48th ANNUAL REPORT 1982-1983

Montreal Neurological Hospital
Montreal Neurological Institute

48th Annual Report

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1982-1983

(Version française disponible sur demande.)

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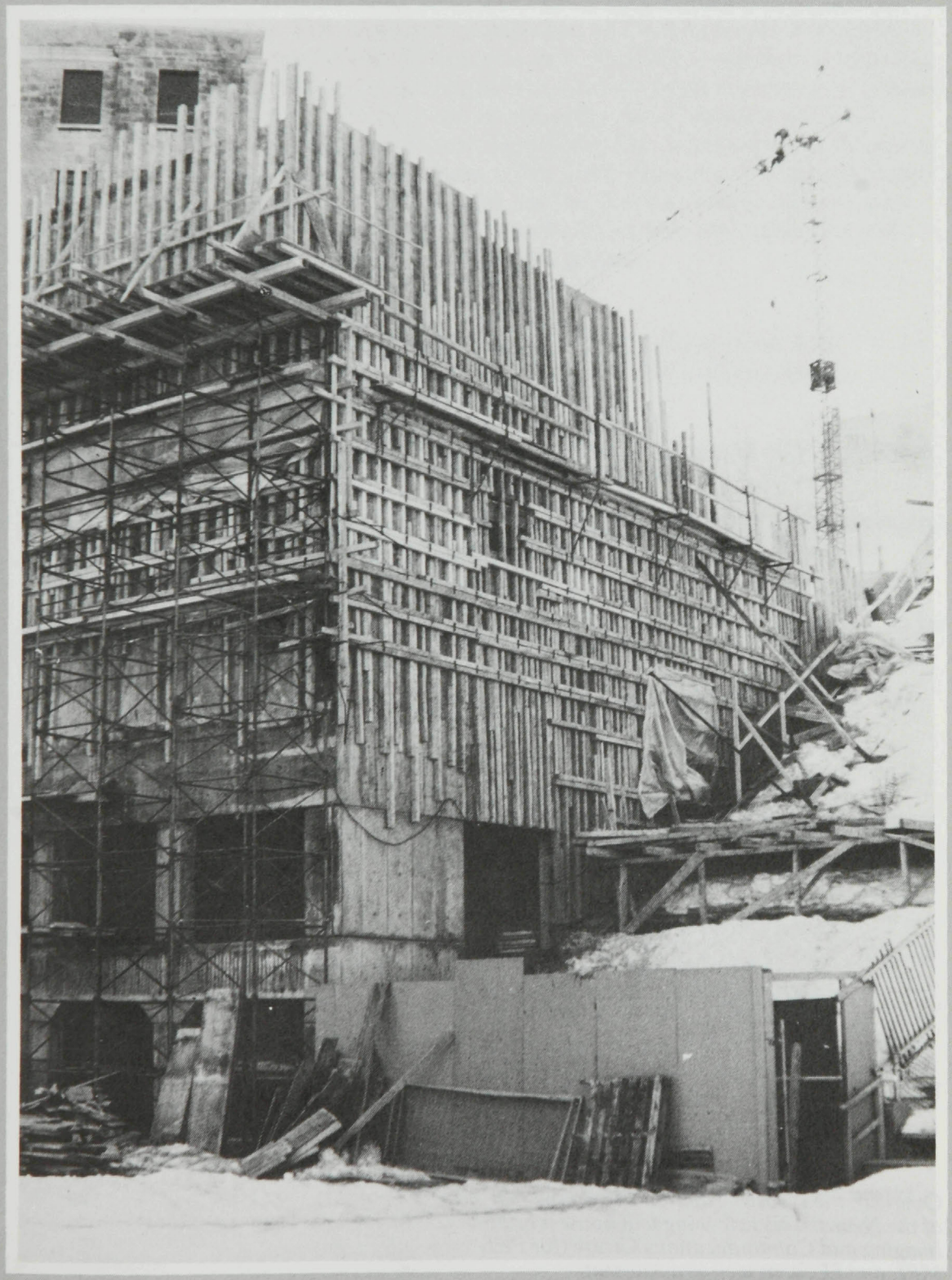
Director's Report



Overleaf, the Webster Pavilion rises to the east of the Neuro. This new wing will house a Brain Imaging and Communications Centre (for PET, MRI, and EEG), as well as a 330-seat amphitheatre.

Report of the Director General

This *Annual Report* gives a double record of two closely related but separately financed organizations. The summary of activities of the Montreal Neurological Hospital is directed to the Board of Directors, le Conseil de la santé et des services sociaux de la région de Montréal métropolitain, and the Ministry of Social Affairs of the province of Quebec. The account of our progress in research and post-graduate teaching at the Montreal Neurological Institute is submitted each year to the principal and the Board of Governors of McGill University. The report is sent as well to our many supporters and friends, and to the Fonds de la recherche en santé du Quebec, the Medical Research Council of Canada, and other research foundations from which we have been awarded grants.

Highlights of 1982-1983

1. Activation of extensive renovations (Phase IV) to the Rockefeller and McConnell Pavilions was begun, supported by the federal and provincial governments and by private donations.

2. Plans were initiated to acquire the most advanced nuclear magnetic resonance scanner through the generosity of the McConnell Foundation.

3. Construction began on the Webster Pavilion, which will house a brain imaging centre and *"Tele-Neuro"*, a program for satellite and electronic exchange of information among brain research centres.

4. Preparations were launched for our anniversary celebration, *Synapse-50*, to be held September 23-26, 1984.

5. Hospital and institute financial operations were balanced despite rising costs and severe budget cuts.

6. External grants and donations increased.

7. Young clinicians and scientists joined our staff to strengthen our expanding programs of research and treatment on brain disorders.

Phase IV

On April 1983 we received reapproval from the Ministry of Social Affairs to complete the renovation of the two older wings, a project known as Phase IV. Federal credits that had lapsed with the Health Resources Fund legislation in December 1980 were again activated through negotiations with the federal government. These funds will allow us to upgrade the services of the Rockefeller and McConnell Pavilions, install air-conditioning to replace an obsolete ventilation system, improve medical services to the nursing areas and wards, modernize the sterile supply unit, and install a neurodiagnostic unit and centralized kitchen service. These changes, originally planned for 1979 immediately after the completion of the Penfield Pavilion, were again reviewed during the year by a task force of Ministry representatives and our planning committee, and work has now begun.

Brain Imaging
In 1973, the Neuro was the first institution in Canada and one of the first four centres in the world to acquire a CAT scanner. In 1978 MNI researchers built a BGO positron emission tomography camera, Positome I, a world first. In 1981 the installation at the MNI of North America's first mini-cyclotron and Canada's first medical cyclotron provided the range of medical radioactive tracers necessary to image the brain's chemistry in health and disease.

