis and under one roof. Thus, neurosurgery was done almost exclusively at the Neurological Institute, general, cardiovascular, gynaecologic surgery and obstetrics at the Royal Victoria Hospital, more of the same at the Montreal General Hospital and even more general surgery at the Queen Elizabeth Hospital. Paediatrics was done at the Children's Hospital and thoracic surgery at the Chest Hospital. Each hospital unit in this loose consortium was fiscally independent of the other and staffed by clinical anaesthetists who relied heavily on the work force of 45-65 residents who rotated through these affiliated hospitals.

In 1942, Harold Griffith, Chief of Anaesthesia at the Homeopathic Hospital, had introduced curare into clinical anaesthesia. This dramatic and enormously potent breakthrough revolutionized anaesthetic technique and began a 50-year cycle in which the bulk of world-wide anaesthesia research shifted from the afferent side of the reflex arc to the efferent side. The advent of curare produced a philosophy of combining systemic neuromuscular and autonomic ganglion blockade to control muscular and cardiovascular responses to surgery and trauma. It offered easy, swift and effective anaesthetic induction and superb operating conditions in which prolonged operations, and even rough surgery could be tolerated under extremely light anaesthesia without apparent harm to the patients.

For the first time, the world looked to Montreal as a champion in the anaesthetic arena. "Uncle" Harold maintained the impetus and rose in international and academic circles to become President of the International Anesthesia Research Society. When he became Chairman of the McGill Anaesthesia Department in 1950 he grasped the opportunity to foster academic excellence by every means. Negotiations began with Sir Henry Dale, Chairman of the Wellcome Trust and finally, by 1956, Griffith saw his labours come to fruition in the appointment of the first Wellcome Research Professor of Anaesthesia at McGill.

Gordon Robson, who had trained in research methodology, was the first appointee. I arrived in Montreal from Britain at about the same time as he did in 1956. Two years earlier I had visited Montreal on the last leg of an extensive North American study tour, generously sponsored by Astra Pharmaceuticals of Sweden. Montreal had seemed one of the best transatlantic sites for a European transplant to find a congenial cultural and academic foothold. And so, I, an anaesthetic specialist with some experience in epidural anaesthesia and simple clinical investigation but no formal research training, left a pleasant practice in the South of England to try my hand at clinical research in the more fertile, experimental ground of a bilingual culture and in a city that seemed closer to Europe in heart and mind than any other in North America. Moreover, this was the very citadel in which the triumphant saga of curare and de-afferentation had begun. It seemed the perfect launch pad for an assault that might bring de-afferentation back into anaesthetic practice and restore the philosophy of protecting the central nervous system and the entire body from inappropriate and harmful reflex responses to nociceptive bombardment, as George Washington Crile had proposed with his ideas of "anoci-association" in 1915.

From a research viewpoint we were a bunch of enthusiastic amateurs in the Anaesthesia Department at McGill. Only Gordon Robson and Ronald Millar, who was also appointed in 1956, had received formal research training. Now, we the amateurs, picked up what we could from these two professionals and staggered along at a slow pace, generating a scientific output of low volume and modest merit. In the warmly collegiate atmosphere that prevailed at McGill we found generous help from other departments as well as from our colleagues within the Department of Anaesthesia.

In 1961 the Departments of Engineering and Mathematics wrote one of the earlier computer programmes to correlate our masses of clinical data on the influences of age, height, pregnancy and local anaesthetic concentration upon the segmental spread of epidural analgesia. The Departments of Pathology and Biochemistry provided invaluable advice and practical assistance with our isotope studies on

the quantitative and spatial uptake of local anaesthetics from the epidural space into the vascular system, spinal cord and brain. Thanks to these freely available back-up services a body of basic information about neuraxial blockade was gradually built up as a foundation for rational clinical practice.

It was a green time and clinical projects blossomed with an ease that would be unthinkable today. Human research was unencumbered by stifling regulatory processes and the dreary delays of ethical and peer review committees and the tyranny of statistical double-blinding constraints that have warped so many of the outcome studies that spread misinformation today. If one had an idea, one just did it — provided always that the experimenter would be willing to be on the receiving end as an experimental subject. Indeed many of us applied that acid test freely, even to the extent of being on the wrong side of accidental human error. In my case that turned out to be a mistaken intravenous injection of 1 mg noradrenaline from a *labelled* syringe, instead of 1 mg atropine. This almost induced cardiac arrest, from sheer terror at what he had done, in my experimenter. We both survived, however, and we were probably wiser and blessed with a little more humanity, common sense and obsessive caution as a result of the experience.

At this time, clinical experimental protocols were models of naive simplicity. In the choice of evils between personal bias and a statistically pure protocol that denied the single-handed researcher his essential surveillance and knowledge of the entire progress of sensory and motor blockade, we chose the former unblinded option and did the best we could to consciously suppress any lurking bias that we could detect in ourselves. On balance, I believe that choice has been vindicated and that, if unconscious bias did escape our scrutiny and muddy our data, the loss of accuracy incurred was far less than the inevitable and misleading losses inherent in the rigid constraints of double or even triple blinding demanded by the statistical shibboleths of contemporary peer-review.

Obstetric Foray

The case load at the Women's Pavilion of the "Vic" was modest but adequate at about 3,000 deliveries per annum. With the help of our obstetrical and neonatal colleagues there was ample time and opportunity to collect outcome data from regional and general anaesthesia in an era that spanned the evolution of two fundamentally important advances. The first was acceptance of the absolute requirement that all obstetrical general anaesthetics *must* be administered through a water-tight endotracheal tube. Adoption of this standard originated from work done by my former colleagues, Hamer Hodges and Mike Tunstall, at Portsmouth, England in 1959, and refined by the Sellick manoeuvre in 1961.

Second, and critically important, was the belated recognition of the supine hypotensive syndrome from inferior vena cava obstruction. This was first described in males by Sharpey-Schafer's group at the Hammersmith Hospital in London in 1950 but its application to obstetrical practice was not fully appreciated until almost two decades later. The importance of controlling this non-anaesthetic variable and others, such as intravenous hydration and oxygen delivery on anaesthetic outcome, was beautifully illustrated by two sequential studies by Gordon Fox and Germain Houle, published in 1968 and 1969, which compared general anaesthesia and epidural blockade for Caesarean section. The first of these two series was done without special attention to maternal posture, significant i.v. prehydration or high maternal inspired oxygen concentrations. This study showed superior newborn blood gases and Apgar scores after delivery under epidural analgesia compared with general anaesthesia. The second study, done one year later when the non-anaesthetic variables of tilted posture, adequate i.v. prehydration and high inspired oxygen tensions were all equalized, showed no difference in newborn oxygenation and behaviour between general and epidural anaesthesia. This important finding should be a corrective to all of us who would like to believe that regional anaesthesia is *always* safer and better than well-given general anaesthesia in obstetric practice.

Surgical Foray

Demonstration of superior pain relief and accelerated restoration of function were the two inseparable goals in our examination of regional anaesthesia, and specifically neuraxial blockade by the epidural route for trauma and major surgery. Models for this endeavour included:-

1. Ultra-early ambulation as attempted by John Cleland at McGill in the 1940s.
2. Measurements of postoperative respiratory function, including functional residual capacity (FRC), and dynamic compliance using pressure-volume loops during sequential epochs of pain, systemic opioid analgesia and segmental epidural blockade.
3. Comparison of metabolic responses after major truncal surgery and postoperative pain management by systemic opioids versus continuous local anaesthetic neuraxial blockade of the entire nociceptive area.

We tried all three of these approaches, with some success in each, but only the last bore fruit in terms of publishable data. A small feasibility study did demonstrate the possibility of ultra-early ambulation within 3-4 hours of upper abdominal surgery, but this required a mid- or upper thoracic epidural catheter, and a very precisely limited area of segmental blockade that extended no lower than T12, as well as a careful check of sensory, motor and reflex competence in the lower limbs before allowing the patient to walk under close escort. While this exercise provided an impressive demonstration of restored motor function in the presence of highly effective pain relief, it did not show any overall improvement in outcome.

Respiratory function tests are difficult to perform with a high degree of accuracy in the postoperative period. FRC measurements by the helium dilution technique defeated us, due to leaks at the face mask around the nasogastric tube, and it is clear that this is a common problem leading to spurious results in the literature. Measurements of pressure-volume loops in three successive epochs were feasible but

very taxing for the consenting patients. In those days, on-line computer facilities were not available and data reduction demanded a full week of solid desk work to construct a set of pressure-volume loops from a single patient. We had to abandon this avenue due to our inability to generate sufficient data for publication within the time allotted by research grants.

The last study of metabolic responses over a 24-hour postoperative period was completed and published in *Surgery, Gynecology & Obstetrics* in 1971. That data revealed a clear difference in blood sugar responses between general anaesthesia and continuous epidural blockade. Moreover, we noted, but did not emphasize that, while the blood sugar remained at normal preoperative levels provided the sensory block covered the entire nociceptive area, hyperglycaemia promptly occurred and persisted if the level of analgesia regressed inadvertently to allow pain to arise from just one unblocked segment. This fundamental and intuitively obvious phenomenon of incomplete blockade permitting a complete breakthrough of the normal reflex adrenomedullary response to trauma has been widely ignored in many of the later statistically "impeccable," double-blinded published studies that have attempted to compare postoperative patient outcome after epidural versus systemic analgesic techniques. The statistical rigour of blinding observers to the nature of the anaesthetic has robbed those studies of the essential imperative for valid results — that is constant, ongoing verification of complete and satisfactory segmental blockade of the entire nociceptive area by the investigators responsible for ensuring effective intra-operative and postoperative pain management.

During the course of these three clinical studies in de-afferentation and surgical outcome the final link in our chain of ideas was forged so as to join the two ends of the system of reflex arcs that underlies the whole practice of anaesthesia. In 1970, Dr. Octavio Calvillo, a young Mexican physician of patrician background, applied for anaesthetic training in the McGill Diploma Course. He came with his career path planned in unusual detail. He would train as a clinical specialist in anaesthesia at McGill. Then he would undertake a

doctoral fellowship in neurophysiology under Professor Kris Krnjevic in the Wellcome Department of Anaesthesia Research. Finally, he would return to Mexico City to lead his country in basic and clinical neurophysiological endeavours.

Octavio Calvillo's time at McGill went exactly as he had planned, and the results were epoch-making for the specialty of anaesthesia. He worked with iron concentration and self-discipline, collaborating in a few of our clinical investigations before moving on to immerse himself in the mysteries of micro-neurochemistry and the arcane craft of cellular electrophysiology at the McIntyre Research Centre. Under the direction of Professor Krnjevic, he built his research around the findings of two Japanese investigators who had just demonstrated interesting enhancement effects of morphine on some inhibitory pathways in the spinal cord. In due course he completed his doctoral requirements and wrote his thesis on spinal nociceptive mechanisms, which was published in part as "Effects of morphine and naloxone on dorsal horn neurones" in *The Canadian Journal of Physiology* (1974; 52: 1207-11). This, and two subsequent papers by Octavio Calvillo, turned out to be the seminal work that opened the present era of intraspinal opiate technology for the relief of acute and chronic pain, beginning with the publication, in 1977, of Josef Wang's preliminary report on intrathecal morphine in animals and man in *Regional Anesthesia*.

In this way, the great loop of clinical exploration around the reflex arc, begun by Harold Griffith at McGill in 1942, ended at McGill 35 years later. The time had come for the specialty of anaesthesia to drag itself away from the blandishments of the quick-fix, de-efferentation technology of muscle relaxants, which had prevailed for more than three decades, and to turn to the far more difficult, but perhaps more rewarding, goal of de-efferentation, as proposed by George Washington Crile and his associates some 60 years earlier.

That change is still in process, and a few more decades may have to pass before the point of balance comes to rest at a rational control of the entire array of reflex arcs underlying the art of pain relief and restoration of function. In the search for this we should learn from

present mistakes and ensure that our clinical outcome protocols are so designed that we really achieve what is intended, that is, clear and unequivocal evidence of complete segmental de-efferentation of the entire nociceptive area throughout the experimental period.

CHAPTER IV

Anaesthetists, along with pathologists and radiologists, have often been dismissed as part of the "service" section of the hospital staff structure. Fortunately the Royal College of Physicians and Surgeons of Canada is all-encompassing and so helps reduce the isolation of such specialties. Acknowledgement of the contribution of anaesthesia to medical thought in general also counters such misinformed opinions. Those who have chaired the Department of Anaesthesia at McGill have been very active in ensuring that both the department and the specialty have gained international recognition.

A DEPARTMENT OF RENOWN

Earl Wytands (McGill 1950-1988)

When the Department of Anaesthesia at McGill University was formed in 1945 it rapidly achieved recognition, and for good reasons. At that time McGill itself was seen as one of the world's leading universities. It was frequently referred to as the Harvard of the North, although McGill students and faculty members could be heard speaking of Harvard as the McGill of the South!

In 1945, although the department was still in its infancy, its members were received with interest and respect on their travels in Canada, the United States and abroad. This was due, in part, to its being the first University Department of Anaesthesia in Canada. The fame of its founder, Wesley Bourne, also helped.

David Shephard, in *Watching Closely Those Who Sleep*, his history of the Canadian Anaesthetists' Society which was published to commemorate its 50th anniversary, documents the difficulties of anaesthesia in Canada before the organisation of that society in 1943. A brief review of this history is worthwhile here.

Anaesthesia as a specialty in Canada probably began with the appointment, in 1899, of Dr. Hutton as Honorary Anaesthetist at the Winnipeg General Hospital. His appointment was followed, in 1901, by that of Dr. Chestnut and, a year later, of Dr. Webster. In 1904 William Webster gave a series of four lectures on anaesthesia and, in

1905, he was appointed Lecturer on Anaesthesia in the Faculty of Medicine at the Manitoba Medical College.

His was the first academic appointment in anaesthesia in Canada. When the Manitoba Medical College became the University of Manitoba, Dr. Webster was appointed Associate Clinical Surgeon (anaesthesia). In 1924 he published *The Science and Art of Anaesthesia*.

Samuel Johnson established a Department of Anaesthesia at the Toronto General Hospital in 1905 and was appointed Lecturer in the Faculty of Medicine at the University of Toronto. He established a tradition of teaching which was carried on by William Brown, Charles Robson, Ralph Hargrave, Tom Hanley, Ken Heard and Harry Shields. Dr. Johnson's initiative meant that anaesthesia in Toronto gained an autonomy which was slower to develop in Montreal. David Shephard attributes this to the fact that anaesthetists in Montreal were salaried hospital employees until the 1950s.

William Nagle was the Chief of Anaesthesia at the Royal Victoria Hospital at the time in which Samuel Johnson was establishing the department in Toronto. By 1913 Dr. Nagle had reported 300 cases of endotracheal ether anaesthesia. After his untimely death, in 1918, Wesley Bourne was asked to take over the department but he declined because he did not want to become a salaried employee of the hospital. He was a staunch advocate of private practice anaesthesia, which he carried out in many Montreal hospitals, including the Western Hospital, the Maternity Hospital and St Mary's Hospital. This gave him the freedom to pursue clinical and basic anaesthesia research.

William Howell and Charles Stewart, who were respected anaesthetists at the Royal Victoria Hospital and the Montreal General Hospital respectively, also did much to enhance the specialty, but it was Wesley Bourne's enthusiasm, dynamic personality and professional reputation which attracted the attention of Francis McMechan. In 1919 he had founded the National Anesthesia Research Society in the United States, which was to become the International Anesthesia Research Society six years later. Inspired by Dr. McMechan, Wesley Bourne, Samuel Johnson and William Webster formed the Canadian Society of Anaesthetists in 1920.

The society attracted physicians specialising in anaesthesia and collaborated with allied societies in the United States. There was great rapport between the societies at their annual general meetings where the forceful and erudite Dr Bourne stood out. Harold Griffith considered him to have been the pioneer of scientific anaesthesia in Canada. His research on the pharmacology of volatile anaesthetics and other clinical subjects attracted great interest at these meetings.

The Canadian Society only lasted for eight years, at which time it was absorbed into the Anaesthesia section of the Canadian Medical Association a year after its formation. Wesley Bourne and other anaesthetists in Montreal felt that this gave inadequate representation to the specialty at a time when it was still held in low regard. Anaesthetists continued to be salaried and employed by hospitals and could only be certified by the Royal College and any available physician, medical student or paramedical personnel could administer anaesthesia under surgical supervision.

In order to gain recognition for the specialty, Dr. Bourne became the driving force behind the formation of the Montreal Society of Anaesthetists in 1930. In this he was ably assisted by other Montreal anaesthetists including Harold Griffith, Digby Leigh, Romeo Rochette, Georges Cousineau, Charles Larocque, William Howell and Charles Stewart. Wesley Bourne's own status helped to raise that of the specialty. In 1935 Wesley Bourne was to become the first recipient of the Henry Hill Hickman medal of the Royal Society of Medicine of Great Britain. This was a great tribute to his abilities, particularly in view of the fact that anaesthesia had been established as a specialty earlier and more widely in Britain than in Canada. In 1942 Wesley Bourne was elected President of the American Society of Anesthesiologists, the only Canadian and non-American to hold this position to date.

By 1942 it became clear to Harold Griffith and other members of the Montreal Society that there was a need for a National Society. A year later the Canadian Anaesthetists Society was formed. Dr. Griffith was its first President and he served for a three-year term.