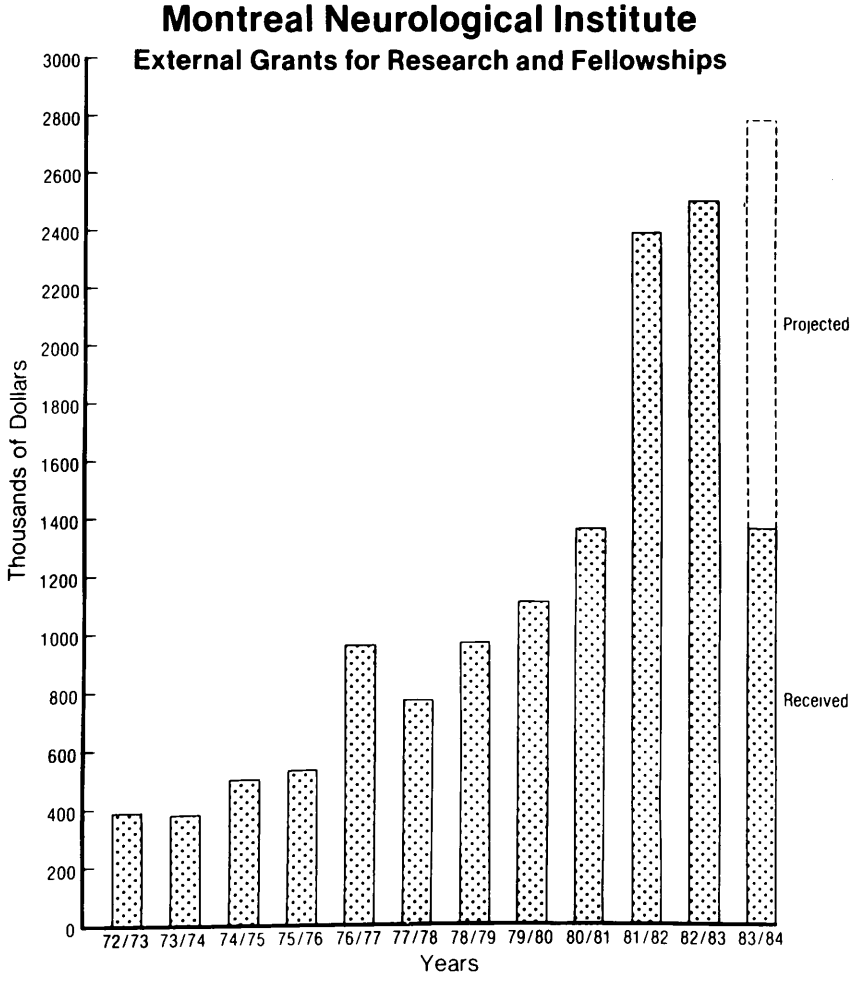
A new form of scanning, part way between CAT and PET, is based upon nuclear magnetic resonance (NMR). The image NMR provides is a reflection, like a radar bounceback, from wobbling atoms in the tissues of the body, when it is enveloped in a powerful magnetic field. NMR produces exciting new views of the brain and spinal cord, with the promise of more sensitive analysis than present techniques allow of strokes, brain tumors, and disorders like multiple sclerosis. We expect delivery in August of Quebec's first and Canada's most powerful NMR scanner. The instrument resembles a body scanner, though somewhat larger. Before approaching the magnetic field one must remove watches, metal objects, and coins. (Our development committee might exploit this situation to advantage.) A generous donation from long-time supporters of the Neuro allowed us to launch this new research and development project early in 1983.

These combined operations—CAT head and body scanners, PET scanning with the automated mini-cyclotron and the new Atomic Energy of Canada version of the MNI imaging camera, and now the prospect of NMR imaging and chemical spectroscopy units—will give the Neuro unmatched resources in these neurodiagnostic and research systems.

Webster Pavilion
During the year, with the university's approval, we began construction of an annex east of the McConnell Pavilion and next to the basement of the former field house of the Percival Molson Stadium. This annex will contain advanced neurodiagnostic imaging units including our NMR scanner. Another level will expand the research and clinical space for PET, and will put this unit near the cyclotron and radiochemistry laboratory where we produce the medical radioactive tracers. On a third floor, the EEG department will be enlarged to facilitate the advanced computer monitoring of electrical activity of the brain that has been invaluable in the diagnostic study of epilepsy, work for which this department has justly become world famous. The complex will also provide much needed areas for other research and clinical needs, as well as an auditorium to serve our increased teaching and conference requirements. This Brain Imaging and Communication Centre (BICC) will also provide space for a pilot system—*Tele-Neuro*—that will use satellite and electronic communication systems to exchange new research findings among selected brain research institutes. The building housing these exciting ventures will be called the Webster Pavilion in appreciation of the magnificant support Howard Webster, Colin Webster, and other members of the Webster family have given over the past decade to develop these advanced imaging systems.

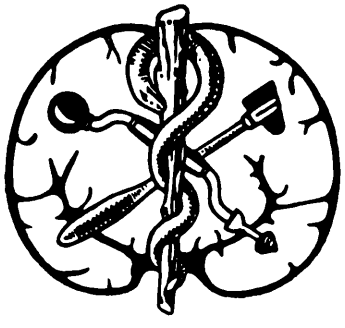
Budget Operations
On the hospital side, despite continuing reductions in funding from the Ministry of Social Affairs, our budget operations for the year ended with a modest accounting surplus. The quality of hospital services has been difficult to maintain with these cuts, particularly as they were imposed midway through the fiscal year. Further reductions will not only seriously affect the quality of medical care but will also limit our efforts to continue to provide world leadership, expertly trained personnel, and new advances in this demanding field of research, diagnosis, and treatment of brain disorders.

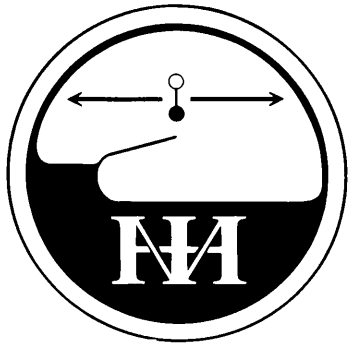
In the institute operations, external research and fellowship grants again exceeded $2 million, most of which was awarded by the Medical Research Council of Canada. A six-fold increase over the past ten years in extramural research grants speaks well for the excellence of our scientific staff. The main increments in



research support over the past decade correspond to physical expansion (Penfield Pavilion) and major installations (CAT and PET imaging systems). Donations increased by 30 percent and endowment by 20 percent over the previous year. We are especially grateful to the Donner Canadian Foundation for a special grant to upgrade the original Donner Laboratory for Experimental Neurochemistry, which was established in 1952 following an agreement between William Donner and Dr. Wilder Penfield. The renovation project has been dedicated to the memory of George Goad, the foundation's former secretary-treasurer.

University funds from the Faculty of Medicine for salaries of the institute and hospital clinical teachers have unfortunately been frozen during the past three years. The institute increased its subsidies to these basic salaries in order to provide our teachers with an appreciable rate of increase. The institute budget now contributes two-thirds of the salary support for teaching in neurology, neurosurgery, and related fields as compared to one-third from the Faculty of Medicine and other university departments. More details of the hospital and institute financial operations will be found at the end of this annual report.





The Neuro Logos

Many have asked about the origin of the logos that appear ubiquitously about the Neuro. Our first logo showed the Hippocratic serpent and staff, with a reflex hammer and a surgical trephine crossed on a section of the brain. Designed by Dr.

Penfield, this symbolized neurology and neurosurgery, their relation to medicine, and their dependence upon the brain sciences.

For the Third Foundation to celebrate the Penfield Pavilion opening in 1978, a less detailed logo was needed for printing on our banners and announcements. So this director, like a previous one, audaciously turned artist, and sketches were turned into a professional design by Margaret Wherry and Charles Hodge. This logo streamlined the brain to a stylized hemisphere, sans cerebellum and brainstem. A few sloping bars to the Roman numeral III indicated both the III Foundation and the initials of the MNI: a horizontal bar provided the initials for the MNH.

This III Foundation logo (adaptable for up to VIII future foundations) appears on our notices, flags, banners, stationery, and haberdashery. A happy suggestion by Guy Lambert, implemented by Winston Rochette and McGill's Physical Plant, placed the logo at the top of the Penfield Pavilion.

To celebrate our cyclotron installation in 1981 we included a positron and an electron schematically giving off gamma rays.

Montebello Atelier I
A review of the past decade by research units of the MNI/MNH was the theme of an atelier splendidly organized by our support staff and held at Le Château Montebello over the weekend of November 19-21, 1982. We were joined by Principal David Johnston, Dr. Francis Rolleston of the MRC of Canada, Dr. Jean-Gil Joly, président, le Fonds de la recherche en santé du Québec, Dr. Richard Cruess, Dean of Medicine, and Dr. Theodore Sourkes, a member of the director's Neurosciences Advisory Council. Dr. Theodore Rasmussen, director emeritus, with Dr. K.A.C. Elliott, Dr. Herbert Jasper, and Dr. Francis McNaughton of our senior scientific consultant staff, were also on hand.

Montebello Atelier II
The group involved in positron emission tomography (PET) held another workshop at Montebello at the end of February 1983. We were joined by the scientific team of Atomic Energy of Canada Limited, who are evaluating with us the new Therascan positron camera based on the original MNI design by Christopher Thompson. This device, established at the MNI in the fall of 1982, is projecting high quality PET images which will greatly enhance our research results. Our three major PET research programs on epilepsy, stroke, and brain tumor are advancing steadily. We are particularly stimulated by the findings with BCNU, an anti-tumor chemical that has been radio-labelled by Dr. Mirko Diksic and his radiochemistry team. These findings will allow us for the first time to image this drug's kinetic behaviour in gliomas and the surrounding brain. Dr. Lucas Yamamoto and his team have also confirmed earlier studies by Drs. Irving Heller and K.A.C. Elliott on brain tumor slices: they have shown, through PET, high glucose metabolic activity in gliomas accompanied by strikingly low oxygen usage. This contrast to the usual aerobic glycolysis of normal brain may serve as a valuable clue for future treatment of these gliomas.

Wilder Penfield Day
Organized by the students of McGill's Osler Society and our support staff here at the Neuro, a celebration of Dr. Penfield's birthday, January 26, brought Dr. William Gibson from Vancouver (where he is chairman of the British Columbia Universities' Council) to talk of Penfield as an anatomist and physiologist. His delightful infusion of historical fact, garnished with anecdotal *croutons*, was followed by Dr. Theodore Rasmussen's survey of Penfield's surgical contributions and my review of Wilder Penfield's longstanding hero worship of William Osler. Bernard Brais, president of the Osler Society, and his associates mounted an excellent display of Penfield manuscripts, photographs, and other memorabilia in the foyer of the Osler Library.

One of the exciting features of Penfield day was the vernissage of a mural, *The World of Neurology*, painted by Luba Genush (Mrs. Pierre Gloor). Based on illustrations in MNI research reports over the years, this brilliant artistic synthesis brightens the Izaak Walton Killam conference room. Acrylic on canvas, the work presents glimpses of the anatomy and physiology of the nervous system and the techniques we use to probe its structure, chemistry, electricity, and kinetic behaviour.

Penfield Archives
Professor Curt Cecil continues the detailed cataloguing of Dr. Penfield's papers books, and memorabilia. Microfilming of this irreplaceable material rapidly advances. The Penfield collection is now housed with the MNI-MNH archives at 3661 University Street, a house that has been renovated by the university and institute to provide study space and proper storage.

Varia
On March 9, we performed the first operation in the newly renovated No. 1 Operating Room. Over the past half century some 2,000 patients have been operated upon for focal epilepsy in this theatre. It was enlarged by removing the south partition behind which, as many former neurosurgical fellows and nurses will remember, surgical instruments were washed and cabinetted and Dr. Richard Gilbert, our chief neuroanesthetist, dealt quietly with his paperwork. A complete refitting includes modern surgical lights to replace the venerable single Zeiss unit, anesthetic supply columns, and an electronically controlled overhead photographic mirror for Charles Hodge's team. This renovation now provides two well-equipped theatres for seizure surgery. We are grateful to all for this surgical overture, and especially to Norma Isaacs, our supportive operating room supervisor.

Just before Christmas, the Governor-General admitted Dr. Charles Drake and myself to the Order of Canada. With Dr. Penfield, Dr. Claude Bertrand, and Dr. Harry Botterell there have now been five neurosurgeons recognized in this way. For my part, the award is a particular reflection of all that remarkable group at the Neuro with whom I have had the satisfaction of working (with the exception of stints at Oxford and Saskatoon) since 1942.

The Izaak Walton Killam Memorial Prize of the Canada Council, awarded annually to a distinguished Canadian scientist, was presented to Dr. Brenda Milner on April 5, 1983 by Mavor Moore, chairman of the council. This distinction, added to an impressive series garnered by Dr. Milner in recent years, further recognizes her valuable research contributions for our understanding of memory, speech, and localization of function in the human brain.

Dr. Stirling Carpenter and Dr. George Karpati have sent off to the publishers a richly illustrated manuscript for a monograph on muscle pathology. An agreement with the publishers, Churchill Livingstone, will mark this as a 50th Anniversary publication of the MNI.

Among recent distinguished visitors to the Neuro, Dr. John Vane reviewed his research on prostaglandins in the Fourth K.A.C. Elliott Lecture on October 7, 1982. A few days later we had the pleasure of congratulating him for being named one of the three winners of the Nobel Prize for Medicine or Physiology in recognition of his work in this exciting area, a field to which our chief neurochemist, Dr. Leonhard Wolfe, has made substantial contributions.

Dr. Barbara Schulz from the department of neurosurgery of the Free University of Berlin spent a month reviewing our program for the surgical treatment of epilepsy. Dr. Maria Valentina Filomena, from Caracas, Venezuela, a colleague of former MNI graduate Dr. Alberto Martinez-Coll, also spent a study period reviewing diagnostic aspects of epilepsy. We were pleased to have Dr. Orvar Eeg-Olofsonn of Linköping, Sweden here working with Dr. Eva Andermann as a visiting scientist on the genetics of epilepsy.

Last summer Yves Fortier, a member of the hospital's Board of Directors, was appointed president of the 31,000-member Canadian Bar Association. A senior partner in Montreal's largest law firm (Ogilvy-Renault), Maître Fortier has served as counsel to several royal commissions, including the Chouinard commission on bilingual air traffic control in 1976. Described recently in the Montreal *Gazette* as "at once an unusually civilized and unusually gifted man," Mr. Fortier's diplomacy and expertise have been most welcome at the Neuro.

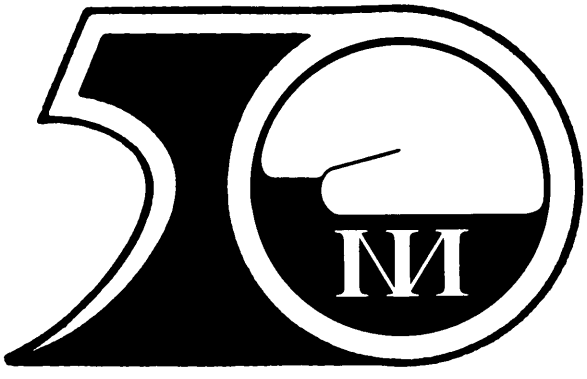
All members of the hospital and institute were saddened to hear of the death of Sam Reitman on November 14, 1982. In 1947 his wife Ruth started a small annual Christmas party on 2-South which attracted more and more staff members each year. After Ruth Reitman's death, Sam continued this traditional luncheon and family affair, with Sam's son Cyril, his charming wife Dorothy, and often his grandson Joel being present. The Reitman family have been generous to the Neuro in many ways, not the least of which is the establishment of a Reitman scholarship fund for young investigators.

New MNI/MNH Staff Members

We welcome several young staff members. Dr. Massimo Avoli, a graduate of the University of Rome, recently received his PhD from McGill for research in the mechanisms of experimental epilepsy. After six months on an MRC fellowship at

the University of Oslo, he has returned to the Neuro's neurophysiological research unit. Dr. Elizabeth Matthew, who did her residency training here in neurology, returned from the United States last year. Having won an MRC scholarship, she has established a neurobiological research unit for peptides using special histological and tissue culture techniques. Dr. Heather Durham, who worked with Dr. Sergio Pena, has joined the institute to continue her studies in neurotoxicology on an MNI research fellowship. Dr. David Caplan, with linguistic training from MIT and neurological training from Harvard, is also a recent addition to our research and clinical staff. Dr. Daniel Gendron brings welcome support to neurology and the electromyography unit. Dr. Rachel Ochs completed her year in internal medicine and is focussing on EEG, the evoked potential unit, and PET studies in epilepsy. Dr. Richard Leblanc, our former chief resident in neurosurgery, who has been investigating cerebral vasospasm on an MRC fellowship, joins the neurosurgical staff and will continue research in the Cone Laboratory. Dr. Ghislaine Savard brings her combined training in psychiatry and neurology to strengthen our psychiatric staff.

SYNAPSE-50: The MNI-MNH Anniversary
For our 50th anniversary, we have modified the logo to convey the message that the Neuro is making good headway.



In 1897 Charles Sherrington coined the word "Synapse" to mean "connections between nerve cells." Synaptic action is the key to the operation of the nervous system. Billions of nerve cell units, each kept individual by "a surface of separation" (as Sherrington termed it), intercommunicate electrochemically through billions of endings—*boutons terminaux*—with speed, precision, plasticity, and instant retrieval.

We have borrowed Sherrington's elegant term for our 50th birthday in September 1984, which we expect to be an intellectual as well as spiritual "joining together." It will be an opportunity to celebrate what this institute and hospital have meant to so many of us. We extend a most warm invitation to all our friends to join us to mark this milestone in the history of the institute and hospital. Special events will be booked throughout 1984 but the particular days set aside for the anniversary will be Sunday, September 23 through Wednesday, September 26, 1984.

For the occasion, we are producing a pictorial history of the institute and hospital with the assistance of Professor Curt Cecil (on sabbatical from McGill's English Department) and book designer Robert Reid.