By 1943 Harold Griffith, like Wesley Bourne, was internationally known. He served in both the army and the navy during the first World War and on returning to Montreal at the end of the war completed his medical training at McGill University in 1922. He had given anaesthetics during the war and continued during his internship, going to Philadelphia to gain an MD in Homeopathy. On returning to Montreal he joined the staff of the Homeopathic Hospital, now the Queen Elizabeth Hospital, where he specialised in anaesthesia and became Head of the Department. He attracted notice with his presentation of a paper on endotracheal ethylene oxygen anaesthesia at the meeting of the International Anesthesia Research Society in 1928 in Boston. Ralph Waters of Madison, Wisconsin was impressed by Dr. Griffith and visited him to observe his anaesthetic practice, inviting him to join the influential and elite Anaesthetists Travel Club, a signal honour. Dr. Griffith enthusiastically promoted endotracheal anaesthesia and controlled ventilation, becoming expert in the use of ethylene and cyclopropane and he published many papers on these subjects. He led by establishing the first post-operative recovery room in Canada at the Homeopathic Hospital. In 1942 Dr. Griffith, with Dr. Enid Johnson made his most important contribution to anaesthesia by using "curare" for muscle relaxation during anaesthesia for the first time. This was such a significant advance in anaesthesia that the history of anaesthesia has been divided into the pre- and post-curare phases. He thus became firmly established as one of the world's leading anaesthetists.

The Diploma Course in Anaesthesia at McGill was based on the training programme that Drs. Griffith, Leigh and Bourne had organised to train anaesthetists for the armed forces in Montreal during World War II. The Diploma Course in Anaesthesia at McGill was a three-year training programme emphasising clinical training and basic sciences as applied to anaesthesia. The creation of the Department of Anaesthesia to run the Diploma Course had met resistance at McGill so Dr. Bourne advertised in a Montreal newspaper that he would organise an anaesthesia training programme in Montreal. McGill then relented and the Department of Anaesthesia

at the university became the first in Canada and had a faculty of internationally known anaesthetists. Wesley Bourne was followed as Head of the Department by Harold Griffith in 1950. Dr. Griffith continued to strengthen the international reputation of the department. He felt that anaesthesia should be organised world wide and worked for the foundation of the World Federation of the Societies of Anaesthesiologists, of which he became the founding President in 1955. Dr. Griffith recruited Gordon Robson for the Wellcome Research Chair in Anaesthesia at McGill funded by the Wellcome Trust in England in 1956. Dr. Griffith had long worked towards strengthening the scientific work of the speciality. In the book "Harold Griffith-The Evolution of Modern Anaesthesia" written by Gillies and Bodman, Dr. Robson referring to Harold Griffith wrote "Dr. Harold was loved by all and for very good reasons. He was known and feted all over the world but he met the adulation with humility and remained entirely his own man..." "Dr. Harold enriched the lives of all who knew him. His original demonstrations of the use of curare in clinical anaesthesia played but a small part in the fruitful life of this man. He was accorded many honours but he valued none of these more than the love and achievements of his many students and friends. I myself owe him an immense debt which I have attempted to repay by emulating his philosophy of life." Dr. Robson in 1964 returned to the United Kingdom to take up the Chair of Anaesthesia at London University and further enhance the international reputation of the McGill University department.

Widespread international recognition of the department continued after Dr. Harold retired in 1957. Alan Noble, when he became Chief of Anaesthesia at the Royal Victoria Hospital in 1955, recruited Philip Bromage. Dr. Bromage came to Canada from the Portsmouth and Chichester Hospitals Group in England where he had established his reputation in the field of epidural anaesthesia. In Montreal he carried out extensive clinical and basic research on this subject, publishing a definitive textbook. He became the Professor and Chairman of the Department of Anaesthesia at McGill in 1970

and the Chief of the Department of Anaesthesia at the Royal Victoria Hospital.

Dr. Richard Gilbert who was the Chief of Anaesthesia at Montreal Neurological Institute took over the department at McGill when Dr. Griffith retired in 1957. He was an enthusiastic, extremely well-informed teacher and excellent clinician, practising anaesthesia for neurosurgery. He became recognised as an expert in neuro-anaesthesia in North America. In the late 50s he organised the McGill Refresher Course on Anaesthesia to prepare local candidates for the Fellowship examination of the Royal College of Physicians and Surgeons of Canada and the McGill Refresher Course became one of the most highly respected courses in North America. The McGill refresher course enhanced the international reputation of the department and the course went from strength to strength under the guidance of Richard Gilbert and John Sandison.

Dr. Sandison was Chairman of the department for eight years during which he dealt with many difficult political problems specific to Quebec. He nevertheless recruited many able staff anaesthetists, including David Bevan who was to succeed him in 1985 as the Chairman of the department. Dr. Bevan came to the Royal Victoria Hospital from St. Mary's Hospital in England in 1978 having completed his training with Gordon Robson at the Royal Postgraduate Medical School in London. In England Dr. Bevan worked on the effect of anaesthesia on renal function and acid-base balance and in Montreal he studied neuromuscular blocking drugs in collaboration with François Donati who was an Attending Staff member in the Department of Anaesthesia at the Royal Victoria Hospital. David Bevan, in addition to his contribution to research made a special contribution to anaesthesia in Canada when he became Editor of the Canadian Journal of Anaesthesia in 1989. The International Anaesthesia Research Society recognised his ability by appointing him to the Board of Trustees of the Society.

In the late 60s and 70s Hillary Don, Douglas Craig and Richard Wahba carried out a series of studies on respiratory physiology. Dr. Don was the first to publish on the effects of anaesthesia on functional

residual capacity while Dr. Craig described the effect of anaesthesia on the newly described small airway closure and closing volumes. In the intra- and post-operative periods Dr. Wahba identified the changes induced by epidural anaesthesia on lung mechanics and pulmonary physiology. These papers gave the first descriptions of the effects of anaesthesia on lung mechanics and were widely acclaimed by anaesthesia and physiology communities.

Many other members of McGill department made contributions to anaesthesia research. Of particular note are the works of those involved in paediatrics, obstetrics, cardiovascular anaesthesia and intractable pain over many years. Drs Dick Gilbert, Phil Bromage, Earl Wynands, François Donati, Peter Slinger, Sally Weeks and Gilles Plourde made many presentations at the American Society of Anesthesiologists refresher courses, a strong indication of the perceived regard for the McGill department. Dr. Wesley Bourne would indeed be proud of the track record of the department he founded over 50 years ago.

CHAPTER V

Anaesthesia at McGill has been subject to varying degrees of political and financial constraints. John Sandison, who became Associate Professor in 1972, assumed that role at a particularly difficult time. Despite the tribulations of those years, however, this eminently practical man exercised admirable control in a way which he has subsequently gone on to do in world anaesthesia.

DIFFICULT YEARS

John Sandison (McGill 1972-1992)

My career in the McGill Anaesthesia Department started inauspiciously. I had intended to fly to Montreal on an afternoon in late December 1971 but my flight was delayed so the farewell party given by my colleagues at the University of the West Indies was extended. As a result, it was a very bedraggled new Associate Professor who was met at 3 a.m. in Dorval airport by Philip and Meg Bromage.

They insisted on driving me to their Vermont farm, despite a snow storm which Philip dismissed as "a passing flurry." I began to question my decision to leave the convivial campus surrounded by hibiscus, bougainvillea and ackee for the austerity of McGill and this cold climate. Philip and Meg Bromage eased my transition, however, and I was to be grateful for their support and encouragement on many other occasions during my stay in Montreal.

My appointment to the McGill department was based on my clinical and teaching experience. As my resident training in anaesthesia was based on a multilocation, see the world, do-it-yourself variety, accepted in the United Kingdom in those days, I was placed in the department at the Royal Victoria Hospital to gain experience of the workings of a structured Canadian programme. In 1976 I became Programme Director.

The late 1970's was not the optimal time to be given this appointment. The Quebec government and College were placing increasingly severe restrictions on the faculty as to the number and origin of future residents. As a result, recruitment to the McGill

programme decreased. It was, then, somewhat irritating for me to be frequently reminded by senior colleagues of the former distinction and size of the McGill programme, with a complement of 50 to 60 residents of whom most had been McGill graduates of exceptional quality!

The first resident group with which I was involved did, indeed, contain individuals of high calibre, including Doug Graham and Bruce Smith. Although I was unable to match their wide knowledge base, to keep my end up I challenged their clinical experience by inviting them to adopt different clinical techniques. This put them slightly out of stride and provided me with a chance to emphasize what I believed to be the essentials of patient care. I agreed with Wesley Bourne's assessment that "a foolish constancy is the hobgoblin of little minds."

Many rewarding experiences during my time as Programme Director related to the discussions, controversies and verbal sparring held with a succession of interested, intelligent and committed residents. Bruce Smith, who assisted me greatly, subsequently became the Programme Director. His wisdom and interest in both individuals and the educational process sustained the McGill department in these difficult times.

Occasionally, almost despairing of adequate recruitment, we would have a lucky break. One such instance was when a community practitioner in Yellowknife, who held an academic appointment in a university in Western Canada, telephoned to request an interview. A youthful, quiet individual duly appeared and was appointed. He subsequently became a leading North American thoracic anaesthetist — Peter Slinger.

Anxieties regarding resident numbers and future recruitment, and their effect on clinical cover, meant that more attention was given to the undergraduate and clinical fellows programme. In the early 1970s undergraduates were offered four-week electives in several hospital departments but their content and the students' assessments were modest. An undergraduate committee was formed in 1977 and the usual questions were then addressed — what particular content

of value could this specialty offer and would recruitment be positively affected by improved undergraduate instruction?

The undergraduate committee managed to agree on the content and objectives of the electives. Then we faced the common McGill dilemma of how to persuade the participating hospital departments to accept the recommendations of a central authority. The committee was fortunate to have interested and active hospital representatives, including Deirdre Gillies, Frances Barry, Dave Thomas, Marnie Haig and Louis Laberge, who pursued this goal in a determined manner. Anne Moore, keenly interested in educational matters, took over the chair of this committee in 1982 and some 60-70 undergraduates took these voluntary electives every year and their assessments were almost universally favourable.

In 1983 the McGill faculty was seen to be the only one in Canada which failed to provide a mandatory core exposure of undergraduates to anaesthesia. Proposals were made and, as a result of a major faculty curriculum review held in 1984, the department was awarded a two-week mandatory assignment in the "Link" period between the preclinical and clinical sections. This resulted in 130 students passing through the hospitals each year, with a further review of the curriculum by the undergraduate committee and the preparation of an excellent basic manual referring to the course content.

The success of Anne Moore and the members of this committee in transposing undergraduate training from a hospital activity to a university responsibility should be noted. There was no doubt as to the appreciation of the students of the nature and content of anaesthesia and the opportunities provided for individual teaching and hands-on experience.

Clinical fellows were of considerable value to the departments at McGill and the several hospitals to which they were assigned. The increasing difficulty in recruiting both residents and staff from other countries, and even other provinces, had tended to create a narrowness of view and insularity common in other institutions of this province. Clinical fellows countered this by bringing fresh viewpoints, opinions and activities in their professional and social capacities being, for the

most part, anaesthetists from overseas who had recently gained specialty qualifications and were responding to the opportunity to gain experience in North American clinical practice, sub specialty training and clinical research.

Overall this arrangement proved mutually beneficial. Clinical fellows significantly assisted the hospital departments in their clinical and teaching responsibilities while gaining different experience and successfully participating in projects which often resulted in publications. A few proved disappointing and some were required to accept an undue clinical load so minimising the benefits they expected of their fellowship year. Several fellows returned to the McGill department to accept faculty appointments including the present chairman.

In the Department at the Royal Victoria several fellows were enthusiastic participants in the TGIF Club and French and Greek female colleagues graced the department with their elegance. While performing an epidural on a particularly difficult and restless patient, one Japanese fellow, not as yet fluent in English, was heard to command "move do not, or I kill you." Another well known fellow was noted for having organized a memorable poolside party which included barbecuing a pig.

I was fortunate to be a member of, and perform clinical work in, four McGill hospitals, even if briefly in two. In another, the Jewish General, I was annually called to account for why the McGill department was unable to assist in strengthening their department. I predicted that there would be a flow of staff in that direction, so I felt pleased and exonerated when first Gordon Fox, having successfully recruited recent McGill graduates, and then Simcha Kleiman led to its recovery.

In 1986 Dean Gruess suggested that I move to the Children's Hospital to assist with its transition following the departure of Jose Rosales, a dedicated leader for many years. Having no particular skills in paediatric anaesthesia, I returned to an elderly resident's rotation. In this I was tactfully supervised and assisted by Irene Assimes and Ruben Carranza, both skilful and experienced teachers. The

department was fortunate to have a group of highly competent and committed anaesthesia technicians who contributed greatly to the practice standards and to the ease and pleasure of administering anaesthesia in this hospital. With the recruitment of Des Spence, Jane Henderson, Joëlle Desparmet, Karen Brown and Davinia Withington, the department was rebuilt. The Children's academic and clinical strength remains an important factor in the McGill Department's reputation today.

During my time in the department, my administrative duties were greatly eased by its secretaries, first Jan McInroy and, from 1983, Maria Pacelli. In addition to her routine duties concerned with the different groups of trainees, Maria proved an invaluable assistant during my term of office. It was her initiative which led to the further development of archives, publications, continuing education, financial administration and fund raising, all of which have contributed to the department's identity and reputation. Lack of space prevents me from naming the many other colleagues who supported my efforts but I would like to thank them all for the associations made during those twenty years.

CHAPTER VI

As anaesthetists are inherently unobtrusive their work is sometimes neglected in terms of endowments. The department at McGill has been remarkably fortunate in this regard, however, as former alumni have given generously in support and recognition of its work. It is to be hoped that the department's financial independence and strength will continue to grow.

THE ENDOWED CHAIRS AND LECTURES

David Bevan (McGill 1978-1991)

Many institutions honour members of staff with endowed chairs, memorial lectures and research fellowships and in doing so not only refresh memories of past glories but also foster the continuation of excellence and show confidence in the future. For example, the International Anesthesia Research Society honours Harry Seldon, who edited *Anesthesia and Analgesia* from 1954 to 1976, with the Seldon Lectureship, and the American Society of Anesthesiologists honours E. A. Rovenstein with an eponymous lectureship. McGill University recalls its past with the lectures and endowed chairs named after Wesley Bourne and Harold Griffith, the first two chairmen of the Department of Anaesthesia. It is of interest to relate some of the events leading to these memorials.

The Harold Griffith Chair in Anaesthesia

Comprehensive obituaries of Harold Griffith were published in the leading general medical and anaesthetic journals on his death in 1985. These included *Anesthesia and Analgesia*, *The Canadian Journal of Anaesthesia*, *The British Journal of Anaesthesia*, *Anaesthesia* and *The Canadian Medical Association Journal*. In 1992, the 50th anniversary of his most notable achievement, the first clinical use of curare in anaesthesia, was celebrated by scientific meetings in Tokyo and Montreal. The Canadian Anaesthetists' Society celebrated the event with a lecture entitled "Fifty Years of Muscle Relaxants" which I had the honour to present.

The heads of the anaesthesia departments of the McGill teaching and affiliated hospitals resolved to start an appeal to fund a Chair to commemorate Harold Griffith. Most fortunately, this resolution coincided with a major university fund-raising campaign, the McGill Advancement Programme, with a target of 61 million dollars. The Griffith Chair was one of several selected for support and was given the highest priority. The advantage of this was that the campaign would match the contributions to the Griffith appeal, including the funds already in hand. Much of the administrative work inherent in an appeal was also done by the Advancement Programme, the anaesthetists identifying potential donors to be approached. Eight hundred and fifty thousand dollars, sufficient to endow the chair, was raised from all sources, including former staff, friends, pharmaceutical companies and others.

François Donati — First Harold Griffith Professor of Anaesthesia

It seems quite appropriate that the first Professor should be a clinical scientist from Quebec capable of linking clinical pharmacology and basic science in the field of neuromuscular transmission. François Donati was born in Quebec City and educated at the Universities of Laval, Toronto and McGill, where he gained his Bachelor of Science, Master of Science, Doctorate and Medical Degree. He completed his anaesthesia residency at McGill and, even before finishing the programme, had established himself as an able clinical scientist in the field.

His research involved both the Department of Pharmacology at the University of Montreal and the Department of Anaesthesia Research at McGill. This restored links between the departments which had been weakened when Gordon Robson relinquished the Wellcome Research Chair in 1964. Kresimir Krnjevic, who succeeded him, is an exceptional physiologist with a particular interest in central system physiology but he found less in common with clinical anaesthesia.

During his professorship, François continued his collaborative work, attracting a number of visiting scientists to join him. His

international recognition was well earned. My treasured memory is of a meeting in San Francisco, soon after François had returned from a sabbatical in Paris. He had been involved in some elegant studies concerned with the timing of the onset and recovery of neuromuscular blockade of the laryngeal muscles. The meeting had been poorly organised, with two neuromuscular sessions occurring simultaneously, and François was booked to present successive papers but in different rooms. Neither he nor the audience were perturbed. At the end of the first lecture he *and* the audience moved from one room to the other together! It was a considerable loss to McGill, but not to the specialty, when François accepted the Chair of Anaesthesia at the University of Montreal.

The Harold Griffith Memorial Lectures

This lecture series was inaugurated in 1986 and, in general, the lectures have been given by clinicians and basic scientists with a particular interest in neuromuscular pharmacology. The lectureship carries with it the Harold Griffith Medal.

The Harold Griffith Stamp

Davy Trop, at McGill, suggested the idea of a Harold Griffith stamp to celebrate the 50th anniversary of the introduction of curare in 1942. Few anaesthetists had had their portraits on postage stamps before. Only the American anaesthetists, Crawford Long and William Morton, had been so honoured, with United States and Transkei stamps respectively, although the Americans subsequently issued a stamp in memory of Virginia Apgar in 1995.

The steps involved in putting our proposal to Canada Post were far from clear. More than 100 suggestions are made every year but fewer than a dozen are accepted. After accumulating world-wide support from physicians, most of whom were anaesthetists, an application was made and we awaited a response. For months there was no reply to our telephoned and written enquiries. Eventually, the department's portrait of Harold Griffith was taken away "for further evaluation" but secrecy prevailed.

Finally we were informed that Dr. Griffith had been selected and would appear along with three other Canadian physicians, Jennie Trout, Frederick Banting and Wilder Penfield. The presentation of the Penfield and Griffith stamps was made in a ceremony by Canada Post in the Osler Library at McGill. It was doubtful whether Linda Griffith recognised her husband, however, as the stylised artwork on the stamps distorted the original portrait! The stamps had been produced sooner than we had expected, in 1991, so they actually commemorated the 49th anniversary of Harold Griffith's original work. None of this could have been achieved without the dedicated persistence of the chairman's administrative assistant, Maria Pacelli.

The Wesley Bourne Lectures

After Wesley Bourne's death the guest lecture, presented by a distinguished visiting teacher at the annual McGill Anaesthesia Refresher Course, became the Wesley Bourne Memorial Lecture. For more than 20 years this has marked the beginning of the annual Visiting Professor programme. Not only does the lecture give the audience an opportunity to hear a distinguished anaesthetist, all but two of the lecturers having been anaesthetists, but it also brings Wesley Bourne to mind once again. The Chairman of the department has often used this introduction to reflect on the past and to look to the future. On occasion the lecture has been affected by the turbulent politics of Quebec, as when it was cancelled at the time of the October uprising in 1970.

The lectures and lecturers have provided an interesting spectrum of subjects chosen by leaders of the field — 24 of 32 were department chairmen. The series began in 1965 with a lecture by Manny (E.M.) Papper, a man who had considerable influence on North American anaesthesia for a quarter of a century. The first McGill Wellcome Research Professor in Anaesthesia, Gordon Robson, was the second lecturer.

The best known of the anaesthetic respiratory physiologists, John Nunn, appeared early and became a frequent visitor to Canada. Tom Hornbein, who climbed Mount Everest without oxygen,

lectured on "Highpoxia." Leroy Vandam, Willie Hamilton, Harry Churchill-Davidson, Nick Greene (the only person to give both the WB and HG lectures), John Michenfelder and Bryan Marshall, who are all household names to anaesthetists, were lecturers. Previous McGill chairmen and faculty are also well represented: Ronnie Millar, Dick Gilbert, Philip Bromage, Ron Stephen and Earl Wynands.

Seventeen of the lecturers were from the United States, 11 from Canada and four from the United Kingdom. In recent years lecturers of note have been Gertie Marx, who lectured from an armchair, having broken her ankle on the way to the lecture, Marcel Boulanger, who gave an interesting lecture, and one which Wesley Bourne would surely have appreciated, on the spectre of Antigone. John Wade, investigator, department chairman, dean and deputy minister of health, gave an extraordinary lecture on the practical and philosophical approaches to intrauterine anaesthesia. Fortunately the texts of almost all the lectures have been preserved in the McGill department. No doubt historians will make good use of them.

The Wesley Bourne Chair in Anaesthesia

The Bourne family had always been extremely generous to McGill, and particularly to the Anaesthesia Department, through a benevolent organisation, the SALTA trust. Few realised that the family were responsible for the funds. At the same time as the Griffith appeal, the family approached Dean Richard Cruess to suggest a "Wesley Bourne Chair." They arranged the financing and, within the year, the first Wesley Bourne Professor was appointed.

It was understood that the head of the department would be the Wesley Bourne Professor and that the university funding for that position would be redistributed to encourage increased research within the department. As a result, the McGill Department of Anaesthesia has two endowed chairs. At times of financial cut-backs to universities most existing funds are at risk. However, endowed chairs are "owned" by the department so the funds remain at its disposal and cannot be appropriated for general university purposes. This means that these chairs are secure for the foreseeable future.

David Bevan — First Wesley Bourne Professor of Anaesthesia

I arrived at McGill in 1978, initially as Research Director within the department and then to become Anaesthetist-in-Chief at the RVH and, in 1985, Head of the McGill department. I left this position to become Professor and Head of the University of British Columbia Department of Anaesthesia in 1991. During my time at McGill my research was mainly concerned with neuromuscular pharmacology.

Franco Carli — Second Wesley Bourne Professor of Anaesthesia

Franco Carli was appointed Head of the McGill Department and Wesley Bourne Professor in 1994. Having graduated from the University of Turin, he did his anaesthetic training in Italy, France, Africa and England. He was, from 1982 to 1983, a Clinical and Research Fellow at McGill. After returning to a Senior Registrar position at Hammersmith Hospital, London, he was appointed Consultant at Northwick Park Hospital.

Dr Carli's research interests to date primarily concern perioperative metabolism and thermal regulation. At a time of further political unrest in Quebec, his professorship may not be easy but no doubt the heritage of Bourne and Griffith will inspire him. I wish him good luck.

Conclusion

Those of us who have spent time at McGill are privileged. It is when one enters and leaves that the differences are obvious. The goals, principles and philosophy laid down nearly 50 years ago by Bourne and Griffith have had their influence far away from Montreal. The Lectures remain permanent records of glimpses of anaesthesia through distinguished eyes and the Endowed Chairs are guarantees that that philosophy will endure.

The Harold Griffith Lectures

- 1986 Dr. F. F. Foldes, Albert Einstein University, USA
The impact of muscle relaxants on the practice of anaesthesia from Harold Griffith until today
- 1987 Dr. J. Savarese, Cornell University, USA
Synthetic relaxants: man improves upon mother nature
- 1988 Professor W. Bowman, University of Strathclyde, Scotland
Feedback control of transmitter release at the neuromuscular junction
- 1989 Professor S. Agoston, University of Nijmegen, The Netherlands
Is the end of curare research in sight?
- 1990 Dr. R. Miller, University of California at San Francisco, USA
Is the choice of muscle relaxant important in critical care medicine?
- 1991 Dr. N. Greene, Yale University, USA
Specialty medical journals: role and function
- 1992 Dr. R. Kitz, Harvard University, USA
The pageant of anticholinesterase drugs
- 1993 Dr. D. Stanski, Stanford University, USA
The contribution of anaesthesia to clinical pharmacology
- 1994 Dr. F. Donati, University of Montreal, Canada
Research in anaesthesia: a perspective
- 1995 Dr. D. R. Bevan, University of British Columbia, Canada
The Harold Griffith heritage — have we lived up to it?

The Wesley Bourne Lectures

- 1964 Dr. E. M. Papper, Columbia University, USA
The selection and management of anaesthesia in patients with heart disease
- 1965 Dr. J. G. Robson, Royal Postgraduate Medical School, England
Control of respiration
- 1966 Dr. J. E. Eckenhoff, Northwestern University, USA
Anaesthesia and systemic function
- 1967 Professor J. F. Nunn, University of Leeds, England
Hypoxia
- 1968 Dr. R. A. Millar, McGill University, Canada
The role of the sympathetic nervous system in the cardiovascular response to anaesthesia

- 1969 Dr. H. H. Bendixen, Columbia University, USA
The ventilation requirement
- 1970 Dr. R. Dery, University of Laval, Canada
Observation on hypoventilation
- 1972 Dr. J. P. Bunker, Harvard University, USA
Anaesthesia as a neurologic syndrome
- 1973 Dr. W. K. Hammik, University of California at San Francisco, USA
Toxicity testing
- 1974 Dr. L. Vandam, Harvard University, USA
How to learn about anaesthetics by giving anaesthesia — the transplant experience
- 1975 Dr. C. P. Larson Jr, Stanford University, USA
Change in anaesthetic practices
- 1976 Dr. T. F. Hornbein, Seattle University, USA
Highpassia: man at altitude
- 1977 Dr. N. M. Greene, Yale University, USA
The influence of anaesthesia on the development of surgery, 1846-1900
- 1977 Dr. R. G. B. Gilbert, McGill University, Canada
A tribute to Wesley Bourne
- 1978 Dr. H. Churchill-Davidson, St Thomas's Hospital, England
Anaesthesia — the way ahead: 1846-1900
- 1979 Dr. M. B. Laver, Harvard University, USA
Anaesthesia and coronary artery disease: perceptions and misconceptions
- 1980 Dr. P. R. Bromage, Duke University, USA
Two faces of de-differentiation
- 1981 Dr. M. Boulanger, University of Montreal, Canada
Anaesthesia: a difficult diagnosis or the spectre of Antigone
- 1982 Dr. J. Wade, University of Manitoba, Canada
Perinatal anaesthesia
- 1983 Dr. A. W. Conn, University of Toronto, Canada
Recent advances in fresh water near-drowning
- 1984 Dr. G. Marx, Albert Einstein University, USA
The evolution of obstetrical anaesthesia
- 1985 Dr. C. R. Stephen, Duke University, USA
The greying of America — a medical challenge

- 1986 Professor M. K. Sykes, University of Oxford, England
New techniques of respiratory support
- 1987 Dr. B. Marshall, University of Pennsylvania, USA
The pulmonary circulation during anaesthesia
- 1988 Dr. J. Milic-Emili, McGill University, Canada
Flow resistance of the lung and chest wall in anaesthetized humans
- 1989 Dr. M. Somerville, McGill University, Canada
Anaesthetists: communicating with the living and the "dead"
- 1990 Dr. J. D. Michenfelder, Mayo Clinic, USA
Seizures, serendipity, science, sham and satisfaction
- 1991 Dr P. G. Barash, Yale University, USA
Cocaine: the Inca's curse or medical miracle?
- 1992 Dr. J. E. Wynands, University of Ottawa, Canada
Contributions of anaesthesia to the development of cardiac surgery. Canadians were there!
- 1993 Professor P. Foëx, University of Oxford, England
Silent myocardial ischaemia: a threat to the surgical patient
- 1994 Dr. R. K. Stoelting, Indiana University, USA
Changing clinical perspectives in anaesthesia practice
- 1995 Dr. F. M. James III, Wake Forest University, USA
Lessons learned from obstetric anaesthesia

CHAPTER VII

All medical specialties need various levels of complementary practice and knowledge to ensure optimal patient care. The relative roles of technicians, nurses, undergraduate and post-graduate medical students, general staff and leaders of the profession need to be clearly defined but this is seldom the case. Training and continuing education for all involved should be encouraged as a means of fostering mutual understanding and co-operation. Such an enlightened approach will, unlike factionalism and protectionism, advance the specialty as a whole. Deirdre Gillies' background, insight and temperament ensures her interest in training which is so important to the future of anaesthesia.

BASIC TRAINING

Deirdre Gillies (McGill 1957-present)

General Practitioners

It is an accepted fact that there is a lack of specialist anaesthetists to provide a satisfactory service to all the population of Canada in general and the Province of Quebec in particular. This deficiency will always be greatest in the rural areas where, for geographic and economic reasons, general practitioners will be called upon to render these services. In the past these doctors learned by doing, often at the patient's expense.

At the present time, nearly 100 general practitioners in Quebec provide anaesthesia services. Of these doctors, 70 to 80 work in hospitals with fewer than 200 beds and more than half are over 45 years of age. As they retire or die, replacements will be required, and it is desirable that some training should be supplied for their successors. A minimum of six months' training seems necessary to equip a general practitioner with the knowledge and experience needed to provide such anaesthesia services.

In the 1970's the Canadian Anaesthetists' Society and the Association of Canadian University Departments of Anaesthesia recognised that, although all anaesthesia should, ideally, be administered by specialists in the field, there was a need for specific

programmes of training in anaesthesia for the general practitioner. This could only be given by hospitals within the orbit of the university departments of anaesthesia and, rather than have students drop out after six or 12 months in a specialist's training programme, it seemed reasonable to design a special programme. On November 23rd 1977, the Post-graduate Education Committee of the Faculty of Medicine at McGill University approved plans for the Department of Anaesthesia, chaired by John Sandison, to set up a special training course of six months duration for general practitioners.

The programme began on the first of January 1978 at the Queen Elizabeth Hospital of Montreal, with rotations to other McGill hospitals for paediatric and obstetrical experience. Trainees spent at least three months at the Queen Elizabeth Hospital and they were expected to become thoroughly familiar with the pharmacology and application of a limited variety of techniques and anaesthetic agents, including regional procedures. The methods selected allowed for the safe and effective administration of anaesthesia for straightforward, common surgical procedures in patients of ASA Grades 1 or 2, either in elective or emergency situations.

Considerable emphasis was placed on the students' participation in detailed pre-operative assessment and early post-operative care of patients. As opportunities presented themselves, trainees were introduced to the management of complications and of the patient who required life support techniques, including cardiopulmonary resuscitation. Trainees were closely supervised but also expected to accept increasing responsibility, as judged by their individual progress.

Apart from intensive teaching in the operating rooms, tutorial lectures were held on one morning each week for three hours. Topics were assigned to individual trainees for presentation at these sessions. All teaching and supervision was done by faculty members with McGill appointments from the hospitals concerned.

Usually progress was very fast as the students, knowing how short the training was, were highly motivated and spent as much time as possible in the operating room, assessing patients, reading and

asking questions. They were also invited to attend other educational activities of the McGill department at which they met students from the full programme. Otherwise, there was no overlap between the two programmes.

At the end of the course, assessment of the candidates was done by examination, written and oral. At that time students were asked to submit their comments regarding the course, its length and content. Ten per cent did not make the grade and were advised against practising anaesthesia under any circumstances. The successful trainees were warned regarding the tendency of some surgeons to try to persuade them to undertake procedures beyond their competence. It was stressed that consultation was readily available and on-site visits would be arranged.

The graduates were encouraged to appreciate the importance of continuing education, in the form of lectures and practical refresher courses, as a way of maintaining and upgrading their competence. Twenty-five per cent of the 23 candidates trained between 1977 and 1984 went on to full specialty training, so the programme proved to be a good source of specialists! Despite its success, however, it met with powerful opposition.

Anaesthetists in the province, led by the President of the AAQ and the Deans of Medicine, felt that the course threatened to diminish their status as well-trained specialists in the eyes of their colleagues in other medical specialties. Their insecurity led to the term "mini-anaesthetists" being coined to disparage the trained general practitioners. This simmering opposition to the McGill programme, which had been considered as a pilot project from the start, ultimately meant that it was discontinued in 1984.

Medical Students

The only medical students who received any training in anaesthesia before 1986 were those who chose to use the elective periods, in either their third or fourth years, for such experience. John Sandison felt strongly that all graduate doctors should be able to manage airway problems in patients. In order to achieve this he

recommended that all students should be assigned to anaesthesia for a two-week period.

From April 1986, this training was integrated into the Link period in the 2nd year of the curriculum but, as this preceded much clinical training, it proved to be too early for students to benefit to the fullest. The course has been constantly revised over the past ten years but, although it was hoped that such exposure to the specialty might help recruit more students to anaesthesia, this has not proved to be the case. In retrospect, the one-month elective period of the past was more fruitful from that point of view.

CHAPTER VIII

The first Canadian MD CM degree was conferred at McGill in 1833. Since the Faculty was formed there have been 22 Deans, nine since the creation of the Anaesthesia Department. Here the last four Deans comment on their contacts with the Anaesthesia Department during their tenures. Although there has not yet been an anaesthetist appointed as Dean it is our hope that this may happen in the future.

THE VIEWS OF RECENT DEANS

i. Maurice McGregor (McGill 1957-present)

Anaesthesia is so intensely demanding that I am always astounded when anaesthetists find the time to do research or to tolerate and encourage the research of others in the operating room. But from my first contacts with the McGill department, starting with Tony Davenport at the Children's Hospital in 1958, I have found McGill anaesthetists open and generous in promoting clinical observation.

At the Children's Hospital this led to five joint publications in the early 1960s, as we documented the cardiovascular effects of different levels of N₂O, halothane and CO₂ on the cardiac output and peripheral resistance of children. I recall, with mild guilt, that we never, to my recollection, asked permission of patients or children. Although we did no harm, if there had been such a thing as an ethics committee at that time it would, quite rightly, have been upset.

I am grateful to McGill Anaesthesia for its help, encouragement and collaboration and an inquiring and generous mind-set. For example Gordon Robson, who gave up a complete experimental day (about 22 hours) in order to help establish the presence of an O₂ or CO₂ receptor in the pulmonary artery and Phil Bromage with whom we induced sympathetic blocks to relieve Raynaud's phenomenon. And all the time they maintained the incredible skills which coaxed some of our "horrendous" and apparently hopeless surgical cases back to life.

In the middle of my period as Dean of the Faculty of Medicine (1967-1972), Dick Gilbert retired as Chairman of the Department of Anaesthesia and I officially inquired about its future organization. Phil Bromage responded unofficially with an excellent resumé of all aspects involved. In particular, his concept of the role of the chairman included:-

1. Promotion and co-ordination of undergraduate teaching.
2. Promotion and co-ordination of post-graduate teaching in basic science and special areas of endeavour.
3. Insistence on excellence in practice, teaching and research by co-ordination of continuous surveillance.
4. Ensuring interdepartmental contact through attendance at rounds and seminars of other departments.
5. Fostering publications and attendance at meetings or conferences to "sell" McGill.

He proposed a temporary regency because of the uncertainties of the time and a worldwide search for the right person. In fact, he was appointed forthwith to cope with separatism, anaesthetists' migration, bilingualism, financial stringency and strikes! Which, if my memory serves me well, he did admirably, while living his own job description.

ii. Pat Cronin (McGill 1959-1984)

I have been asked if I was involved in any matters in connection with the Department of Anaesthesia during my tenure in the Deanery. As we are all aware, when we grow older our memories run short of storage space with the result that dramatic events, generally disagreeable, tend to be retained at the expense of the less obtrusive and more comfortable ones. Having searched carefully, I am very happy to say that I have no recollection of any single event with regard to the department which belongs in the former of these two categories!

What is left is the memory of Anaesthesia as one of the strongest of the Faculty's clinical departments, ably led and staffed and providing a superb service to patients. Its members carried out their

teaching responsibilities with diligence and still managed to find the time and funding for important research activities which, I believe, rendered the McGill department unique among its Canadian peers.