McGill will be holding a special MNI convocation September 24, which we expect to be as colourful as that held during the III Foundation in 1978. Named lectures, including the Hughlings Jackson and the Willis, will all be presented that week of September 23, together with summaries of research progress at the institute.

Envolée

During my twelve years as director of the institute and hospital it has been my particular privilege to have taken part in the growth of the "Neuro" enthusiastically supported by the staff in our own organization and many individuals outside the institute. Deserving particular mention are the hospital's Board of Directors, the institute's Neurosciences Council and Advisory Council, and the Friends of the Neuro. We have enjoyed generous moral and material support from patients, their relatives and friends, and many public bodies and foundations; without this the ongoing momentum of our hospital and scientific work would not be possible. We work day to day with the staff of McGill University and the Royal Victoria Hospital, benefitting from their larger administrative group. We are particularly grateful also, on the hospital side, for the support of le Ministère des Affaires sociales and le Conseil de la santé et des services sociaux de la région de Montréal métropolitain. The federal government, through its Ministries of Science and Technology and of Employment and Immigration, has added to funding from Quebec and from private donations to reactivate a major renovation project that will bring the entire institute and hospital structure up to modern standards.

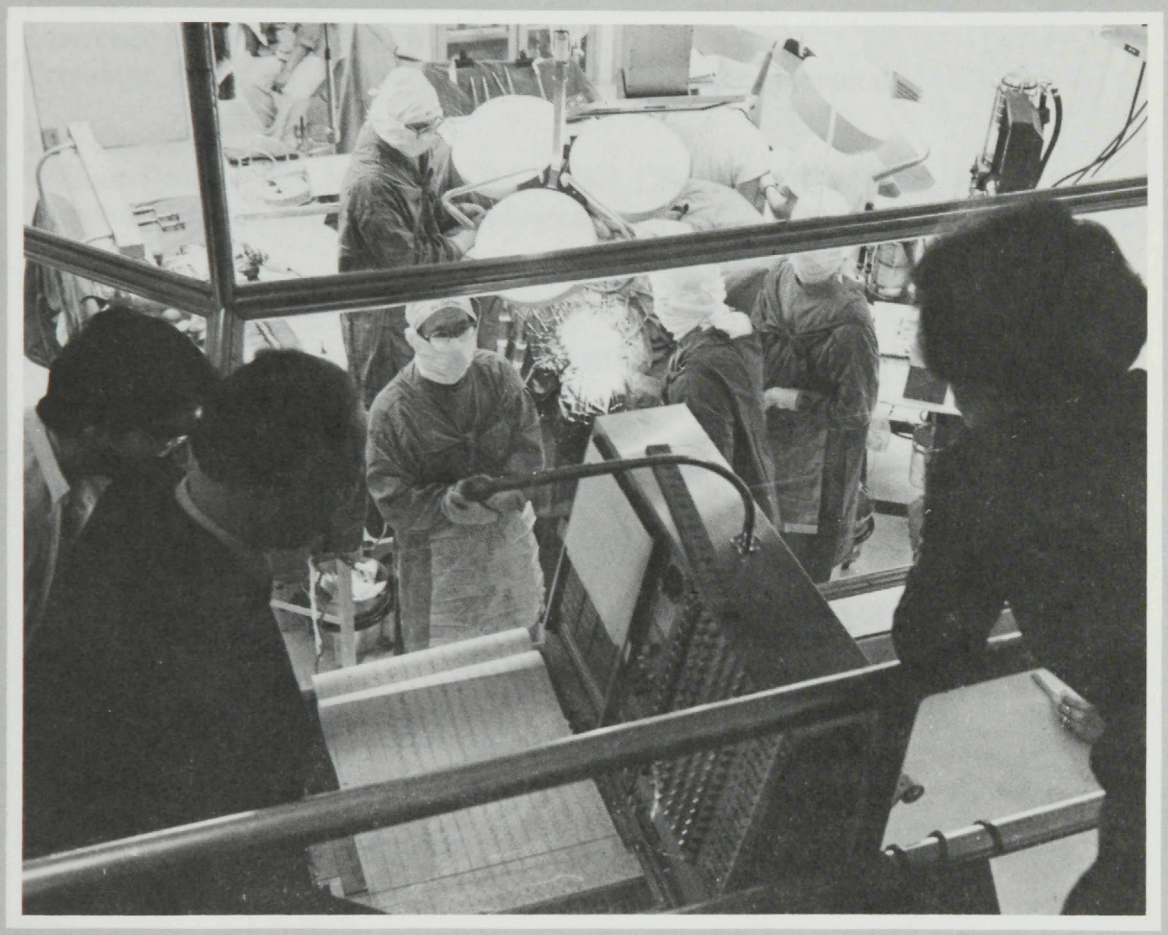
My official term of office ends in August 1983. A firm conviction that the three successive directors, Dr. Penfield, Dr. Rasmussen, and myself have passed on to earlier search committees as well as to the current one, is that the Neuro derives special benefits from the integrated action of the research resources of the institute and the clinical strengths of the hospital. This unique arrangement has evidently been successful not only in serving the national medical scene but also in providing here, under one roof, patient treatment and brain research that have earned world-wide recognition. Substantial advantages derive from a directorship responsible for the combined operation of the two closely related organizations so that, like the two hemispheres of the brain, they can function as a whole organ.

Many of the problems of running a hospital and institute resolve themselves if we keep in mind that our main concern is our patients. Without patients our clinical teachers, detached from the bedside, would be talking mere book-stuff. And without patients our scientists would lose the nagging creative uneasiness that challenges their intellect when facing an individual with brain disease untreatable because of our ignorance of its cause. But beyond that, beyond even the compassionate care of the stricken patient, there is the forefront of knowledge generated by the circumstance that the human brain—how it is structured and

how it works—presents the greatest intellectual puzzle of the universe. And paradoxically, all the answers must be found, ultimately, by the brain examining itself. The brain—the seat of good and evil, love and hate, truth and falsehood, kindness and greed, and all those values or foibles to which the human mind and frame are subject—can claim unmatched priority in our continuing struggle to better mankind. As Wilder Penfield expressed it, "The problem of neurology is to understand man himself." I wish Godspeed to those here at the Neuro who will be keeping alive, for the years to come, a small flame to light our way into that awesome darkness of the human mind.

—William Feindel, MD

Montreal Neurological Hospital



Neurosurgeon Dr. William Feindel consults with neuropsychologist Dr. Brenda Milner and electroencephalographer Dr. Luis Felipé Quesney during the first operation to be performed in the newly renovated Penfield operating theatre, March 9, 1983.

Board of the Corporation

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President, Board of Directors, Montreal Neurological Hospital

Vice-President
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Director General, Montreal Neurological Hospital

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Neuroradiologist-in-chief, Montreal Neurological Hospital

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Dean of Medicine, McGill University

David Lloyd Johnston, BA, LLB*°
Principal and Vice-Chancellor, McGill University

Colin Webster, BA, LLD
Governor Emeritus, McGill University

* Executive Committee member
° *Ex officio* member

Board of Directors
March 31, 1983

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Elected by the Corporation

Honorary President
Colin Webster, BA, LLD*
Elected by the Corporation

Ex officio member
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Director General, Montreal Neurological Hospital

Secretary
Laughlin Taylor, BEd, MSc
Neuropsychologist, Montreal Neurological Hospital

Members
Jacques Bergeron
Appointed by the Lieutenant-Governor of Quebec
(Representing Socio-Economic Groups)

Robert Birkett
Storekeeper, Montreal Neurological Hospital
Elected by non-clinical staff

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Director of Social Work Department, Montreal Neurological Hospital
(Representing the CLSC)

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Dean of Medicine, McGill University
Appointed by McGill University

Yves Fortier, QC, BCL, BLitt
Elected by the Corporation

Raymond Matte
Appointed by the Lieutenant-Governor of Quebec
(Representing Socio-Economic Groups)

Sonja Newman
Elected by voluntary organizations

Alan Gibb Thompson, MD, DABS, FACS, FRCS(C)
Elected by the Corporation

Jean-Guy Villemure, BA, MD, FRCS(C)
Neurosurgeon, Montreal Neurological Hospital
Elected by the Council of Physicians

Curtis Worthington, MD
Elected by interns and residents

Nancy Wright
Elected by the beneficiaries

Lloyd MacLean, MD, PhD, FRCS(C)
Surgeon-in-chief, Royal Victoria Hospital
By invitation