I remember having a most friendly, and mutually productive, relationship with Phil Bromage, the then Chairman, as well as with Tom McCaughey who, I believe, succeeded Phil before the end of my tenure. Their contributions to the discussion at our monthly meetings of department heads were invariably useful and germane. I also remember with great affection Dick Gilbert, Chief at the MNI, whom I had the pleasure of knowing socially as well as professionally, and Harold Griffith who was still active at the Queen Elizabeth Hospital during that period.

Perhaps my forgetfulness is due, in part, to the external issues with which we were seriously preoccupied during the years I spent as Associate Dean to Maurice McGregor (1969-1972) and later as Dean (1972-1977). This was the turbulent era of the "Trudeau years," with the wave of bombings, the Cross kidnapping and the murder of Pierre Laporte, in 1970, followed by the application of the War Measures Act. After rejection of the Victoria Charter by Bourassa, in 1971, came the rise of Quebec student activism in which the separatist cause was embraced. This culminated in the *McGill français* march on the university.

Finally, in 1976, we witnessed the unexpected election of the Parti Québécois, with René Lévesque as provincial Premier. The latter event scuttled the plan, carefully arranged with the Bourassa government, which would have allowed McGill to acquire the QMVH as an additional teaching hospital to house the Montreal Chest and the Rehabilitation Institute. In retrospect I have come to regard this unfortunate turn of events as the greatest disappointment of my tenure as Dean.

iii. Samuel Freedman (McGill 1959-present)

My recollection is that the period of my deanship, from 1977 to 1981, was a relatively difficult one for the Department of Anaesthesia. The budget of the department was historically small compared with

other departments of similar size, and there were very few GFTU members. The Chairman was John Sandison, now retired, who, either at the request of the department or on his own initiative, elected to function as Chairman of the university department without being appointed Chief at any of the major teaching hospitals. My view at the time was that such an arrangement was largely unworkable and would result in the Chair becoming "a floating apex" without a power base to provide the necessary clout.

Although Dr. Sandison's efforts to improve the lagging department at the Montreal General Hospital by personal participation in its day-to-day activities was admirable, in my opinion it did little to advance the academic profile of the department. The department felt that the best way to advance this profile was to establish a research unit at the Royal Victoria Hospital. As Dean, I had some reservations about this plan since there was a well-functioning and highly regarded anesthesia research unit in the McIntyre Medical Sciences Building. I was fully aware of the tensions between the clinical department and the research unit, but was of the opinion that it would be better to work out a *modus vivendi* between them rather than start a clinical research unit *de novo*.

Nevertheless, in keeping with my philosophy of allowing departments to manage their own affairs, having expressed my opinion, I assisted in the recruitment of Dr. Bevan, a research anaesthetist interested in respiratory function, and his wife. He remained at McGill for several years before moving elsewhere. While there was some duplication of research effort, the two groups were also able to provide a synergism in clinical research directed towards intensive care and related problems in post-operative patients.

I also had some difficulty with the notion of anaesthetists having one half or whole day of "protected time" for research during the course of a busy week. Research, clinical or otherwise, can only be accomplished satisfactorily by a small number of individuals spending at least 50% of their time on it. During my tenure, the Chiefs at both the Montreal General Hospital and the Montreal Children's Hospital resigned and it was necessary to find internal replacements. Dr.

Sandison had difficulty in recruiting anaesthetists and made several trips to the United Kingdom with partial success in this endeavour. On a somewhat happier note, the Harold Griffith Chair in Anaesthesia was introduced, with heavy support from the members of the department, during my term as the Dean.

I have always felt that the situation in the Department of Anaesthesia during this period was one in which I was able to do very little. Historically underfunded, the department was having major problems with the clinical services both at the Montreal General Hospital and the Montreal Children's Hospital, and the research programme was only beginning its development. My predecessors as Deans had told me when I took office that very little money was required for Anaesthesia since anaesthetists earned their own livings through clinical practice. The small amount available was largely spent at the Royal Victoria Hospital to the detriment of the other two major teaching institutions.

My role as Dean was limited to providing any small amounts of university money that could be released from other departments as well as encouragement and support of initiatives such as the clinical research unit at the Royal Victoria Hospital, and the Harold Griffith Chair.

iv. Richard Cruess (McGill 1963-present)

The years 1981-1995, during which time I served as Dean of the Faculty of Medicine at McGill, were important and exciting times within the Anaesthesia Department. I would basically like to highlight three major areas in which activities took place.

The first and foremost I would like to discuss is the leadership within the department. As is well known, both the economic and political situation within the Province of Quebec at the time created difficulties which affected the universities and their teaching hospitals to a major degree. As a result of both the recession and a shrinking tax base within the province, McGill did not have the ability to increase academic activities by depending just on federal and provincial funding. It required leadership, ingenuity, and a very

rigorous control of expenses in order to be certain that the money was well used.

Of all the qualities, leadership was obviously the most important. The department required strong and visible direction from someone whom it wished to follow. John Sandison gave this leadership and established strong committee structures within the department so as to run the unit and increase the feeling of participation by the department members. He gave freely of his time and, during a period of particular difficulty at the Montreal Children's Hospital, even served as Anaesthetist-in-Chief at that institution.

He stepped down of his own volition and was replaced by David Bevan. Dr. Bevan presided over a period of great excitement within the department. As will be noted below, the resource base available was greatly expanded, new geographic full-time appointments were made and a host of problems within the department were addressed. The undergraduate programme was revised extensively in order to give more exposure to anaesthesia and to recruit future residents. The research base, in particular at the Royal Victoria Hospital but also at other institutions, was increased significantly, with Dr. Bevan himself serving as an example.

David Bevan served as the Chairman of the Department and as Anaesthetist-in-Chief at the Royal Victoria Hospital. Part way through his mandate, he accepted the position of Editor of *The Canadian Journal of Anaesthesia* and felt that this was incompatible with both administrative jobs. He consequently resigned as Anaesthetist-in-Chief at the hospital while continuing as Department Chairman. The editorship further added to the prestige of the position and recruitment to all units increased. When Dr. Bevan left, to become Chairman at the University of British Columbia, Gordon Fox served admirably as Interim Chairman and recruited two excellent young investigative anaesthetists.

Francesco Carli, originally from Italy, was recruited from Northwick Park to become Department Chairman in 1994. His mandate was to consolidate further the department and to continue the improvement in its academic performance.

The second major period of activity was in the area of resources. The most exciting developments were the establishment of two endowed chairs within the department. The Harold Griffith Chair in Anaesthesia was set up with contributions from the department, from the anaesthesia community, and from the university. It was ably filled by Dr. François Donati, who gave research a much higher profile within the department and within the anaesthesia community.

The Wesley Bourne Chair was established by the family of Dr. Bourne who had for many years supported the major lecture series in the department. This Chair was, and is held by the Chairman of the Department and also has had an impact both on the profile of the Chair and on the department's funding. The department more fully exploited the pharmaceutical moneys available to it and continued its highly successful refresher course which also added to the discretionary resource base. As the department moves into the future, these types of activities will obviously have to expand. Those academic units which are to truly flourish must diversify their sources of funding if they are to expand their activities. There is every indication that Anaesthesia is doing this.

Finally, the latter part of my tenure as Dean was dominated by the necessity to merge academic teaching units in the clinical departments. McGill's major hospitals have elected to fuse their structures and, ultimately, to construct a new McGill University Hospital Centre. When this occurs, centralized teaching in anaesthesia will make the organization of its academic duties both easier and more effective. It will make possible the establishment of divisions within the department and, properly exploited, should have a great effect on anaesthesia, as on every other department.

The last 15 years have been very significant for Anaesthesia. Its undergraduate teaching programme became extremely effective and the residency programme, while smaller, at least maintained and probably increased its quality. The research activities taking place within the department increased dramatically, in terms of the quantity of research but also in the areas being investigated. From the

point of view of this Dean, it was an enormously satisfying department whose accomplishments gave cause for pride.

CHAPTER IX

Students represent the essential product of the Anaesthesia Department at McGill, that is productive and successful anaesthetists who enhance our specialty worldwide. These recollections are presented as personal records of what is a crucial stage in the development of all who have specialised in this field.

STUDENT LIFE

I. Ian Geddes (McGill 1954-1956)

In the autumn of 1954 I set out on the crossing from Liverpool to Montreal on the Cunard Ship *SS Azamora*. On our first day out, the ship's doctor asked me to administer an anaesthetic to a young girl who had broken her wrist. All that was available was a Schimmelbusch face mask and an ampoule of ether; no endotracheal tubes or laryngoscope could be found. Deep ether anaesthesia was thus administered and I had no time to be seasick!

My attachment to the Montreal General had been organised by Cecil Gray of the Department of Anaesthesia at Liverpool University, where I had spent two years as a Research Fellow. I had only just acquired my M.D. from St. Andrews University. Harold Griffith had been Professor Gray's contact in Montreal, with the introduction of d-tubocurarine into general anaesthesia as the common link. My appointment was as Research Fellow in the McGill Montreal General Research Institute directed by Professor Quastel.

On arriving in Montreal we were met by Dr. Ferguson, who looked after us and arranged accommodation. The Montreal General Hospital was still down in the dock area and our apartment was on Van Horne Avenue so I soon got familiar with the buses in Montreal. The Research Institute was on University Avenue and had four floors.

On the top floor, research was devoted to the study of metabolism, using a Warburg apparatus to quantitate brain slice respiration. Since my M.D. had involved the study of local anaesthetics on brain metabolism *in vitro*, this resulted in the publication of a paper in *Anesthesiology*, with Professor Quastel as joint

author. On the floor below, further biochemical studies were in progress and, on the ground floor, Sam Baker was deeply involved in studying various sugars and their involvement in tissue metabolism. In the basement, Donald Douglas was in charge of a radioactive laboratory.

The most important periods of the day as far as I was concerned were the tea breaks. I sat and listened to my colleagues discussing their research problems, feeling completely out of touch on hearing their unfamiliar jargon. It was like learning a new language. Few clinical doctors have this exposure and, as a result, only read the abstracts of biochemical papers. After my first year in Montreal these overheard conversations had taught me how to read and understand biochemical journals — a facility which greatly influenced me in my academic career.

I received much help from Donald Douglas. From my comments on my work he realised that no one knew whether xylocaine (lidocaine, lignocaine), then widely used as a local anaesthetic, was metabolised or not. One day Dr. Douglas presented me with a test tube containing a few white crystals. These were C^{14} labelled xylocaine which he had synthesised so that I could study its metabolism. He then proceeded to teach me how to do paper chromatography with subsequent autoradiography to identify radioactive metabolites.

It was fortunate that I was in Montreal for two years as there was so little radioactivity. The X-ray films required contact with the chromatograms for some 3-6 months before visible results, following development of the films, were seen. We found that xylocaine was in fact metabolized only by the liver.

My second year was spent in the new Montreal General Hospital. I had access to a laboratory and so returned to clinical anaesthesia. Astra Pharmaceuticals kindly bought me a Warburg apparatus and I was able to continue my studies.

On my return to Liverpool I obtained a permanent appointment as Lecturer in the Department of Anaesthesia and Honorary Consultant in the National Health Service. As a result of my research in Montreal I was provided with a radioactive laboratory in the

Department of Anaesthesia to allow me to continue radioactive studies. I obtained C^{14} carbocaine and repeated my metabolic experiments.

I then began to study halothane which was labelled with Br^{82} using the university research reactor at Risley. These latter studies resulted in my being invited to spend a year as Visiting Professor in the Department of Anesthesiology in the Presbyterian Hospital, Columbia University, New York. Studies were carried out on pregnant guinea-pigs and Br^{82} halothane was shown to cross the placenta. Human experiments were also carried out in the Brookhaven National Laboratories to allow distribution of halothane throughout the body to be quantified.

My two years in Montreal were very important to me and, by attending meetings throughout the USA, I made valuable contacts with many famous anaesthetists. I look back on my time in Montreal with great pleasure and wish to express my gratitude to all who helped me so early in my academic career.

I am now retired. During the summer months I live in Drome Provence, France, where I metabolise traces of Cotes de Rhone rouge. In winter I metabolise traces of malt whisky and play golf in Crail, Scotland.

ii. Ljubomir Ribaric (McGill 1957-1958)

In 1957 I sailed from Yugoslavia on a merchant ship to begin a post-graduate course at McGill. On my arrival in Philadelphia I had only three dollars in my pocket and a ticket for the journey from New York to Montreal. Being young, idealistic and eager to learn, I was undaunted.

I was very happy to be the first doctor to be allowed abroad from Rijeka at that time. This concession had been made despite the fact that I was regarded as "not sympathetic to the regime." A chief surgeon, whom I regard as my medical father, had had to "guarantee" that I would not emigrate, but my having left my wife and children behind was the best insurance against my defection.

On arriving in Montreal, I was overwhelmed by the sheer size of the Children's Hospital. Everything, including the elevators, the paging system, the shining lights, impeccably dressed nurses and the self-service restaurant, was new and impressive to me. My salary of 150-250 dollars a month plus food and lodgings was ten times what I had been earning at home and the free food in the doctor's house seemed amazingly plentiful and varied to me.

I was also struck by the informal attitude of superiors and colleagues. Tony Davenport, who was my boss at that time, wanted me to call him by his first name. Wesley Bourne was a real character, eloquent, kind and friendly, even to a rookie like me. Harold Griffith, who had been responsible for my applying for, and getting, the scholarship at McGill, was unlike any professor I had met.

Dr. Sekely was impressed when I said that I was not staying in Canada. He introduced me to society so that I learnt about Canadian culture, politics and social relations, including eating, drinking and party-going. This limited socialising got me into trouble with the Yugoslav Embassy, however. They charged me with not working, not going to lectures, and chasing girls. I told them to ask Tony Davenport if anybody could get away with not working in the hospital and to check on my attendance at lectures with Harold Griffith. As for their third charge, I was under such stress that thoughts about girls did not enter my mind!

My command of English at that time was very poor. One word, "couple," mystified me until, having asked me to give him a couple of buckets of ice during one of the first open-heart operations with hypothermia, Tony Davenport explained that it meant two. I kept asking the nurses if what I had said was correct. The answer was always a polite, "No, but we know what you mean."

Those nurses, secretaries and other colleagues, including Misses Johnson, Ryan, Burt and Galvin and Drs Hodjera, McDonald and Mikelsons, were a nice bunch. Dr. McGilvary used to tease me by calling me "professor." But Jose Rosales was my particular friend.

My days at McGill enabled me to mature and become more confident as an anaesthetist. It made me fully aware that my specialty

was an independent field of medicine so that no surgeon could determine what kind of anaesthesia I should administer or when and how it should be administered. Harold Griffith's article, "The boundless realm of anaesthesiology" (*Canadian Medical Journal*, April 23rd 1960), gave me moral support in asserting this independence when I returned to Yugoslavia.

On going back, in 1958, I returned to the hospital of 1200 beds, 200 being surgical, where I had first gone to work as the lone anaesthetist, on call every day, in 1950. There were still only four anaesthetists on my return but I was determined to increase the profile of anaesthesia. By 1980 I had succeeded to the extent that there were forty-two anaesthetists in the hospital, I had trained more than 150 colleagues and we were performing about 20,000 anaesthetics every year.

I introduced the use of Fluothane as an anaesthetic in Yugoslavia. Initially the opposition to this was very great but, I had been acquainted with its use in Montreal and so gained acclaim as its champion back home. I had also been introduced to endotracheal anaesthesia for tonsillectomy and this innovation made me seem very advanced to my compatriots.

I became President of the Yugoslav Society of Anaesthetists and fought for our "rights." In retrospect, I can see that I was a somewhat arrogant young man, but this stood me and my specialty in good stead. Intensive therapy became my particular interest and I succeeded in organising a nice department. In 1987 I became a Professor, the title with which Dr. McGilvary had teased me years before!

I retired in 1989, just to escape the terrible responsibility of sending my colleagues to perform front-line anaesthesia and resuscitation, but I am proud to say that they have all done their best in a very difficult and complicated situation. Rijeka, where I live, has been spared devastation and we can only hope that the people in our part of the world will live in peace again.

I spend my time organising meetings for other retired doctors. In the summer we go to a little chalet by a lake in the mountains and wait for the heat to fade away. Then we go to the sea and wait for the

winter to come. This is my life after forty years of "putting the people to sleep," as most of them thought of it!

iii. Michael Cousins (McGill 1969-1970)

My first contact with the Department of Anaesthesia at McGill dates back almost 30 years to my days as an anaesthetic registrar in Sydney. I had developed a keen interest in the use of neural blockade techniques. Not surprisingly, one of the texts on the subject which captured my attention was Philip Bromage's "Epidural Anaesthesia." This struck a chord with my own interest in improving the management of pain after major vascular surgery as I had been using a rather primitive "drip" method of continuous epidural analgesia following arterial bypass graft surgery.

Serendipity often plays a big part in people's lives and this was certainly the case with me. Gordon Robson, who had been McGill's first Wellcome Professor of Anaesthesia, was visiting Australia in 1968 as Sir Arthur Sims' Commonwealth Visiting Professor. It struck me that he would know Philip Bromage and so might be able to help me obtain a fellowship to work in Montreal. To my surprise, he was pleased to talk about my dreams of working with Dr. Bromage.

To this day, I still have the piece of Royal Victoria Hospital stationery, with Philip's signature on the bottom as Anaesthetist-in-Chief, informing me of my acceptance as a Clinical and Research Fellow for 1969. In order to scrape together the air fare to Montreal I assembled a rather ragged protocol which aimed to evaluate the effects of epidural analgesia on post-operative pain and vascular graft blood flow following arterial reconstruction. Fortunately, the post-graduate medical foundation of the University of Sydney awarded me a travelling fellowship based on this.

Apart from its taking over six months to get a visa to enter "la belle province," all proceeded smoothly.

My most lasting memory of the department is of the extraordinarily high quality of its work. It delivered superb clinical care, was committed to a strong teaching programme and engaged in a vigorous research programme. Of even greater importance was the

high morale and mutual regard among department members. Certainly there were disagreements and, indeed, short term feuds, but overall there was a spirit of co-operation, pride in the department, loyalty and helpfulness. Over the years I have come to realise how difficult it is to engender such a wonderful team spirit in the current health care climate.

Philip Bromage's meticulous approach to documenting almost every clinical case for research purposes was a great example that has stayed with me to this day. Hillary Don had a passion for applied respiratory physiology and anaesthesia, not to mention his scepticism about the benefits of regional anaesthesia and his tendency to bait the boss on the subject. Paul Otton was brave enough to perform cervical epidurals in order to investigate and dissect out the cardiovascular effects of epidural anaesthesia.

Gordie Fox and Germain Houle, the "obstetrical twins," managed to tread a very tricky path between doing exactly what they wanted to do and avoiding the wrath of Dr. Maughan, the domineering head of Obstetrics and Gynaecology. Mike Burfoot took us under his wing immediately after our arrival and introduced us to the clinical, research, departmental, political, social and cultural facets of life in Montreal. Derek Wrigley was endlessly obliging — part of the "engine room" upon which every department depends.

Two younger members of the department, Kon Semeniuk and Morris Gertel, were always questioning the routines of their seniors and egging on young fellows with new ideas. Andy Mungall terrified me by asking me to administer a caudal anaesthetic for his haemorrhoidectomy — fortunately the caudal was highly-effective! There was also Jack Firth, a stalwart who kept ploughing on day after day, and Gladys Ellison, a pedantic, meticulous woman who administered spinal anaesthesia with the finesse of a prima donna.

Arthur Sheridan and Earl Wynands served as superb role models. The latter was the department's cardiac anaesthetist and, as such, had to contend with the demanding requirements, mysterious rationale and lengthy operations of Arthur Vineberg, the legendary pioneer of the internal mammary artery graft procedure. Earl Wynands, with his

impaired sight, had a very humane approach and a wonderful way of putting trainees at their ease. Arthur Sheridan, at this stage an elderly man, was an accomplished clinician who understated his own capabilities. I saw him retrieve many associates from difficult situations with such courtesy and consideration that it appeared that they had done him a favour in letting him help them!

In all of my travels, I have never again seen a department comprised of such extraordinary individuals. They not only worked well together but had the absolute confidence of their surgical and other colleagues. The "six o'clock Charlie" was a practice by which we all shared out the long cases so that the majority of the staff could leave at a reasonable hour. But we also had fun. I well remember a bash at Philip Bromage's farm in Vermont, complete with a Dixie band, swimming in the freezing river, three-legged and sack races and much hilarity throughout the day and night.

For my own part, I was motivated to do as much research as possible and found that the best way to achieve this was to offer to do extra nights so that I could have the next day for research. I teamed up with a surgical fellow, Charlie Wright, who was working in Lloyd MacLean's department. We studied the outcome of arterial bypass graft patients, with improved management of post-operative pain. I also studied the use of carbonated lignocaine in caudal anaesthesia with Philip Bromage and managed to complete a number of other small studies for a total of five publications during my year in Montreal, a feat that I would not like to tackle these days.

Other events in Montreal were to play a role in shaping my future in academic medicine. Shortly after my arrival I heard lectures by Ronald Melzack and Patrick Wall on various aspects of the exciting, emerging field of pain research. I was struck by the lack of knowledge in this field and, although I felt I would stay with the treatment of acute pain at the time, I now look back over 25 years of involvement in the management of acute, chronic and cancer pain.

My epidural study in Montreal also placed me in some conflict with John Bonica. Subsequently I was impressed by his enormous dedication in the fledgling field of pain management and I decided

that this would form at least a part of my professional activity. Little did I know that 20 years later I would become President of the organisation that Dr. Bonica founded, namely the International Association for the Study of Pain.

1970 was originally planned as the year of my return to Australia but, encouraged by McGill, I moved to Stanford University. This consolidated my interest in academic medicine and led to my appointment, in 1975, to the Foundation Chair of Anaesthesia and Intensive Care at Flinders University Medical Centre in South Australia. Fifteen years later I returned to my alma mater, Sydney University, to take up the Foundation Chair of Anaesthesia and Pain Management where I remain today.

iv. Octavio Calvillo (McGill 1971-1977)

In January 1968 I obtained a rotating internship at the North York Branson Hospital in Toronto and, during that year, I took an elective rotation with the anaesthesia department. This was the first time I had heard about McGill University and Philip Bromage. A number of the anaesthetists in the department had received their training at McGill and I was very impressed by their ability to participate in major surgery and intensive care. They often talked with admiration about Dr. Bromage and his achievements in academic anaesthesia.

During that year in Toronto I travelled to Montreal and was very impressed by that beautiful and exciting city. At the completion of my internship I returned to Mexico to finish one year of social service at a small rural community hospital near Puebla in central Mexico. I had by then decided that anaesthesia would be my chosen career and I thought it would be great if I could do my training at McGill University under Philip Bromage.

I made enquiries about such a residency and was put in touch with Richard Gilbert, who was then Chairman of the Department. Later he notified me that Dr. Bromage would be the new Chairman and my negotiations would be with him. It was explained to me that,

in order to be considered for a residency position in the department, I would need the ECFMG with a minimum score of 80 per cent.

I knew about the ECFMG and was in the process of submitting my application when I decided to go to Montreal and visit Philip Bromage in the early part of 1970. I laid my plans to concentrate on an academic career, including a degree in basic science related to anaesthesia, before him. Dr. Bromage told me that the opportunity was there for the right candidate and to let him know when I had obtained my ECFMG.

As soon as I received my result of 82 per cent for this examination I wrote to Dr. Bromage and, at the end of 1970, I received a letter from him which I still keep as a memoir of one of the most significant moments in my professional career. The letter read "I must congratulate you on your perseverance and single-mindedness, it will indeed be a pleasure to have such qualities in this department." I was about to embark on what was to be a remarkable stage in the evolution of contemporary pain management.

July 1971 marked the start of the most memorable and enjoyable part of my life to date as I took up my residency at the Royal Victoria Hospital. I was young, eager and ready to make the best of what I considered a unique opportunity to train under the tutelage of Philip Bromage. Before I had left Mexico, I had read as much I could find of his published works on epidural anaesthesia and now I was primed to learn.

My first year was taken up with learning basic anaesthesia. When the second year began I asked Paul Otton, Director of the Residency Programme, to devise a programme for me that would allow rotation through the Pain Clinic. This enabled me to spend six months running the Pain Clinic with Philip Bromage, a unique opportunity to learn directly from him, on a one-to-one basis, the fine art of doing epidurals away from the lumbar spine. I performed somewhere between 50-60 cervical epidurals, with the professor observing at least thirty per cent of them. This was quite a nerve-wracking experience but it proved to be invaluable.

Before the end of my second year of training Dr. Bromage and I spent several hours trying to plan my next move. At his suggestion I met Kris Krnjevic, a pure basic scientist at the anaesthesia research laboratory. As his time was very valuable, we talked for only ten minutes and I presented the idea of my doing a master's degree for one year so that I could get on with my anaesthesia training. He advised me to devise a plan for a PhD which appealed to me as it chimed with my dream of an academic career. Philip Bromage helped me to obtain a grant from the Medical Research Council of Canada and so my time with Dr. Krnjevic began.

Under his direction, my graduate studies concentrated on spinal nociceptive mechanisms and the unexplored territory of the mechanism and site of action of morphine in the spinal cord. In 1974 and 1975 our findings were published in the *Canadian Journal of Physiology*. We had been the first in a worldwide race to define the mechanisms and site of action of morphine in the cord and we maintained this position for the six months it took before other publications came out confirming our results. As a result, my name was in every journal on the subject and I presented our material at various scientific meetings in North America and Europe.

Philip Bromage was very pleased to see my name as a senior author in the journals and that was probably the most rewarding aspect of my research efforts. From then on Dr. Krnjevic and I did many more experiments, including a significant amount of work on presynaptic inhibition in the spinal cord. This came within the conceptual framework of the Gate Control Theory of Pain, which was falling into such disfavour that even its authors were unsure about it.

Dr. Krnjevic's intellect is formidable. Even the physicists and mathematicians in the Department of Physiology came to discuss advanced mathematical dilemmas with him. He was always ready to discuss results and experiments and I found that it was more productive to talk with him directly than to spend hours in the library studying a subject he knew more thoroughly than anyone, with every paper and reference at his finger tips. This dedication to excellence

also meant that he was a hard task master, however, and my life became very stressful as a result.

My supportive wife, Elizabeth, whom I had married in my second year, had trouble understanding why I had to work every day of the week and sometimes into the early hours of the next morning, and I came to share her resentment. About half-way through that year, I telephoned Philip Bromage in deep depression. He came and talked to me for over an hour, sitting on a bench outside the classrooms on that dark and very cold, winter evening. Although he would not hear of any plans that might take me away from the research laboratory, he was very supportive.

Consoled by the thought that "whom the Lord loveth he chasteneth," I decided to persist, thinking that I was about to finish my degree. Little did I know that I was still two and half years away from that goal! Finally, after about four years in the laboratory, I wrote a draft of my thesis. Kris Krnjevic read this and literally tore it to pieces, recommending that I should do more experiments.

I decided against this and, about one month later, was home in Mexico, working and rewriting my thesis. It took me another year to have my thesis approved by Dr. Krnjevic, at which point I returned to Montreal for my doctoral defence. This went well and I came out of the building walking on clouds, with a Doctorate in Physiology.

After finishing my degree, we moved back to Mexico City, where I worked with Dr. Rudomin at the Instituto Politecnico Nacional on presynaptic inhibition in the spinal cord of the cat. I subsequently accepted a position at the Texas Tech University, where I worked on the mechanism of action of clonidine in the feline spinal cord with Gabor Racz. After two years in Lubbock, we moved to Houston, where we remain today.

In June 1993, I took a six-month sabbatical period and Pain Fellowship back in Lubbock with Dr. Racz. This made me eligible for the American Board of Anesthesiology Certification in Pain Management, which I obtained in 1994. Shortly afterwards I gave up anaesthesia as a specialty and I am now dedicated exclusively to pain medicine. I am currently the Director for Pain Management at Baylor

College of Medicine, where I have an active teaching involvement in a fellowship programme in interventional pain management.

Looking back on my life in Montreal, my fondest, most lasting memories are of my residency and association with Philip Bromage but the taxing demands of Kris Krnjevic also proved to be worthwhile in retrospect. Now I feel grateful to that unique teacher and leader. Dr. Krnjevic is to be congratulated on the well-deserved Order of Canada with which his many services to science, humanity and his adopted country have been rewarded.

CHAPTER X

For the 70 years before the Royal Victoria Hospital was opened, Medicine at McGill was mainly staffed by the Montreal General Hospital. Eventually an alternation of the professorial chairs in medicine and surgery was arranged — in anaesthesia this did not happen. There has always been dispute about the priority of service, teaching or research in departments of anaesthesia. Ideally they require equal commitment. A concentration on service occurred at the Montreal General Hospital, perhaps due to heavy workloads or surgeon's demands.

VIEWS FROM THE MONTREAL GENERAL HOSPITAL

I. Bob Ferguson (McGill 1935-1942 & 1945-1969)*

I joined the Department of Anaesthesia at the Montreal General Hospital on July 7th 1935, spending July and August at the Central Division on Dorchester Street East. This was one short block east of St. Lawrence, which was a very poor section of the city. In September I was sent to the Private Patients' Pavilion on Tupper Street which had been opened the previous October.

I lived in, along with other medical residents, receiving bed, board, a uniform and a very small stipend. For the first year this stipend was twenty five dollars per month. This was doubled in the second year, so I stayed on. These increases continued for two more years until 1940, when I joined the army. A military atmosphere had prevailed at the hospital since the First World War, in which so many of the older staff had served, so there was no difficulty in recruiting a field ambulance unit and two major hospital units from McGill with help from other Quebec universities.

Upon returning from overseas to civilian life, in 1946, I was assigned to the department at the Central Division. Dr. Kelly remained at the Private Patients' Pavilion, where he had been seconded from military service in 1942, because of serious shortages of hospital staff. Having married in 1939, one day before the war began, resumption of my job at the Montreal General Hospital meant that I

was now a permanent fixture. The method of remuneration, by salary, became a problem but the amount of non-paying cases made fees-for-service impossible before Medicare Insurance and Blue Cross. This was finally changed in 1956, when the staff anaesthetists formed a group practice when we were all together on Cedar Avenue.

There were five theatres at the old Central division of the Montreal General Hospital, including the main amphitheatre. Three of these were one floor above ground level and looked out onto the hospital courtyard which faced de Bullion Street. In summer, the windows were wide open and the cotton sheets which covered the doorways billowed in the breeze. Even so, the post-operative infection rate was practically nil, or, at least it was not a topic of conversation. The usual scene from these theatres, early on Monday mornings, was to see the weekend patrons of the brothels being tossed out on the street and hearing their bellowed curses as they landed on the sidewalk.

Very early in my time at the Private Pavilion I was required to give a woman a spinal anaesthetic to help her pass some flatus — the medical myth of the moment. She was very well-to-do and had a private suite with her own attendants and bed linen. Her personal physician and six or seven consultants from the Montreal General and Royal Victoria Hospitals surrounded her bed. Extra chairs were brought in so that her entourage could be comfortable while I gave her the spinal. The procedure went well and the patient was turned on her back. In due course I left the specialists to their expectant consultation.

During the war years an obstetric case room opened at the Private Pavilion. Obstetrical anaesthesia continued when we moved to Cedar Avenue. Here we shared the pains of labour with many patients and used a variety of agents and techniques, including nitrous-oxide, trilene, caudal and epidural blocks and continuous epidural. Local paracervical blocks became popular with many of the obstetricians. Dr. Asquith developed a trilene inhaler which could be clamped to the head of the bed and used by the patient. This was made for him by the Canada Car and Foundry Company, where his

father was Vice-President. The government eventually closed the Montreal General Hospital as an obstetric hospital.

At the new Cedar Avenue site we had complaints from the nursing office that we were discharging patients from the recovery room too soon. This reflected badly on us and the nursing staff, and we felt sure that it was wrong. Attempting to work out what was going on, we returned with several patients in the elevator. In this way we found that the operator was using top speed to go from the eighth to the nineteenth floor of the building, so that we were all a bit dizzy on reaching our destination. After slowing the elevator to a crawl, the complaints stopped!

**[Editor's note — sadly Dr. Ferguson died in 1996]*

ii. Bert Robillard (McGill 1951-1989)

In 1954 I applied to be a resident in anaesthesia at Montreal General Hospital. I was accepted and assigned to the Western Division, where Jerome Kelly was in charge of anaesthesia, and I spent almost all of my time at the Western until the new hospital opened on Cedar Avenue. Dr. Kelly was a very kind and conscientious person but there was little academic teaching. Dick Price and Alex MacDonald were there at that time and occasionally Dr. Davenport came up from the Central Division.

I remember a resident demonstrating the first epidural I ever saw, for which we filed the point off a spinal needle. I also visited the Central Division to see what I believe was Harry Scott's first closed mitral commissurotomy, assisted by Eric MacNaughton with Dr. Ferguson giving the anaesthetic. It was pretty exciting. Ventilation was by hand, of course, although I later saw Tony Davenport use his brand new Aintree respirator, a mechanical concertina bag-in-a-bottle system. This was eventually retired in favour of the Jefferson's bag but it was recycled many years later and bedeviled me in the dog lab.

Equipment was archaic and help was non-existent. Part of the job description of residents on duty was to wash the endotracheal tubes used that day in the workroom sink and replace any ruptured cuffs. The resident was completely alone at night. I remember giving an

anaesthetic for a Caesarean section to a woman who, having just suffered a ruptured cerebral aneurysm, was to be transferred to the Neurological Hospital immediately after the operation. I called for help but was told to carry on. The most frightening cases for me were those of the hockey players injured at the Forum across the street. They were so big, had full stomachs and were famous. I remember being particularly terrified when Dickie Moore came in with a dislocated shoulder.

The Montreal General Hospital paid me \$100 a month for my first year, with yearly increases thereafter. This made it possible for me to finish my training. I did not join the McGill Diploma Course because this would have meant rotating to other hospitals which did not pay at all. I was, however, allowed to attend the lectures although Dr. Griffith did not approve of this.

There were Monday night meetings held at the old Ciba Building, to which all anaesthetists were invited. These were very good and were well attended by the staff of both the English and French hospitals. There were many fine lectures from excellent teachers from the British Isles and USA. I recall the Ciba Company staff being annoyed because Wesley Bourne, who was partially deaf, used to pull the plug on a noisy refrigerator in the room and then forget to plug it back in after the meeting.

Dr. Griffith scheduled a December meeting at which a report on the New York Meeting was to be presented. Discovering that I was the only one who had attended this, he called and asked me to do it. After that he became quite friendly, which was a good thing as I had him for my Quebec oral exam. He was a fine man whose contribution to anaesthesia was enormous.

The best help I received in preparation for Certification exams was David Power's refresher course. He was so knowledgeable and effective as a teacher that he could speak for two hours and still have you listening eagerly at the end. These sessions were held from four to six in the afternoon. Once I remember David going on until 6:30 and continuing all the way to the parking lot where he kept on talking through the open window of my car.

The New Hospital

The new hospital was like a dream in comparison with our previous standards. The Anaesthesia Department in the old Central had been at the end of a closed-off corridor. At the Western it had consisted of one little workroom and Dr. Kelly's office, from which he would rush out with a little black bag of emergency supplies when called out. We now had a large, bright workroom, a secretary's room and an office for Dr. Ferguson. Still there was only a narrow staff room, with no privacy in which to read or think, and there was no specialist library nor any books on anaesthesia in the hospital library.