Caroline Robertson, N, BN, MScA
Director of Nursing, Montreal Neurological Hospital
By invitation

Membership as of September, 1983
Robert Birkett
Verna Bound
Richard Cruess, MD
William Feindel, MD
Yves Fortier
Jacques Laurent
Richard Leblanc, MD
Peter Leggat
Raymond Matte
Lawrence McDougall
Sonja Newman
Laughlin Taylor
Alan G. Thompson, MD
Jean-Guy Villemure, MD
Curtis Worthington, MD
Nancy Wright
Lloyd MacLean, MD *(by invitation)*
Caroline Robertson *(by invitation)*
Joy Shannon *(by invitation)*
Colin Webster *(by invitation)*

* Executive Committee member

Council of Physicians Executive

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Vice-Chairman, André Olivier, MD

Members
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(ex officio)
Irving Heller, MD
André Olivier, MD
Allan Sherwin, MD
Leonhard Wolfe, MD

Committee Chairmen
Admission and Duration of Stay
Serge Gauthier, MD

Credentials
Denis Melanson, MD

Infection Control
Jean-Guy Villemure, MD

Library
Theodore Rasmussen, MD

Medical Evaluation
Michel Aubé, MD

Medical Records
Bernard Graham, MD

Nursing (Patient Care)
Allan Sherwin, MD

OR-ICU
Gilles Bertrand, MD

Out-patient
Irving Heller, MD

Pharmacology
Allan Sherwin, MD

Research Evaluation
Francis McNaughton, MD

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Jean-Guy Villemure, MD

Representative to the Board of the Corporation
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Luis Felipe Quesney, BSc, MD, PhD

Assistant Electroencephalographers
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Rachel Ochs, BSc, MD
Ivan (John) Woods, MB, BAO, MSc, FRCP(C)

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Assistant Electromyographer
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J. Preston Robb, MSc, MD, FRCP(C)

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Irving Heller, BSc, MD, MSc, PhD, FRCP(C)
George Karpati, MD, FRCP(C)
Allan Sherwin, BSc, MD, PhD, FRCP(C)

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Bernard Graham, BA, BSc, MD
Ivan (John) Woods, MB, BAO, MSc, FRCP(C)

Assistant Neurologists
George Elleker, MD, FRCP(C)**
Gordon Francis, MD, FRCP(C)
Serge Gauthier, BA, MD, FRCP(C)
Daniel Gendron, MD, FRCP(C)
Antoine Hakim, BS, MS, PhD, MD, FRCP(C)
Elizabeth Matthew, MBBS, FRCP(C)

Neuro-ophthalmology
Neuro-ophthalmologist
Trevor Kirkham, MBChB, DO, FRCS

Neuropathology
Neuropathologist
Stirling Carpenter, AB, MD

Assistant Neuropathologists
Kathleen Meagher-Villemure, BA, MD
Yvon Robitaille, BA, MD, FACP

Neurophotography
Neurophotographer
Charles Hodge, RBP, FBPA, AIMBI

Assistant Neurophotographer
Marcus Arts

Neurophysiology
Electroencephalographer and Clinical Neurophysiologist
Pierre Gloor, MD, PhD, FRCP(C)

Associate Electroencephalographer and Associate Clinical Neurophysiologist
Luis Felipe Quesney, MD, PhD

Neuropsychology
Neuropsychologist and Medical Research Council Career Investigator
Brenda Milner, BA, MA, PhD, ScD, FRSC, FRS

Associate Neuropsychologist
Laughlin Taylor, BSc, BEd, MSc

Assistant Neuropsychologists
Marilyn Jones-Gotman, BA, MA, PhD
Michael Petrides, BSc, MSc, PhD
Robert Zatorre, BA, MSc, PhD

Clinical Assistants
Eva Flannery, BSc, MA, PhD
Gabriel Leonard, BA, DAP

Neuroradiology
Neuroradiologist-in-chief
Roméo Éthier, BA, MD

Associate Neuroradiologists
Denis Melanson, BA, MD
Jacques Théron, MD

Assistant Neuroradiologists
Guy Breton, BA, MD
Pierre Charles Milette, BA, MD

Neurosurgery
Honorary Neurosurgeon
Arthur Elvidge, MD, MSc, PhD, DCL, FRCS(C)

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Neurosurgeon
William Feindel, OC, BA, MSc, MDCM, DPhil, DSc, FRCS(C), FACS, FRSC

Associate Neurosurgeon
André Olivier, BA, MD, PhD, FRCS(C)

Assistant Neurosurgeons
Elaine Joy Arpin, BSc, MD, FRCS(C)***
Richard Leblanc, BA, MD, FRCS(C)
Jean-Guy Villemure, BA, MD, FRCS(C)
John Wells, BA, MD, FRCS(C)****

Psychiatry
Psychiatrists
Louise Demers-Desrosiers, BA, MD, FRCP(C)
Ghislaine Savard, MD, FRCP(C)

Assistant Psychiatrist
Robert Bull, AB, BMSc, MDCM, FRCP(C)

Radiochemistry
Radiochemist
Mirko Diksic, BSc, MSc, PhD

Research Computing
Computer Systems Engineer
Christopher Thompson, BSc, MSc

Assistant Computer Systems Engineer
Jean Gotman, ESE, MEng, PhD

Medical Physicist
Terence Peters, BE, PhD

* Resigned August 1983
** Resigned October l983
*** Resigned January 1983
**** Resigned April 1983

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John Sandison, MB, FFARCS

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Jeffrey Rubin, BSc, MD
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John Stewart, BSc, MBBS, MRCP, FRCP(C)
William Tissington-Tatlow, MB, MRCP, FRCP(C)
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André Bellavance, BA, MD, MSc, PhD
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Mihai Botez, MD, FRCP(C)
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Gilles Tremblay, BA, MD, FRCP(C)

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Jean-L. Vézina, BA, BM, MD, FRCP(C)

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François Schubert, BSc (Pharm), DPH

Physiology
Kresimir Krnjevic, BSc, MB, PhD, FRCP

Veterinary Medicine
Richard Latt, DVM

Resident and Rotator Staff
July 1982—June 1983

Dr. Thomas Adamkiewicz
Dr. Deidre Anglin
Dr. Elizabeth Angus
Dr. David Archer
Dr. Peter Bailey
Dr. Dana Baran
Dr. Marc-André Beaulieu
Dr. Leo Berger
Dr. Deborah Black
Dr. Scott Brown
Dr. Enrique Cardenas
Dr. Jean-Louis Caron
Dr. Howard Chertkow
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Dr. Neil Hagen
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Dr. Scott Brown (McGill University)
Dr. David Dubuisson (McGill University)
Dr. Rick Holmberg (University of Alberta)
Dr. Jack Jhamandas (University of Calgary)
Dr. Seth Pullman (McGill University)
Dr. Thomas Staunton (University of London)

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Dr. David Dubuisson (McGill University)
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Dr. Larry Picard (University of Toronto)
Dr. Thomas Staunton (University of London)
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Dr. Gary Dvorkin (University of Alberta)
Dr. Ben Hoffman (McGill University)
Dr. Rick Holmberg (University of Calgary)
Dr. Fernando Illescas (McGill University)
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Dr. David Vickar (McGill University)
Dr. Yonas Zegeye (Hahnemann Medical College)

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Director of Nursing and Assistant Professor, School of Nursing, McGill University
Caroline Robertson, N, BN, MScA

Assistant Director of Nursing
M. Irene MacMillan, BA, N, MScA

Nursing Coordinators
Emily Andrews, N, BScN
Felicia Skretkowicz-Benarroch, N, BN
Joan Boucaud, N
Anne Carney, N, BN
Melencia de Guzman, N, BScN
Linda Maruska, N
Catherine Negus, N
Susan Panicker, N*
Abdool Saumtally, N, BN**
Margaret Smeaton, N*

Nurse Clinician and Lecturer, School of Nursing, McGill University
Linda Norman-Robbins, N, BN

Operating Room Supervisor
Norma Isaacs, N, BN

Head Nurses
Lucy Dalicandro, N
Marion Everett, N
Kimiko Hinenoya-Worsley, BA, N
Georgette Jotic, N
Cecilia Largo, BScN, N
Frances Murphy, N
Barbara Petrin, N
Ursula Steiner, N
Winsome Wason, N