The next exciting development was when we began billing our private patients. We formed a partnership, known as Drs Ferguson, Kelly and Associates, the latter being Larking, Sutherland, Neilson and myself. A little later Boright, Matzko and Dunkley joined the group. Bart Sutherland was given permission to take a year as a medical resident to qualify for a fellowship. He was a dedicated person with good management and teaching skills. Shortly after receiving his fellowship, he got interested in medical politics. Bart became Vice-President of the Federation of Specialists and left to become chief at the Queen Elizabeth Hospital, instead of Chief at the Montreal General Hospital, for which he was admirably suited.

The advent of hypothermia in surgery and neurology was exciting. I recall the first cardiac case we did with hypothermia. Donald Douglas, a hospital biochemist, fashioned a thermistor before my eyes with a torch and then calibrated it with a Wheatstone's Bridge. John Burgess, a cardiologist, kindly came and showed me how to do arterial cannulation and loaned us his very bulky recorder. We borrowed a large metal tub from the Queen Mary Hospital to cool the patient. I remember the orderlies trying to remove the tub later and upsetting it, almost flooding the operating room. For neurology we were persuaded, initially at least, to cool the anaesthetized patient in the bath tub on the ward. I recall sitting on the toilet cover for several hours monitoring the patient.

Monitoring was always a problem. At first we only had one ECG monitor. If we had a big case we used to try to get in early in the

morning to grab the monitor. Then others would come along claiming that their cases were more major or their patients sicker. The same thing happened over the use of ventilators.

With the advent of cardiac surgery monitoring became much more complex, of course. I was fortunate at this time that my classmate, Tony Dobell, arrived on staff. He and Harry Scott were working on solving pump oxygenator problems on dogs at the Donner Building. Tony called me one day to say that the dogs were all dying and they thought maybe it was the anaesthesia. I volunteered to go down and make recommendations. This began a long and close association with the cardiac team.

They soon moved to the Animal Laboratory at Montreal General Hospital, which was much more convenient for me. I worked with them on the dogs and, later, calves. Their equipment was even worse than ours, consisting of rejects and recycled equipment from the operating rooms.

A fortunate spin-off from this work was that Tony Dobell invited me to attend cardiac conferences. The case presentations were very helpful to me. Not only did I learn a great deal about cardiology and cardiac catheterizations but I also got to meet and become familiar with the patients who might be coming to surgery. Juliot Sosa, the cardiologist who did the cardiac catheterizations, was especially kind. He taught me how to interpret the pressures and gradients and how to make sense of the cines as well as recognise and treat arrhythmias.

We did venous pressure monitoring early on but it was some time before we were supplied with arterial pressure monitors. I remember coming back from a New York meeting all excited about ACT monitoring and being unable to raise the money for the heater. For several years I maintained anaesthesia during bypass with halothane through the oxygenator. It worked well and could be shut down near the end of bypass. High dose narcotics later made this unnecessary. Bleeding was often a problem but improved as bypasses were shorter and the oxygenators improved. I believe that ACT monitoring was also valuable in dealing with this problem.

Intensive Care

The availability of the Recovery Room in the new hospital not only improved patient care but enabled us to learn a great deal about post-operative management, especially respiratory support and pain control. The first cardiac patients were managed post-operatively in the Recovery Room but it soon became apparent that the space was insufficient and the nursing staff inadequate. Harry Scott lobbied vigorously for an ICU and finally one was constructed.

I was very much interested in ventilatory support. Harry Scott was a big help in financing new equipment. When we wanted something expensive, his approach was to ask for three and then let the administration talk him out of two! The Nursing Staff was marvellous and always willing to try new procedures. Operating Room commitments made it impossible for me to be in the Intensive Care Unit as much as I would have wished so others with more time and expertise took over.

Formal involvement of anaesthesia in the direction of the Intensive Care Unit only came later, in the 70s, but I believe it could have come sooner if we could have provided the staff. We were always understaffed, it seems to me, and academic enrichment was often stifled by an inability to find free time to pursue one's interests. Bart Sutherland had an involvement in the problem of chronic pain and, after he left, I became involved in pain management and I believe this is an area where we could have done much good work if we had had more time to spare.

When Dr. Ferguson decided to retire, a search committee was formed and Dr. Dunkley was appointed as the interim Director. He recruited Mani Batra, who was a fine acquisition. Dr. Dunkley could not be persuaded to take the job permanently and the search went on and on until, finally, in 1970 Dr. Tom McCaughey took the job. His acceptance was mainly based on the promise by Jim Darragh, the Chairman of the Executive Committee, to make improvements to the physical plant, get new equipment, GFT money *et cetera*. Initially Dr. McCaughey performed well, recruiting several excellent people

including Drs Metcalf and Holland. Eventually he became Acting Chairman of the McGill department.

iii. Ian Metcalf (McGill 1970-present)

When I arrived at The Montreal General Hospital in 1970 a dual crisis, precipitated by the Federation Liberation du Quebec (FLQ) and the re-introduction of Medicare, was the prime topic of conversation. Very soon after my arrival I gained the impression that the General Hospital was a very active, multi-disciplinary unit whose anaesthesia and surgical staff could measure up to even the most challenging polytrauma, salvaging life and limb if physically possible. This strength and expertise ran through all surgical services and patients who demanded multi-disciplinary care found expert help available around the clock.

The emergency room had an open door policy and the ambulance services brought their most challenging cases to us. Over two and one-half decades the hospital's expertise in emergency medicine and trauma gained even more strength, so that it was not surprising when the Ministry of Health designated the General as "A Class Trauma Referral Centre." No particular individual person was responsible for developing the anaesthesia service to deal with these very sick and seriously injured people, but some names need to be mentioned.

Richard Robinson and Peter Slinger took a special interest in patients with closed chest injury and were among the first anaesthetists to recommend continuous thoracic epidural analgesia as an adjunct to management of flail chest. Together they published some innovative ideas about differential lung ventilation in chest injury. Peter Slinger, particularly, became interested and involved in endobronchial techniques, the surveillance of endobronchial tubes using a fiberoptic bronchoscope. In collaboration with Andrew Scott he did some valuable studies on the prediction of oxygenation during one-lung anaesthesia as well as studies on the relationship between carbon dioxide output and lung perfusion during differential lung ventilation.

Andrew Scott has been a tower of strength in the department with his training in research methods and knowledge of statistics. He worked closely with the Biomedical Engineering Department to give us state-of-the-art monitoring technology. Canada is a very cold country in the winter and some of the trauma patients on admission suffered, in addition, from exposure injury. Michael English became interested in the whole subject of heat transfer in the surgical patient and has worked hard, initially with volunteers and then with a patient model, to study heat loss and gain during surgery by means other than temperature differentials, using direct measurements of heat exchange as provided by sensitive heat transducers. Currently, he is working with Wolfgang Weyland in this very important area of research.

Anaesthesia at the General has benefited over these years from close collaboration with Ronald Melzack and his team of psychologists stationed at this institution. Tony Holland and, more recently, Michel Germain and Donald Hickey, have taken a special interest in chronic pain and in the multi-disciplinary consultative unit that also includes neurosurgeons, general practitioners and the Department of Psychiatry.

Many things have given me personal satisfaction over 25 years of service here at the General Hospital. There has been a growth of invasive monitoring, especially for cardiac surgery and neuro trauma. Patient monitoring and surveillance systems, such as pulse oximetry, capnography and the use of the pulmonary artery oximetric catheter for the surveillance of the critically ill have also developed. The hospital department has been challenged over these years by a greatly reduced number of residents and we have been made strong and self-sufficient by developing the training and skills of anaesthesia technologists, all of whom are fully qualified inhalation therapists. Perhaps the most gratifying aspect of the last 25 years has been to see young, apprehensive trainees enter the department as novices and emerge with the confidence, training skills and self-assurance of first class consultants.

iv. Harry Scott (McGill 1946-1988)

My first experience of anaesthesia was as a patient in about 1924 when I was given chloroform for a minor procedure done on the kitchen table in our house on Metcalfe Avenue in Westmount. I was fortunate in having Fraser Gurd Senior as the surgeon and Wesley Bourne as the anaesthetist. In 1929 I had osteomyelitis and had several procedures done by A.T. Bazin, with nitrous oxide-ether anaesthesia administered by Charles Stewart. This anaesthesia was unbelievably horrible, producing a whirling feeling together with a wavering sound on induction followed by often violent excitement and terrible nausea. I also had a joint 'mouse' removed from my elbow as an emergency. This was done under local anaesthesia, which was better than inhalation. Then, in 1935, I had 'Pentothal' for a Colles fracture, and that was miraculous in that there was no nausea on waking up.

During the thirties the anaesthetist was under the direction of the surgeon, who was the "captain of the ship." Woeberide the wretch who tried some new technique without the surgeon's permission. Spinal, with Novocaine or light Nupercaine, was occasionally used but "whiff of gas" was the standard. In 1943 I became an anaesthetist in the Royal Canadian Army Medical Corps at 17 Canadian General Hospital. "Pentothal," plus nitrous, were still the standards but I became quite good with spinal and caudal block. Anaesthesia in the army was different in that with casualties we knew they had all been healthy young men until being wounded. We did not have curare then and this is why I abandoned the specialty as I could not stand the surgeon's abuse, along the lines of "for heaven's sake give me relaxation" and "if the patient can stay awake, why can't you?"

Things gradually improved after the war but I never realized what could be done until my days from 1949 to 1950 with Urban Eversole's group at the Lahey Clinic. In 1953 I did the first closed mitral commissurotomy at the Montreal General Hospital, with Bob Ferguson giving the anaesthetic. All went well and we were on our way, but slowly. Fergie had the foresight to get some keen young men but the real changes came with the advent of Bert and Bart (Robillard & Sutherland). These two became real "take charge" men who busied

themselves with the total care of the patient, newer agents, monitoring, fluid and electrolyte replacement *et cetera*.

We were still doing closed procedures — mitrals, coarctation, patent ductus and pericardiectomy. By 1961 it was clear that open heart surgery was not to be solely confined to children. That year, Tony Dobell and I, with Roger Samson as pump operator, closed an atrial septal defect using a disk oxygenator. We struggled on, with the usual problems of inexact diagnosis, and were only passed the worst possible cases.

At this time several unfortunate things occurred. During these days anaesthesia had difficulty getting good residents and this led to a problem. The Surgical Intensive Care Unit (SICU) was built and opened in late 1966. Fraser Gurd, the Chief Surgeon, insisted that this be under surgical control, as they were in most USA teaching hospitals at that time. Dr. Gurd won his case over Doug Cameron, the Chief Physician, who did not think surgeons were competent to deal with such complex situations.

Most surgical boards demanded SICU experience as part of the training. Bart Sutherland, who had had a full residency in medicine to get his FRCPC, felt anaesthesia should at least share, if not take over the SICU. Anaesthesia residents at that time were not suitably trained so Fraser Gurd said that he welcomed their support as consultants but as no more than that. Unfortunately this led to Bart Sutherland moving to the Queen Elizabeth Hospital.

Then, when Bob Ferguson retired, we had a bad time finding a replacement. By this time Alan Thompson was Chief Surgeon and, when Tom McCaughey was appointed in charge of anaesthesia, there was distrust instead of co-operation between the two departments. In part this arose from surgical domination and the reluctance of anaesthetists to increase their commitment. As far as heart surgery was concerned, we got on well, with full support from a good group of new staff appointees.

When Ian Metcalf became chief he had a tough group to lead. Recruitment is difficult as anaesthesia is not the most popular specialty in North America, which puzzles me when I see the expertise

in the field. Some of the new young anaesthetists, many from the UK, were extremely good but some generated friction and there was a fairly frequent turnover. I retired thirteen years ago so my real knowledge ended then.

You will have noted that, in this series of anecdotes, I have made no mention of a young Englishman who joined us in the early fifties, although I remember him well, and how disappointed we were when he left for the Children's. As I recall, his name was Davenport. I trust he will cast modesty to the winds and remedy my deficiency in relating his part in this story.

CHAPTER XI

For the last 50 years the Royal Victoria Hospital has been housed in a very large complex along with the adjacent Montreal Neurological and Allan Memorial Institutes. More recently obstetric services were also transferred from elsewhere. The Chairman of the University Anaesthesia Department came to be attached to this hospital

VIEWS FROM THE ROYAL VICTORIA HOSPITAL

i. Paul Otton (McGill 1960-1985) and Art Sheridan (McGill 1955-1984)

Sir William Osler and his disciple of the next generation, Wesley Bourne, established the foundation of teaching in anaesthesia at McGill. Osler insisted on the Hippocratic dictum that all physicians should be student-teachers for their professional lives and that their practice should display exemplary clinical care founded on continuously updated basic science knowledge. Wesley Bourne grasped these essentials and was to apply them to the teaching of anaesthesia at McGill and, indeed, to Canada.

Dr. Bourne joined the staff of the Royal Victoria Hospital on his graduation in 1911. Here he was inspired by Francis Nagle but refused to take up his position as head of department on his death, choosing to set out on his own as an independent fee-for-service physician anaesthetist instead. In 1921, ever mindful of the importance of basic science, he joined the Department of Pharmacology. So McGill came to have in its midst a champion of a specialty otherwise held in such disregard that anaesthetists were seen as little more than salaried servants and "ether pourers."

The Early Beginnings

The exigencies of warfare brought anaesthesia into the academic fold. During the war Wesley Bourne, with the able assistance of Drs Griffith and the inimitable Digby Leigh, developed a three-month intensive course in anaesthesia for medical officers. Trainees were

eager to pursue their interest in the specialty in peacetime. Backed by an enthusiastic group of these veterans, Dr. Bourne established the first academic Department of Anaesthesia in Canada.

This coincided with two important developments in the Royal College of Physicians and Surgeons: In 1944 the College gave Anaesthesia full specialty recognition and, acting on the advice of the Canadian Anaesthetists' Society, included Anaesthesia in the Faculty of Medicine rather than the Faculty of Surgery, an important first for Commonwealth anaesthesia. The MRCPC Certificate was accorded, without examination, to all current practitioners of the specialty.

The first admission by examination was in 1946 after candidates met the prerequisites of a year of rotating junior internship followed by three years of supervised practice in the specialty. These College requirements formed the basis of the new McGill department's curriculum. Fellowship status in Anaesthesia, the FRCPC, was first granted in 1950 and required a year of training in clinical medicine or basic science study. The dual standard of specialty recognition persisted until 1972 when the MRCPC was melded into the single FRCPC standard.

The McGill Diploma Course

The teaching structure established by Wesley Bourne followed the Royal College pattern of three years of supervised clinical practice. In a significant break from the past this course offered, by tuition fee, a basic science and clinical lecture series. A McGill Diploma in Anaesthesia was granted on successful completion of the course.

The core curriculum was established in 1946, and with updated revisions, still forms the basis of resident teaching. Phase I consisted of a weekly lecture in basic science for junior residents originally delivered by members of the university basic science departments including such eminent professors as Drs Melville, Martin, Denstedt, Thomson, Wood, Burns, Benfey and Leblond.

This group established an imposing, extensive review of basic science applicable to the specialty of anaesthesia and delivered to first and second year residents. The course was amended each year

according to the aptitude of the faculty and the rapid growth of new knowledge in the field. It remained dominated by the basic scientists for the best part of two decades until such time when the anaesthesia faculty was mature and confident enough to take on full responsibility for the course content.

The remainder of the curriculum consisted of a Clinical Lecture Series of clinician-led seminars on clinical management problems given on a weekly basis to third year residents, the Continuing Education Lecture series, better known in the beginning, as the Monday Evening Ciba meetings. These were meant to bring all interested anaesthetists, practitioners and residents together for approximately two hours. Faculty members or renowned visitors delivered the first topic, usually clinical, while members of the resident staff followed with a critical review of an assigned topic.

Although the presentations naturally varied in quality and interest, they did offer a unique opportunity to bring a good cross section of the city consultant anaesthetists together with resident staff for an exchange of ideas. In retrospect, perhaps the most significant feature of these meetings was the melding of the "two solitudes" into a friendly scientific and social grouping. French and English anaesthetists spoke to and with each other without rancour, a fact no doubt due, in large part, to the personalities and international outlook of both Wesley Bourne and Harold Griffith.

Unfortunately, this series languished after the destruction of the Ciba building in the early 1960s and the subsequent "Quiet Revolution" of Quebec nationalists. It was not restored until almost two decades later when Professor Sandison, flush with profits from an expanded Annual Review Course, established the present CME format.

Hospital-based Clinical Operating Theatre Teaching

The first clinical operating theatre teaching was done by Wesley Bourne, Digby Leigh, Ron Stephen and Harold Griffith at various hospitals. Later, the Royal Victoria and Montreal General Hospitals provided the majority of the clinical cases. Regardless of scientific

merit, or perhaps for lack of it, in the 1950s the Royal Victoria and the associated Montreal Maternity Hospital were the leading practitioners of spinal analgesia on the continent. Spinal analgesia was used for the majority of abdominal, pelvic, lower limb, Caesarean sections, forceps vaginal deliveries, and even for thoracic surgery as practised by Dr. Bourne. In total some 10,000 spinals were performed per year in the combined unit, which was a rich training ground for residents awaiting the refinements of general anaesthesia and more modern hospitals.

The McGill Diploma Course was a substantial success from inception and became a model for many other Canadian medical schools. It did so because of the dedicated expertise of the core teachers who carried on in spite of the impediments of less than modern facilities and the demeaning role of the low-salaried, indentured anaesthetic staff in the major hospitals. In the 1950s changes were introduced with building for efficient, modern practice and the establishment of new departmental leadership offering private fee-for-service anaesthesia. Having accomplished this, Wesley Bourne passed the torch to his great friend and colleague, Harold Griffith.

The Tenure of Harold Griffith: 1950-1957

As a co-founder of the McGill Diploma Course, Harold Griffith shared Dr Bourne's insistence upon the importance of basic sciences for good clinical practice. In his modest way, Dr Griffith deferred to his predecessor and claimed "only to try to travel on in the path along which he had pointed the way." Although he made few changes in course structure, he oversaw a great expansion in new clinical facilities and the introduction of "new blood" to the staff.

In the mid 1950s, all in close order, a completely new Montreal General Hospital opened on Cedar Avenue, the Montreal Children's moved from the antiquated Memorial to its present Atwater location; the Royal Victoria opened an eight storey surgical wing with, for the first time, modern operating theatres and Alan Noble was recruited

from Kingston as chief. The stage was now set for the expansionary phase of McGill Anaesthesia.

Alan Noble arrived at the Royal Victoria Hospital to find a demoralized staff, still indentured to the hospital. He insisted on a private practice arrangement for all anaesthetists, who, along with new recruits, formed a financial practice group with full control over the collection of fees and their distribution to members. With this in place, the new chief was able to recruit competitively for a strong staff with interest in teaching and research. Most notable of these early recruits was Phil Bromage, an established, critical investigator of regional analgesia, who was transplanted into the fertile field of a hospital already attuned to spinal regional analgesia for use in both surgery and obstetrics.

By this time, the Royal Victoria had combined with the Montreal Maternity Hospital as one administrative unit and anaesthesia, under the philosophical guidance of Alan Noble, who perceived obstetrical analgesia as society's refined gauge of compassion, formed one of the first obstetrical epidural consultant anaesthesia services in Canada using the expertise of Phil Bromage. The obstetrical unit of the Maternity Hospital also had the dedicated expertise of the pioneer neonatologist, Robert Usher. Together, these three clinical disciplines forged one of the foremost high risk obstetrical units in Canada, soon producing infant mortality figures which, then as now, are comparable with any in the world.

At the end of Dr Griffith's tenure he established, through his international connections and good offices, the Wellcome Chair of Anaesthesia Research as a teaching and research base with Gordon Robson of Edinburgh as the first holder of the Chair. This was to carry McGill Anaesthesia onwards and upwards beyond the next decade, until the chill winds of increasing government control blew down on the seemingly invulnerable Anglo community. The Royal Victoria serves to illustrate the strength of the groundwork laid down at that time.

The Tenure of Richard Gilbert: 1957-1970

The years of Dr Gilbert's tenure as Professor possibly coincided with the "Golden Age" of McGill Anaesthesia. He was a clinical anaesthetist of firm pedagogic bent who had inherited a strong resident programme which was soon to fully flower under his care and the teaching assistance of the associated hospital departments powered by Drs Brindle, Noble, Bromage, Ferguson, Sutherland, Davenport, Rosales, Griffith, Gillies and Power.

This group of international, clinical teachers wanted a good supply of residents in their hospitals so recruitment became a priority. As Canadian graduates could not meet the demands of the large training machine the net was cast abroad for an ever-increasing supply of overseas residents. Nationalistic policies adopted in one developing country after another resulted in political instability and sent successive waves of immigrant physicians into the welcoming arms of McGill Anaesthesia.

Unfortunately, Canadian graduates formed a diminishing proportion of the resident body and McGill graduates, in particular, were difficult to attract to the specialty. Nonetheless, the programme flourished and quality teaching continued. Entrance criteria were, perhaps, less than critical, allowing a mixed inflow so that the large service needs of the hospital network could be met. Through the 1960s this "internationalism" saw the programme grow from a resident body of some 30 trainees to a peak of 68 residents at all levels in 1970-71. This was the largest such programme in Canada and one of the largest in North America.

Disappointed by the lack of interest in anaesthesia expressed by McGill students, Richard Gilbert established the first direct undergraduate exposure to clinical anaesthetic teaching through a short series of didactic lectures. This was a small but important first step. Furthermore, in 1960 Dr. Gilbert took the innovative step of creating a week-long review course of basic sciences, open to McGill residents and outsiders contemplating the fall exams of the Royal College. From its inception this course was a continuing success that is now entering its 36th year. Now known as the McGill Annual Review

Course, it is premier in Canada and one of the major such courses given in North America.

In the 1960s there were noteworthy achievements at McGill University in general, and the Royal Victoria Hospital in particular, in the field of clinical research and subsequent publications. Coincident with the new, improved facilities was the recruitment of young, aggressive, clinical scholars keenly interested in research. They were principally guided by Professor Ronald Christie and Drs Bates, McGregor and Becklake of the Department of Medicine with anaesthesia ably represented by Professor Robson and Dr. Bromage. Together they opened an exciting new chapter for anaesthesia. An index of the power of this group is that, for that decade, the Royal Victoria was ranked, according to the criteria of significant cited publications in world medical literature, as second only to the NIH, Bethesda.

The Tenure of Philip Bromage: 1970-1976

Dr Bromage took the Chair at a turning point in the department's fortunes. He assumed his post under the first properly salaried Geographical Full Time (GFT) conditions, which allowed him to devote the majority of his time to academic pursuits. Additionally, he was able to obtain the first funding from the university for two part-time GFT positions given to Hillary Don for research activities and Paul Otton for management of teaching. The residency programme was at its peak enrolment of 68 with an additional three post-graduate students registered as PhD candidates while a further three studied in an MSc programme under the tutelage of the Wellcome Research Department. In addition, the Clinical and Research Fellowship, a privately funded programme, was at capacity, with quality international fellows.

However, explosive political changes began to take place in Quebec in 1970, with terrorist bombings, political kidnapping and murder. The "Quiet Revolution" had become very noisy and this had a profound effect on the sheltered Anglo community. At the same time, Quebec entered fully into the Canada Health Act and Medicare

was born by decree. All physician services and acts were now to come under a government funded fee-for-service scheme. This double blow was extremely destabilizing and Quebec lost its attraction as a safe and productive environment for the anglophone medical community.

In 1974, a second chill descended with the election of the first provincial government dedicated to the separation of Quebec from Canada. The total impact of these socio-political events on McGill Department of Anaesthesia is difficult to estimate but it changed the optimistic outlook of both staff and residents. Staff defections grew and resident recruitment shrank.

At first the resident numbers fell to 50 or so, insufficient to sustain the luxury of a full complement of residents in all but the core hospitals. Training rotation to the Queen Elizabeth, St. Mary's and Queen Mary Veterans Hospitals was gradually abandoned. It was hard to bolster resident numbers. The France-Quebec exchange programme initially brought 5-7 residents to McGill but recruitment of Canadian graduates was a very difficult as many preferred to take up posts outside the province.

In the mid 1970's the, now budget conscious, government grew weary of paying for the training of foreign graduates, most of whom did not remain in Quebec, and it reduced the content of allowable resident openings for foreign graduates to 15% of the total complement. McGill Anaesthesia, with a tradition of recruiting something in the order of two thirds of its residents from outside Canada, was destined to suffer the most in terms of the quantity of supply. Alterations in both resident and undergraduate teaching were demanded to meet the competition from other, growing Canadian schools and to make anaesthesia more attractive to McGill students.

Post-graduate teaching was now restricted to the four core hospitals; the Royal Victoria and Montreal General for introductory and senior level advanced training, and the Montreal Neurological and Children's Hospitals for their specialized teaching. Even with this reduced core, falling numbers of recruits raised the spectre of the programme falling below a "critical mass" for effective teaching. In

Course, it is premier in Canada and one of the major such courses given in North America.

In the 1960s there were noteworthy achievements at McGill University in general, and the Royal Victoria Hospital in particular, in the field of clinical research and subsequent publications. Coincident with the new, improved facilities was the recruitment of young, aggressive, clinical scholars keenly interested in research. They were principally guided by Professor Ronald Christie and Drs Bates, McGregor and Becklake of the Department of Medicine with anaesthesia ably represented by Professor Robson and Dr. Bromage. Together they opened an exciting new chapter for anaesthesia. An index of the power of this group is that, for that decade, the Royal Victoria was ranked, according to the criteria of significant cited publications in world medical literature, as second only to the NIH, Bethesda.

The Tenure of Philip Bromage: 1970-1976

Dr Bromage took the Chair at a turning point in the department's fortunes. He assumed his post under the first properly salaried Geographical Full Time (GFT) conditions, which allowed him to devote the majority of his time to academic pursuits. Additionally, he was able to obtain the first funding from the university for two part-time GFT positions given to Hillary Don for research activities and Paul Otton for management of teaching. The residency programme was at its peak enrolment of 68 with an additional three post-graduate students registered as PhD candidates while a further three studied in an MSc programme under the tutelage of the Wellcome Research Department. In addition, the Clinical and Research Fellowship, a privately funded programme, was at capacity, with quality international fellows.

However, explosive political changes began to take place in Quebec in 1970, with terrorist bombings, political kidnapping and murder. The "Quiet Revolution" had become very noisy and this had a profound effect on the sheltered Anglo community. At the same time, Quebec entered fully into the Canada Health Act and Medicare

was born by decree. All physician services and acts were now to come under a government funded fee-for-service scheme. This double blow was extremely destabilizing and Quebec lost its attraction as a safe and productive environment for the anglophone medical community.

In 1974, a second chill descended with the election of the first provincial government dedicated to the separation of Quebec from Canada. The total impact of these socio-political events on McGill Department of Anaesthesia is difficult to estimate but it changed the optimistic outlook of both staff and residents. Staff defections grew and resident recruitment shrank.

At first the resident numbers fell to 50 or so, insufficient to sustain the luxury of a full complement of residents in all but the core hospitals. Training rotation to the Queen Elizabeth, St. Mary's and Queen Mary Veterans Hospitals was gradually abandoned. It was hard to bolster resident numbers. The France-Quebec exchange programme initially brought 5-7 residents to McGill but recruitment of Canadian graduates was a very difficult as many preferred to take up posts outside the province.

In the mid 1970's the, now budget conscious, government grew weary of paying for the training of foreign graduates, most of whom did not remain in Quebec, and it reduced the content of allowable resident openings for foreign graduates to 15% of the total complement. McGill Anaesthesia, with a tradition of recruiting something in the order of two thirds of its residents from outside Canada, was destined to suffer the most in terms of the quantity of supply. Alterations in both resident and undergraduate teaching were demanded to meet the competition from other, growing Canadian schools and to make anaesthesia more attractive to McGill students.

Post-graduate teaching was now restricted to the four core hospitals; the Royal Victoria and Montreal General for introductory and senior level advanced training, and the Montreal Neurological and Children's Hospitals for their specialized teaching. Even with this reduced core, falling numbers of recruits raised the spectre of the programme falling below a "critical mass" for effective teaching. In

1975, the granting of a diploma through the university was abandoned by mutual consent.

By 1977 the total residents in training had fallen to 26, about a third of the peak registered only seven years earlier. Undergraduate anaesthesia teaching, in common with the general shift away from didactic teaching, was restructured to make exposure to anaesthesia a more practical, "hands on" experience with the introduction of a 4-week clinical elective option during the clerkship year and a series of more informal clinical seminars for students on their surgical rotation. Similar recruitment problems existed in all Quebec universities and the maintenance of a clinical service, so dependent in the past on the work of residents and fellows, was in jeopardy.

To overcome this shortfall, the Quebec government, with the assistance and approval of the Quebec Association of Anaesthetists, developed, through the junior college system (CEGEP), a programme for anaesthesia technicians. This was the first and, to date, the only such programme in the Commonwealth. Coming as it did at the start of the rapid increase in anaesthetic technical complexity, these technicians were to provide valuable assistance to the busy clinician in setting up and maintaining the complex machines and monitoring equipment now required in assisting with the monitoring of patients through stable periods of standard anaesthetic procedure.

Unfortunately, the increasing pressures of sustaining a clinical service in a "residentless" environment may encourage an abuse of the technicians' services by confusing their limited role with that of resident physicians; technicians were pushed into situations of responsibility beyond their training and capabilities. It is likely that this overuse and abuse of the anaesthetic technician will, rather than enhancing the image of the specialty, reduce the role of the anaesthetist to a more technical level in the eyes of the medical student and our surgical colleagues, so decreasing the recruitment attraction to the hard pressed specialty.

In 1976, after completing his major textbook, *Epidural Analgesia*, Dr. Bromage resigned from McGill, leaving behind him a strong bias towards regional analgesia. Among his lasting achievements were his

application of epidural analgesia in obstetrics, the use of epidural for surgical anaesthesia and its extension to the early and intermediate post operative period and the establishment of a chronic pain outpatient clinic.

The Tenure of John Sandison: 1977-1985

Dr. Sandison assumed this post at an unpropitious time but he was determined to carry on in the excellent tradition of the McGill department. In the past the Chairman had also been head of a specific hospital department, a situation that was open to the criticism of bias in favour of that "home" hospital. John Sandison opted to be independent of any hospital and set up the McGill department as a separate administrative unit while he divided his clinical activities between the Royal Victoria, Montreal General and Children's Hospitals.

A major change in the McGill teaching format, initiated by Dr. Sandison during the Bromage era and strengthened during his tenure, was the revitalization of the Annual McGill Review Course. In keeping with his hobby of organ playing, he pulled out all the stops and upgraded the faculty with a generous supply of international "star" lecturers. Success was measured in increased attendance and profit which, for the first time, gave the department some financial independence. An early result of these riches was the upgrading and revitalizing of the then defunct CME evening meetings. The format, as initiated by Dr. Sandison, was to bring in, about every month, an outstanding guest lecturer to deliver the evening lecture as well as attending two teaching hospitals for rounds and seminars with the residents and staff.

Bruce Smith assumed the GFT position of teaching co-ordinator for both graduate and undergraduate teaching. The restrictions in government funding and the emphasis on Canadian graduates did not make it easy for him to achieve a high number of qualified residents, although it did make for a quality programme. Entry into the programme was now effectively restricted to graduates of Canadian universities. Accordingly, the resident body gradually contracted to

something in the order of 25 residents. Important clinical and research advances were nonetheless made and the horizon of anaesthesia broadened.

David Bevan was recruited to the position of Research Director with a clinical base at the Royal Victoria Hospital. Along with his colleague, François Donati, he made several valuable contributions to the safe clinical use of standard and newer muscle relaxants. Richard Catchlove joined the staff of the Royal Victoria to assume control the Chronic Pain Clinic established by Dr Bromage. As he undertook the management of this clinic on a full time basis it became the first Pain Clinic (1976) to be run by an anaesthetist in a Canadian Department of Anaesthesia and to offer an optional rotation for fellows and residents on either a clinical or a research basis. Anaesthesia branched further from the narrow confines of the operating room after Morris Gertel was appointed to share directorship of the newly organized Intensive Care Unit at the Royal Victoria, with anaesthesia residents assigned on rotation to the unit.

In 1985, having weathered political and fiscal storms, Dr. Sandison passed the torch to his Research Director, David Bevan.

The Tenure of David Bevan: 1985-1991

Dr. Bevan sustained his interest in research and, along with François Donati, consolidated McGill's strength in basic neuromuscular pharmacology. Based on this strength, the Harold Griffith Chair in Anaesthesia was established, with François Donati as its first holder. Recruitment reached its nadir with a total enrolment of 13. At the completion of his five year term, David Bevan moved on to the Chair at the University of British Columbia.

The Tenure of Franco Carli: 1994-present

As one of McGill's most talented Clinical and Research Fellows, Dr Carli was encouraged to leave his research position at the Northwick Park Research Unit to take up the challenge of the McGill Department, where he is now firmly in control. Fortunately, resident recruitment has improved and, it is hoped, stabilized at a total of 30

under the capable programme direction of Anne Moore. Involvement in undergraduate teaching is more extensive than ever, indicating that the goal of recruiting more McGill graduates may yet be achieved.

ii. Sally Weeks (McGill 1970-present)

Since 1970, there has been a significant reduction in the number of centres in Montreal providing obstetric services. The Catherine Booth and Queen Elizabeth Hospitals closed their obstetric units in the early 1970s, followed by the Montreal General Hospital in the early 1980s. The Jewish General and Royal Victoria Hospitals were designated as tertiary care referral hospitals. Residents in anaesthesia at McGill receive their training in obstetric anaesthesia at these two institutions.

During the past 25 years, epidural anaesthesia for labour has continued to be very popular with both patients and obstetricians. We who came later were fortunate to be able to build on the strong foundations built earlier by Dr. Bromage in the 1950s and 1960s. Obstetric anaesthesia was always one of his chief interests and he made the safe provision of epidural anaesthesia in labour a paramount concern.

We have seen a remarkable rise in the number of Caesarean sections done under regional anaesthesia. Today, fewer than 10% of patients receive general anaesthesia for this surgery. The Royal Victoria Hospital obstetric unit moved into a brand new facility in the Centennial Pavilion in 1994. There were no regrets on leaving the Dickensian environment of the old unit in the Women's Pavilion, apart from the loss of the magnificent view of river and mountain.

Research continues on a variety of topics and many fellows have made invaluable contributions to this. We are fortunate that Franco Carli is an obstetric anaesthetist and has revitalised obstetric anaesthesia research since his arrival.

CHAPTER XII

The Children's Memorial Hospital opened its doors in 1904 at 300 Guy Street. Its move to Cedar Avenue was funded by charitable donations and, in 1920, it became a teaching hospital at McGill. In 1954 the more apposite name of The Montreal Children's Hospital was adopted. Anaesthesia for children was simplistic until World War II and it was slower to advance than that for adults. Now it is highly sophisticated but not taught as widely as it should be.

VIEWS FROM THE MONTREAL CHILDREN'S HOSPITAL

I. Tony Davenport (McGill 1951-1966)

A year after having worked with Cecil Gray in Liverpool, I wrote my first major paper during an extra post-graduate year which I spent as a resident anaesthetist in Hartford and New Haven, Connecticut in 1950. Our work had concerned the use of curare for Caesarean section before it was widely used in anaesthesia. In 1951 I came to Montreal with the intention of staying for six weeks before returning to England. This was made possible by Drs Griffith and Tovell, who had an exchange rotation arrangement for their trainees for a number of years.