Consultant in Nursing
Florence Mackenzie, N, BN, MScA

Assistant Directors. Post-Basic Program in Neurological and Neurosurgical Nur
Gine
Marilyn Manchen, N, BA, BN***

Nurse Clinician Teachers, Post-Basic Clinical Program in Neurological and Neurosurgical Nursing
Lise Desbiens, N, BScN
Geraldine Fitzgerald, N, BN

* Part-time coordinators
** On leave of absence
*** Resigned September 1982

Graduates of the Post-Basic Clinical Program in Neurological and Neurosurgical Nursing

September 1982 — February 1983
Rebecca Aluyen (Brokenshire School of Nursing, Davao City, Phillipines)
Susan Dyer (Dawson College, Montreal, Quebec)
Veronica Leatham (Dawson College, Montreal, Quebec)
Gisèle McNabb (Maisonneuve College, Montreal, Quebec)
Jung-Kang Park (Nursing College of Bio-Medical Technology of Osaka University, Osaka, Japan)
John Pinto (Humber College, Toronto, Ontario)
Yanita Rowan (Misericordia General Hospital School of Nursing, Winnipeg, Manitoba)
Milena M. Segatore (McMaster University, Hamilton, Ontario)
Elizabeth Sterling (University of Alberta, Edmonton, Alberta)
Donna Talbot (Health Sciences Centre School of Nursing, Winnipeg, Manitoba)

March 1983 — August 1983
Jacynthe Bolduc (CEGEP Lévis Lauzon, Quebec, Quebec)
Lucille Bond (Hôtel-Dieu de Montréal, Montreal, Quebec)
Marie-Thérèse Déflubé (CEGEP Bois-de-Boulogne, Montreal, Quebec)
Thi-Mai-Phuong Le (CEGEP St-Laurent, St. Laurent, Quebec)
Réjeanne Plamondon (CEGEP du Vieux-Montréal, Montreal, Quebec)
Lucie Mercier (CEGEP Lévis Lauzon, Quebec, Quebec)
Louise Ouellet (CEGEP du Vieux-Montréal, Montreal, Quebec)

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Director of Auxiliary Services
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Director of Finance
Gean-yuan Pwu

Director of Nursing
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Director of Personnel
Leo Robitaille

Director of Social Work
Verna Bound

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Bernard Graham, MD

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James Gates

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Marina Boski

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Bernard Graham, MD

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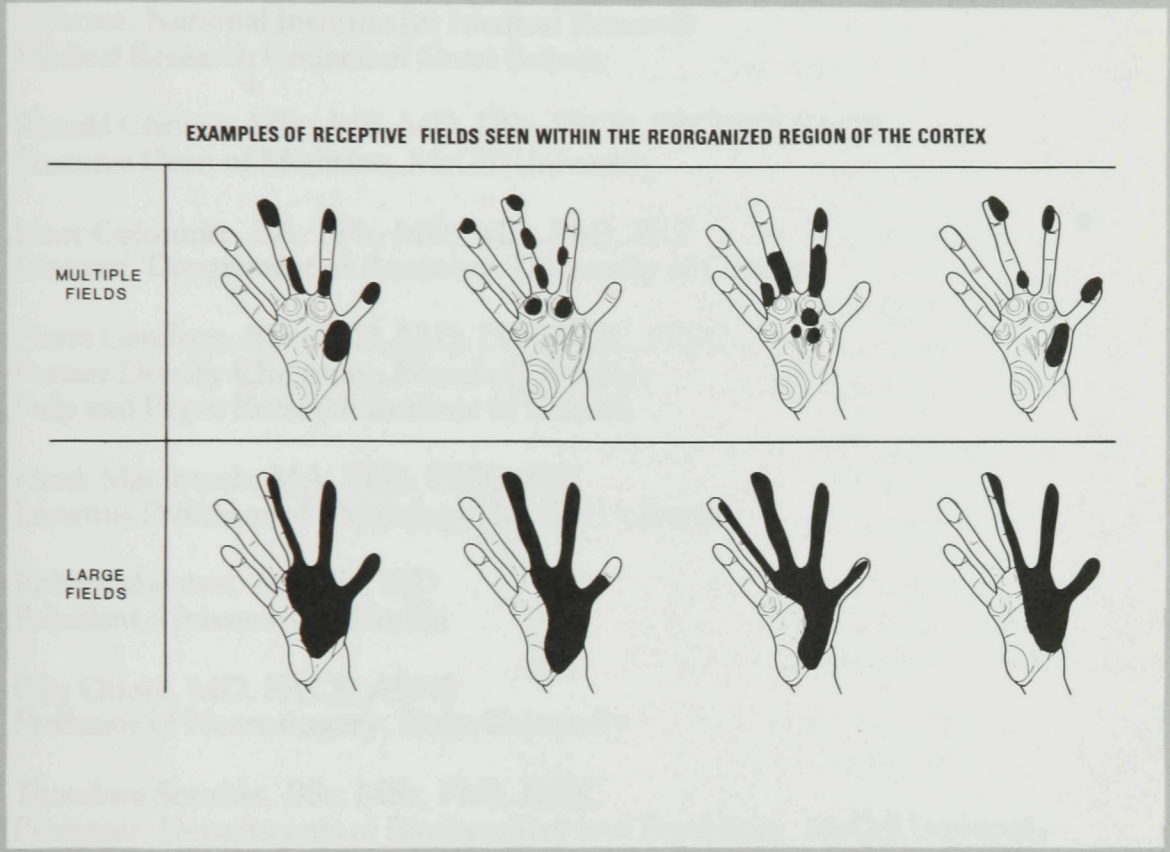

Overleaf, schematic results of Dr. Robert Dyke's research on sensory areas of the hand mapped out in relation to cortical organization.

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Elected by the staff of the Montreal Neurological Institute

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Appointed by the Principal, McGill University

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Associate Director (Neurosciences), Montreal Neurological Institute
Elected by the staff of the Montreal Neurological Institute

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Trustee, Estate of Dorothy Killam
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* Executive Committee member
° *Ex officio* member

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Christopher Thompson, BSc, MSc, *Computer Systems Engineering*
Robert Zatorre, BA, MSc, PhD, *Neuropsychology*

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Daniel Gendron, MD, FRCP(C), *Electromyography*
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John Wells, BA, MD, FRCS(C), *Neurosurgery*****
Ivan (John) Woods, MB, BAO, MSc, FRCP(C), *Electroencephalography*

* Resigned August 1983
** Resigned January 1983
*** Resigned October 1983
**** Resigned April 1983

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Department of Neurology and Neurosurgery
McGill University

(Brackets denote joint appointments.)

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Antoine Hakim
Elizabeth Matthew
Rachel Ochs

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Nico van Gelder

Mirko Diksic (Chemistry)

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David Archer
Lise Morin

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Stirling Carpenter (Pathology)

Assistant Professor
Yvon Robitaille (Pathology)

Lecturer
Kathleen Meagher-Villemure (Pathology)

Neuropsychology
Professor
Brenda Milner (Psychology)

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Michael Petrides (Psychology)
Laughlin Taylor

Lecturer
Robert Zatorre

Psychology
Lecturer
Justine Sergent

Biochemistry
Associate Professor
Paul Holland

Neuroanatomy
Professor
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Associate Professor
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Assistant Professor
Alain Beaudet

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Associate Professors
Jean Gotman
John Ives****
Christopher Thompson

Assistant Professor
Terence Peters (Radiology)

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Associate Professor
Trevor Kirkham (Ophthalmology)

Neuroendocrinology
Professor
Yogesh Patel (Medicine)

Neuropsychiatry
Assistant Professors
Louise Demers-Desrosiers (Psychiatry)
Ghislaine Savard

Lecturer
Robert Bull

* Resigned October 1983
** Resigned January 1983
*** Resigned April 1983
**** Resigned August 1983