I immediately sensed the excitement and friendliness of anaesthesia at McGill and changed my plans, being fortunate enough to become a junior staff member of the Montreal General Hospital. Five years later I was asked to become head of the department of the old Children's Memorial Hospital on Mount Royal. This was an opportunity which would have been unimaginable in Europe at my age. Becoming a successor to Drs Leigh, Stephen and Slater, three of the leading paediatric anaesthetists at that time, was a daunting challenge.

I had envisaged that my duties would involve a lot of tonsillectomies and squint corrections but this idea was immediately dispelled. Open heart surgery began as I joined the team of Drs Murphy, Karn and Dobell. The general surgeons Drs Beardmore, Owen and Shagovitch tackled every type of anomaly from all over

Eastern Canada. Plastic surgery and ENT work was headed by Drs Woolhouse and McHugh, respectively. They tackled many cleft-lip and palate lesions, thalidomide stigmata and airway problems, particularly epiglottitis and foreign bodies, especially the pernicious peanut. Dr. Blundell also began neurosurgery at this time.

All this work demanded service of a high order and the co-operation of a team of associates from the McGill Anaesthesia Diploma Course graduates. To provide a safe service and encourage and protect our trainees, these staff members had to agree to sleep in the hospital in rotation. Due to the limited third party cover for children's anaesthesia, salaries had to be provided from a stipend of five dollars per anaesthetic as provided by the hospital administration. The hospital also paid the residents' salaries at the standard rate.

McGill students were rotated at a rate of four to eight per six months and we tried to inculcate them with all things to do with paediatrics, as well as anaesthesia, at the Montreal Children's Hospital. Teaching by experience was complemented by the McGill Anaesthesia Course Lectures and the combined city-wide staff discussions at the Giba building each Monday evening.

We made films for teaching purposes, including one specifically for the Toronto World Congress in 1960. Before that meeting, those *en route* to it were guests at a whole day presentation by the McGill department which created many long-standing friendships. A short, silent film of the first three chairmen of the Department was also made and this began an archive of McGill Anaesthesia. By collecting notes of what some of our best residents had learnt at the Children's Hospital, I compiled and published a "cook book" of paediatric anaesthesia. Remarkably, the first three North American books on this subject originated from the Montreal Children's Hospital and became standard texts for many years.

Our clinical research was boosted when clinical fellows were employed, and Gordon Robson began weekly visits to assess the progress of projects. Our major innovative studies included electroencephalography during open heart surgery, operative blood loss analysis, psychic trauma control and prolonged nasotracheal

intubation therapy. Among those co-operating in this work were Dr. Arfel from France, Dr. Barr from Scotland, Dr. Werry from New Zealand and Dr. Berkovitz from Holland. Other subjects tackled were infant caudal block, the introduction of halothane, methoxyflurane, droperidol and fentanyl, white sound and anti-analgesia, administration of succinylcholine by various routes and different anaesthetic circuit assessments. Our subsequent adaption of the Ayre-Rees infant set for simpler use was marketed as the "Montreal set."

One lasting memory of our research at this time is of the statistics which had to be calculated on a crude, noisy, mechanical calculator. Most gratifying, though, was the unstinted co-operation of associates in other specialties. Misses Taylor and Burt formed the nursing team of the theatre/recovery suite and they, together with Mr. Baker, the inhalation technician, were invaluable allies in all ways.

Sadly, one of our patients died of hyperpyrexia. We subsequently made a study of this, which was a new syndrome at the time, and initiated the first meeting to discuss the condition. This was held in Toronto and, despite forewarnings, I found that the anaesthesia departments in the major children's hospitals in Winnipeg and Toronto were friendly and co-operative.

We first practised day-care in dentistry at the Montreal Children's Hospital in 1956. This was initiated by necessity, as there were not enough in-patient beds, and it went unreported. The sub-specialty of paediatric anaesthesia was espoused by some but we did not encourage this as it led to a false mystique. Nevertheless, we strongly supported the foundation of the Anaesthetic Section of the Academy of Paediatrics, with the aim of spreading the best practice as widely as possible.

In 1966 I moved to Vancouver, where I hoped to spearhead paediatric anaesthesia. Unfortunately, I found that the McGill spirit did not prevail there and so returned to England. I proudly retain my Canadian citizenship to this day as a reminder of the happy and productive time I spent in Montreal.

ii. Jose Rosales (McGill 1956-1983)

In February 1956 I came, along with three other McGill Diploma of Anaesthesia students, to the Children's Hospital, then on Cedar Avenue. I had just completed my training in Philadelphia and London, England and was attracted to McGill because of the writings of Wesley Bourne and Harold Griffith. My interest in paediatric anaesthesia continued and, having passed the national and provincial specialist certification examinations, I was appointed Clinical Fellow at the Children's.

By then the new Montreal Children's Hospital on Tupper Street was in full swing. In the early sixties, ether and cyclopropane were discontinued, allowing the use of cautery and electronic monitoring to become routine. I completed the compulsory year of internal medicine at the Montreal General Hospital, as required for the Canadian Fellowship examination, and then returned to the Children's and the challenges of my chosen specialty.

In 1966, I succeeded Tony Davenport as Head of the Department. In the sixties and seventies, major orthopaedic (Harrington rods and Dwyer operations), urological (ileal loops) and cranial facial reconstructions (after Dr. Tessier's visit) were all challengingly new to us. We also increased our activities in areas outside the operating room with the intensive care of medical and surgical patients and participation in resuscitation. Resuscitation equipment was standardized and simplified at this time.

With the assistance of Elliot Rhine we studied acute cardiac tamponade in experimental animals. Raafat Hannallah and I reviewed and compared tracheostomy versus intubation in patients requiring artificial airways. We also wrote a critical review on our experience with acute epiglottitis.

Dr. Dobell and his team continued their operations (palliative and corrective) for complex anomalies of the heart and great vessels with our assistance during and following operations. Many cases of status asthmaticus were successfully managed by controlled ventilation. Prolonged intubation for mechanical an accepted technique for postoperative surgical patients, status asthmaticus and

broncheolitis in respiratory failure and other conditions requiring respiratory assistance. At that time, the department was responsible for the initiation, maintenance and termination of mechanical ventilation of patients in respiratory failure. The department, as always, took an active part in the care of patients with acute airway obstruction.

In the seventies, even though the number of residents in training decreased, our teaching requirements increased since we also taught paediatric medical residents, emergency residents, inhalation therapy students, medical and nursing students. In order to maintain our clinical services in the face of our increased teaching responsibilities, we required additional staff anaesthetists and, in 1975, anaesthesia technicians.

Originally we recruited two inhalation therapy graduates for their practical experience as anaesthesia technicians to the Children's. They were assigned limited and specific tasks, helping in the preparation of equipment and monitoring patients. All their functions were under direct staff supervision. With experience, they became proficient in airway management and became members of the resuscitation team. Today there are 11 anaesthesia assistants.

In the mid-seventies, naso-tracheal intubation largely replaced tracheostomy which had, in its day, saved so many lives. In 1976, demand led to the creation of a major Day Surgery Centre, now known as the Herbert Owen Centre after one of the Children's paediatric surgeons. This was on the ground floor, where eventually more than half our cases were performed. Originally undertaken as a teaching tool, but now useful for historic purposes, we filmed many conditions and their management. Some conditions were relatively rare and others were of interest because of their management at that time.

In 1983, I moved to Dalhousie University and the IWK Hospital for Children. Subsequent Chief Anaesthetists at the Montreal Children's Hospital have been John Sandison and Desmond Spence. They have continued the development of the department in teaching and clinical care.

AFTERWORD

When Franco Carli was appointed to the Chair of the Department he marked a precedent, being the first non-Anglo chairman. As such, his appointment was a rather belated reflection of the internationalism which has long been a feature of McGill's intake of staff and students. On occasions this has been a source of resentment in both the countries from which they emigrate and in Quebec but it is to be hoped that McGill will resist the current trend towards parochialism. The enlightened approach of Canadians like François Donati should ensure that the provincial and international aspects of the department are both maintained in a way which will be mutually beneficial.

THE WAY AHEAD

i. François Donati (McGill 1984-1994)

"We have, by the grace of God, arrived at a stage where anaesthesia is pleasant, safe and efficient." Harold Griffith," An anaesthetist's valediction," *Canadian Anaesthetists' Society Journal*, 1967; 14:373-381.

For most of us who trained and practised after Harold Griffith pronounced these words at a conference given when he retired, it is difficult to believe that anaesthesia in the 1960s could have been considered to be anything like pleasant, safe and efficient. Many of us would be reluctant to apply these adjectives to current anaesthetic practice but Dr. Griffith was regarding things from a perspective gained over many years. When he started learning and practising anaesthesia, there were few of the fundamental ingredients of modern anaesthetic practice, including the muscle relaxants he himself was to introduce.

It is difficult for us, in the last years of the twentieth century, to imagine what anaesthetic practice was like when inhalational agents were explosive, intravenous agents were unknown, tracheal intubation was seldom used, a finger on the pulse was the most sophisticated equipment, recovery rooms were nonexistent and artificial ventilation depended on manual strength and endurance. Harold Griffith saw,

during his long career, a tremendous explosion of knowledge in physiology, pharmacology and internal medicine, all of which had a great impact on the body of knowledge necessary to the safe use of anaesthesia.

The creation of the McGill Department of Anaesthesia 50 years ago was certainly a milestone in the journey towards safer anaesthesia. Recent years have brought enormous change and promise. Statistics and surveys indicate that anaesthesia is safer than ever — so safe that it is difficult to show how safe it is. The introduction of routine capnography and pulse oximetry in the 1980s probably contributed to this but other factors played a role.

Thanks to well structured residency programmes, more anaesthetists have better training now than ever before. Modern drugs are more specific, have fewer side effects and do not linger as long in the body, and a wider range of anaesthetic techniques is now available. It would be very difficult to go back to a time before on-line oxygen saturation, plastic intravenous cannulas, epidural narcotics, laryngeal masks, patient-controlled analgesia, end-tidal gas analyzers or the use of one's favoured cocktail of drugs.

The gradual improvement in drugs and equipment and the increased sophistication of knowledge in fields connected with anaesthesia have been, and will continue to be, an invitation to consider new challenges. Some of these involve what might be considered to be non-traditional areas of anaesthetic practice. For example, anaesthetists have found a role in intensive care units where their expertise in resuscitation, airway management, acute care of severely ill patients and mechanical ventilation is much valued. Pain management is also becoming more and more the responsibility of the anaesthetist, not only in chronic pain clinics but also because of the development of better organised acute pain management. Another challenge for the specialty is that presented by sicker patients, often at the extremes of age, undergoing surgical procedures which in the past would have been discounted as too risky and complicated.

Life in the hospital and university of the 1990s is not a peaceful one, however. Patients expect more and more of the health care

system, and clinical services have to be provided from reduced financial resources. Fortunately, some of these expectations can be met in spite of dwindling resources thanks to recent advances in anaesthesia. Day surgery is now common, partly because of our ability to provide anaesthetics with rapid and good recovery. With improved monitoring, the judicious use of regional anaesthesia, the use of safer drugs and rational pain management, major surgery can now be performed with minimal hospital stay.

We must be ready to tackle new challenges, however. I hope that solutions to the problems ahead will be as simple, user-friendly and easy to understand for a new generation of anaesthetists as, say, pulse oximetry has proved to be for us. One of these challenges, that is the need to monitor the depth of anaesthesia, might appear basic and simple but it has been neglected. At this time I believe that we have the gadgetry necessary to put such apparatus together but we do not have a clear idea of what we would like to measure. In fact, determining what anaesthesia and unconsciousness are would be extremely useful to us and our patients, not only because we need to have this sort of practical information but because the research involved would tell us more about how brains work!

Another problem which needs serious consideration is the occurrence of the pain and nausea which most patients associate with anaesthesia. It would be nice if patients could walk out of the operating room without excessive pain, nausea or sedation. We have today, or will have shortly, a choice of short-acting drugs which would normally allow us to avoid most of the side effects seen in the recovery room: respiratory and cardiovascular depression, inability to maintain an airway, residual paralysis and excessive somnolence. The next step is to deal with pain and nausea. Regional anaesthesia is an answer to some of these problems but not all. Techniques of regional anaesthesia with fast onset and rapid recovery would be a definite advance.

As anaesthetists, we constantly look at cardiac function. Our tools are certainly more sophisticated than the finger-on-the-pulse approach of earlier years. The widespread use of non-invasive, automatic blood pressure monitors has changed the practice of

anaesthesia. A simple, non-invasive cardiac output monitor, with an option to look at regional blood flow, especially flow to the brain, would be a major advance. As always, such a solution would raise new questions. If anaesthetics did not cause cardiac depression, the role of cardiac output monitors would be diminished, although not quite eliminated as the actions of surgeons can also cause decreased cardiac output! But then, is it possible to have anaesthetics without cardiovascular depression? Respiratory depression poses a similar question.

Perhaps patients, 50 years hence, will have minor surgery under ultra-short acting anaesthetics with neither cardiac nor respiratory effects and only a small, non-invasive depth of anaesthesia monitor applied to their foreheads. Perhaps they will leave, unassisted, minutes after undergoing surgery, having been given a pill, spray, patch or other form of preventive treatment for pain and nausea. Perhaps they will go home the night after undergoing heart or neurosurgery.

This may seem far-fetched but it is probably no more so than current practice would be in the eyes of anaesthetists practising 50 years ago. Our younger colleagues will see the future of anaesthesia. Indeed, those who take on the exciting challenges presented by the specialty will determine that future.

ii. Franco Carli (McGill 1994-present)

"You need a little time to acquire the McGill spirit", an old friend said to me when I assumed this post. On my first day no specific job description was handed to me; my mandate was simply to consolidate what had been achieved and enhance the academic strengths of the department. During my initial negotiations with the Dean of Medicine I had realised that a great challenge awaited me.

Contrary to the style of my predecessors, I took the risk of confining my responsibilities to those of chairman. This was determined by my view of a university-based department which was not necessarily hospital-based. In the present McGill scenario (only two other clinical chairs have a similar position), this could represent

a frustrating business. There is no budget to dispose of as every dollar comes from contracts negotiated with the Dean and, on the other side, the bargaining power is that of the chief of each hospital's anaesthesia department.

Why then choose such a risky position? Having witnessed the re-organization of hospitals in England, I was already familiar with some administrative jargon, such as re-engineering, downsizing and rightsizing. In my first months at McGill, I learned more about the intricacies of a system of administration reminiscent of that in Europe but altered by North American pragmatism. At the departmental level, there had been little interaction among faculty members, neither intellectual nor material sources had been shared and one person had been left to make all the decisions.

I felt that the large number of decisions and representations we were collectively involved in demanded a more professional approach. The evolution of health care and scientific reasoning, together with the budgetary pressures imposed by western governments, have challenged the way in which we operate and make decisions but there are also opportunities for the creation of outstanding academic clinical groups. Major choices have to be made in the way we teach, provide clinical care and perform research, however.

The participation and commitment of academic physicians are essential for the academic health science centre to discharge its responsibilities properly. A particular challenge for our members is how to protect the time needed to satisfy academic career aspirations. We also have to remain in the mainstream of the profession and avoid isolation from non-academic professional colleagues. Whether these challenges are related to worldwide economic and political instability, the redefinition of health care or academic insecurity, we are compelled to ask whether an academic department of anaesthesia fulfils a purpose.

Critical analysis of academic anaesthesia in major countries indicates great difficulty in recruiting suitable candidates for academic chairs, a sharp reduction in postgraduate trainees and decreased research funding. It is my strong belief that academic anaesthesia is

more likely to survive this challenge here at McGill than in many other institutions. As this book illustrates, the department has survived major difficulties such as restricted funding and recruitment crises in its first 50 years and, in spite of such hardship, it has kept the pride and enthusiasm which strike every outsider who comes in contact with it. These qualities infect those who come to work here and are a necessity in times of redefinition.

The challenge will be to integrate fully these valuable human and intellectual resources into one academic environment. This way of thinking requires minds prepared not to be disbelieving but to exercise a constant, graceful scepticism, remaining open to any possibility, including impossibility; minds profoundly questioning but buoyantly hopeful, willing and able to bring processes, procedures and people to judgement. Of course there is a risk in questioning our performance and making choices but, if we do not risk failure we limit our chances of success.

One question constantly raised in our circles is whether clinical teachers should receive appropriate training before they are engaged in this responsibility, in the same way as researchers are trained in research methods before engaging in either bench or clinical research. The development of teaching methods and the use of informatics could help form a critical mass of teachers able to provide specific knowledge, not only within the specialty of anaesthesia but to other health-care professions and the public.

Another concern relates to the direction of research and, specifically, whether there should be more emphasis on that concerning patients' care in the domain of anaesthesia. This implies recruitment of scientists working in close association with clinicians, the direction of a selected group of residents towards research training, the formation of a multidisciplinary core group with accessible infrastructure and the clarification of research objectives.

The shrinking of research funds means that there is greater competition amongst departments and an increased need to ensure an infrastructure which allows us to be productive leaders in the field. We need to consider how to fuse our performance and our potential

to produce a strong new dynamic, reaching out to our colleagues in other departments and faculties so that we can reach objectives together which would be impossible to achieve separately.

Although we have an international profile, here in Montreal, we are still an anglophone institution in a francophone environment. We must choose to become a community of scholarship involving international affiliations *and* the local community. There need be no contradiction between these two goals as we can both promote international relations and remain an inviting and congenial place for active academic collaboration with our anaesthetic colleagues at the Université de Montréal.

The challenge which started 50 years ago continues today!