Executive Committee of the Montreal Neurological Institute

Director
William Feindel, MD

Director Emeritus
Theodore Rasmussen, MD

Associate Director (Administration)
Joy Shannon, BA

Associate Director (Finance)
Norman Bleakley, FCMA

Associate Director (Neurology)
Donald Baxter, MD

Associate Director (Neurosciences)
Pierre Gloor, MD

Associate Director (Neurosurgery)
Gilles Bertrand, MD

Associate Director (Nursing Research and Education)
Caroline Robertson, MScA

Associate Director (Publications)
Victoria Lees, PhD

Associate Director (Research)
Leonhard Wolfe, MD

Associate Director (Research Evaluation)
Francis McNaughton, MD

Associate Director (Special Projects)
Irena Straszak, MHA*

Senior Executive Secretary
Sophie Malecka, BSc

Assistant Executive Secretary
Linda Kandestin, BA

* Resigned August 1983

Research Fellows
June 1, 1982 — May 31, 1983

Cone Laboratory for Neurosurgical Research
Dr. Masao Izawa (Tokyo Women's Medical College)
Dr. Amami Kato (Osaka University)
Dr. Keitaro Kobatake (Tokai University)
Dr. Richard Leblanc (University of Ottawa)
Dr. Devidas Menon (visiting scientist, University of Alberta)
Dr. Toshihiro Ouchi (Keio University)
Dr. Kazuhiro Sako (Hokkaido University)
Stephen Strother (Auckland University)

Donner Laboratory of Experimental Neurochemistry
Dr. David Archer (McGill University)
Dr. Jorma Palo (visiting professor, University of Helsinki)
Dr. Ronald Pokrupa (University of Western Ontario)

Experimental Neurophysiology Laboratory
Jack Abrahamson (McGill University)
Dr. Massimo Avoli (University of Rome)
Paola Diadori (McGill University)
Dr. Daniele Giaretta (University of Padua)
Francis Jean (McGill University)
Dr. Itsuki Jibiki (University of Kanazawa, Japan)
Raphael Justewicz (Massachusetts Institute of Technology)
Annette Majnemer (McGill University)
Dr. Maria Gracia Marciani (visiting scientist, University of Rome)
Dr. Richard McLachlan (University of Western Ontario)
Douglas Munoz (McGill University)
Dr. Rachel Ochs (Indiana University)
Christopher Power (University of Toronto)
Deborah Taylor (McGill University)
Michel Volle (University of Quebec/Trois Rivières)
Norman Werely (McGill University)
Paul White (University of Victoria)

Neuroanatomy Laboratory
Dr. Olivier Bosler (Centre national de la recherche scientifique, France)
Lee Friedman (McGill University)
Dr. Edith Hamel (University of Montreal)
Dr. Denis Hervé (University of Paris)
Michael Paré (McGill University)
Harry Webster (McGill University)
Kiran Ya'shpal (McGill University)

Neurogenetics
Kathleen Clark (Concordia University)
Linda Dansky (McGill University)
Dr. Orvar Eeg-Olofsson (visiting scientist, University of Goteborg)
Dr. Najma Aslam Janjua (McGill University)
Tracy Kimmel (Harvard University)
Neil Kovalsky (McGill University)
Richard Nagy (McGill University)
Hélène-Marie Seni
Marina Straszak (McGill University)
Susan Wisebord (McGill University)

Neuromuscular Research Group
Dr. Shashikant Champaneria (University of Newcastle-upon-Tyne)
Jeffrey Charuk (McGill University)
John D'Argenzio (McGill University)
Dr. Pierre Jacob (Laval University)
Brenda Joy (McGill University)
Dr. Marco Sosa (Catholic University of Chile)

Neuropsychology
Dr. Bessie Alivisatos (University of London)
Nicole Beaulieu (Concordia University)
Julien Doyon (Laval University)
Virginia Frisk (University of Waterloo)
Antonio Incisa della Rocchetta (University of Rome)
Dr. Gregor Jason (University of Oxford)
Gabriel Leonard (McGill University)
Laurie Miller (Westminster College)
Mary Louise Smith (McGill University)
Dr. Robert Zatorre (Brown University)

Hospital Reports

April 1, 1982 — March 31, 1983

Overleaf, a magnetic resonance image of the spinal cord. In August the MNI will install Quebec's first and Canada's most powerful magnetic resonance unit in the Brain Imaging Centre of the Webster Pavilion.

Neurology

Our patient care activities increased appreciably in the past year. The neurology offices and clinic saw 10,864 patients, and 931 patients were admitted to hospital, about 45 percent of the latter being emergencies. We estimate that 90 percent of new patients seen in consultation could be adequately investigated on an out-patient basis. We again stress the urgent need to streamline and coordinate the availability of diagnostic studies. The patient-stay period of 17 days on the combined neurology services is too long. If we exclude patients on the seizure service, who perhaps justifiably stay in hospital for longer periods, the average stay is 13 to 14 days; and with diagnostic and consultation services organized more efficiently this would be reduced to 10 days. Forty of our patients died in hospital and autopsies were obtained in 20 instances.

In addition to seeing patients here and at the Royal Victoria Hospital, members of the neurology staff provide consultation services to the Queen Elizabeth Hospital, the Montreal Chest Hospital, Ste. Anne's Veterans' Hospital, the Douglas Hospital, and the Pinel Institute. We also plan to visit the Psychiatric Hospital in Shawinigan every six weeks for a trial period during the next year, to give teaching and consultation services.

The goal of assigning the neurology services to distinct hospital areas, mentioned in last year's report, has been largely realized thanks to the efforts of James Gates, our admissions officer, and the Department of Nursing. Before the recent bed closures, at least 75 percent of neurology patients were being admitted to their appropriate service area. We believe the patients, the attending staff, and the neurology trainees all benefit from the closer cooperation between nurses and physicians that this arrangement permits.

One of the real benefits of working in this hospital is the unique relationship that clinicians have with radiologists, clinical electrophysiologists, neuropathologists, neurochemists, and neuropsychologists. The remarks I made about the difficulty in scheduling diagnostic tests in no way diminish our respect for these skilled colleagues. We hope that the next year will see the development of more sophisticated and available laboratory services for the study of cerebral spinal fluid and for the special biochemical studies vital to the diagnosis of inborn metabolic errors. These are services that are as indispensable to a world-class neurological hospital as are the newer diagnostic imaging techniques.

During this coming year we also hope to initiate a clinic for evaluation and follow-up of patients with neuromuscular disorders. This project, headed by Dr. George Karpati, will involve the cooperation of physiotherapists, orthopedists, clinical electrophysiologists, and neurochemists. A number of active clinical research projects headed by Dr. Serge Gauthier, Dr. Antoine Hakim, Dr. Allan Sherwin, Dr. George Elleker, and Dr. Karpati are also under way. As a result of these and comparable studies, thirty-six papers were published by the neurology group during the past twelve months.

Since my last report Dr. David Caplan has joined the neurology staff. Dr. Caplan's background in neurolinguistics, aphasiology, and neurology brings new and important clinical and research strength to the department. We also welcome the appointment, effective this October, of Dr. Robert Zatorre as clinical neuropsychologist. We hope that a speech pathologist will be appointed to the hospital in the near future so that maximum use can be made of the diagnostic, treatment, and research potential of this new group in behavioural neurology.

Dr. Gordon Francis, who has just completed a two-year training period in neuroimmunology, will soon rejoin our group. His arrival will bring much needed expertise in the diagnosis, management, treatment, and study of the increasing number of neurological disorders in which faulty immune mechanisms seem to play an important role.

We note with pride that Dr. Douglas Arnold, currently studying NMR research techniques at Oxford, has been awarded the Francis McNaughton Prize of the Canadian Neurological Society. It is our confident expectation that Dr. Arnold will be returning to McGill next year to strengthen further the neuromuscular group here at the MNI.

We would again express our thanks to and our admiration of the trainees in the neurology program with whom we have had the pleasure of working during the past year. Ten individuals will complete their required period of training at McGill before the next annual report. We wish them all every success in their careers and know that they will be fine representatives of McGill wherever they may work.

Finally, I would like to express the gratitude of the neurologists to our neurosurgical, nursing, and social service colleagues.

—Donald Baxter, MD
Neurologist-in-chief

Neurosurgery

On March 9, 1982 Dr. William Feindel performed the first operation (appropriately enough, for the treatment of seizures) in the recently renovated Theatre 1. Designed over fifty years ago by Dr. Penfield with an excellent and easily accessible observation gallery, this theatre had always offered unique teaching and demonstration facilities which were dear to us from a historical as well as a practical point of view. These facilities could not be duplicated in the new Penfield Pavilion theatres, where the ceilings are lower. Much as we loved it, however, old Theater 1 was too small and it badly needed modern ventilation, electrical improvements, and distribution equipment for anesthetic gases . After a great deal of work, it is now a spacious, clear, and functional room which will make it easier for our surgeons and electroencephalographers to cope with the increasing numbers of epileptic patients who are treated surgically. It will now be possible to operate on two seizure cases simultaneously without conflicting with other surgical procedures.

This year an all-time record of 90 craniotomies were performed for seizure disorders in this institution. For the first time also in the history of the institute, we operated upon more than 100 brain tumors, not counting pituitary tumors. Our operating room nursing supervisor, Norma Isaacs, reports that we did 789 theatre cases this year (9 percent more than last). Of these, 327 were major craniotomies (a 20 percent increase over 1981-1982).

The trend towards a higher proportion of major cranial surgery therefore seems to continue. These procedures require sophisticated investigation and surgical equipment, and long hours for operating room personnel and the medical staff.

Longer, more complex procedures carry a higher risk of operative infection and it is a tribute to Miss Isaacs and her staff and to Dr. Jean-Guy Villemure and his infection committee that there were only 6 instances of post-operative infection in the 789 cases.

Our residents, headed by Drs. Scott Brown, Curtis Worthington, Yonas Zegeye and David Dubuisson, certainly all deserve credit for holding the line against infection and for the smooth running of the services. More than this, they deserve our gratitude and admiration for their devotion to the welfare of their patients, for the keen interest they manifest in finding ways to understand and solve their problems, and for their willingness to help these patients even after they have left the hospital.

Their task has not been easy because the neurosurgical services are chronically understaffed, particularly at the level of the junior echelons, and we only periodically recruit rotators and junior surgical residents in other disciplines. If a solution to this problem could be found, I think the quality of our training program would be greatly improved.

Last January, Dr. Joy Arpin, who had been with us since 1975 as a resident and had joined our staff in July 1979, resigned her post to join a neurosurgical group in Dallas, Texas. A few months later, Dr. John Wells also left the institute to join forces with Dr. Robert Hansebout and Dr. Charles Hollenberg in Hamilton, Ontario, thereby strengthening the nucleus of former MNI former fellows and staff that seems to be taking over southwestern Ontario. To both Dr. Arpin and Dr. Wells we wish success in their new careers.

These departures would have been very demoralising had it not been for the arrival on our staff of Dr. Richard Leblanc. Dr. Leblanc was born in Hull, Quebec and is a graduate of the University of Ottawa. He came to Montreal for his internship, returned to Ottawa for his general surgical residency, then completed his four years of neurosurgical residency at the MNI. He has research interests that date back to the early years of his medical school in Ottawa and which have continued here in the Cone Laboratory where his work on cerebral vasospasm is supported by a fellowship for the Medical Research Council of Canada. Last year he successfully passed the specialist certification examinations in neurosurgery for the province of Quebec and those for the Fellowship of the Royal College of Surgeons of Canada. He is most welcome in our ranks as a neurosurgeon and as a scientist. We hope the demands on his expertise in microvascular surgery will leave him some time to pursue his research on what seems to be a promising avenue of treatment for cerebral vasospasm.

I should also like to take this opportunity to wish Dr. David Dubuisson, who this year was awarded the Penfield Prize for Excellence, and Dr. Rick Holmberg, whose contagious enthusiasm we somehow managed to survive, all the success and happiness they deserve in the neurosurgical careers that are about to begin.

Finally I should like to record how happy and proud Dr. Feindel's neurosurgical colleagues were as a result of the great honour he received in being made an officer of the Order of Canada. I am sure that everyone here will agree that it was fully merited.

—Gilles Bertrand, MD
Neurosurgeon-in-chief

Council of Physicians

Three new members joined the medical staff of the hospital and the Council of Physicians in the past year: Dr. David Caplan, Dr. Elizabeth Matthew, and Dr. Richard Leblanc. Two members left the hospital and council: Dr. Joy Arpin and Dr. John Wells.

A department of pharmacy was established and the two members of this department, François Schubert and My-hoa Chan, were accepted as full members of the council.

In a move that was welcomed and appreciated, the dean of the Faculty of Medicine, as chairman of the university's selection committee for a new director of the institute, met with the council for an exchange of views. The council members emphasized to the dean the mutually beneficial interdigitations of hospital and institute. As a consequence of that meeting, the dean arranged for the chairman of the council to meet with candidates who are invited to appear before the selection committee.

More mundane developments during the year included the definition of procedures for renal transplant donors, the establishment of criteria for cerebral death, the standardization of post-operative drug orders, and the development of forms to be sent to elective patients coming from out of the province, out of Canada, and out of North America. A short-term discharge form was adopted for patients transferred to the RVH for certain procedures.

On the recommendation of the council's Infection Control Committee, except in an emergency dressing rooms are no longer used for procedures on out-patients.

The Medical Evaluation Committee made recommendations to prevent complications during the investigation of certain seizure patients. An *ad hoc* committee was formed to study the feasibility of implementing these proposals. The Pharmacology Committee has been particularly busy this year, involving itself with numerous items, most notable of which was the proposal for a Department of Pharmacy.

The Admissions and Stay Committee has been concerned with the perennial problem of chronic care patients. We have already begun to see some results of that concern. Chronic care will never cease to be a problem and we encourage this committee to keep up the good work.

The need for two clinical neuropsychologists who could make psychological assessments on patients other than those requiring surgery for epilepsy was again expressed. The director-general anticipates that this gap will be filled in the near futur

Of gı year was the organization of the medical profession in the province. The McGill teaching hospitals were not confident that in the last round of negotiations with the government their best interests were being served by their representatives. In order to avoid a recurrence of this, a committee was formed that included representatives from the McGill

teaching hospitals. This committee has already been effective in putting forward proposals that were adopted at the FMSQ's recent orientation congress. The committee will continue to be active in promoting the interests of the McGill hospitals within the FMSQ. The committee is also prepared to consider the broader relationships between the McGill teaching hospitals, the English-speaking community, and the province of Quebec. The council should continue to be actively involved in the McGill committee in years ahead so that our own particular views and interests can be well represented and we can benefit from the shared experiences of other hospitals in the group.

—Denis Melanson, MD
Chairman

Nursing

Looking over last year's calendar, from April 1, 1982 to March 31, 1983, is one way to evaluate the activities and development of the nursing department. It was a revival year during which we recovered from the trauma of having to reduce our study programs and working committees for three months to allow leaves of absence for budgetary reasons. Eventually able to revive learning activities, we again carried out from September to March a full program that included orientation and on-the-job learning of new procedure reviews and nursing rounds.

We provided 1,780 hours of orientation and 645 hours of in-service programs for a total of 2,472 hours, one-sixth of them outside the hospital. This means that at any given time 1 1/3 persons were engaged in learning, compared to 1 3/4 nursing staff members learning continuously in the 1970s. We hope that the Ministry of Social Affairs will one day agree that orientation replacement and in-service learning hours are part of our budget. As professionals, keeping up-to-date is our responsibility, and we are extremely grateful for the E.C. Flanagan and McDougall funds that provide financial support for learning.

In November we implemented plans to establish an identifiable method to teach the organization of nursing so that any nurse may become the primary and continuing nurse for her group of patients. As continuity of care is a priority, we must make time for it. I credit the group of head nurses who have set high standards for reporting, communication, and assignments, and who have encouraged our nurses to try different methods and to set guidelines useful to all.

This involvement of a wide group of management and staff nurses is not easily coordinated, but standards are being set and the pre-primary nursing audits have been done. Many nurses are now giving total patient care rather than fragmented pieces. We thank all of you who are trying to implement this plan and all who are helping us to make the change.

Head nurses must also orient new staff and cope with the multiple day to day problems that must be solved to make a unit run smoothly. With further development of nurses' ability to manage their patients' care we do not expect to move head nurses out of their rightfully important place. Head nurses are the backbone of patient care in this hospital and stand together to provide quality care to neuro patients.

To this end we have spent considerable time re-evaluating our patient classification on the basis of the 1978 study and the 1983 nursing staff requirements. Quality has two requisites: staff who know how to give care, and sufficient staff to give care. Although we have not completed our review of the data comparing 1978 and 1983 results, we are finding similarities. Irene MacMillan has ably guided us in this study project, which marks a new beginning for a nursing research team. On particularly busy days more staff are needed on the float team to cover for illness, maternity leaves, and sudden departures. Keeping our float team nurses well prepared will therefore be a priority in the coming year. Weekend replacement nurses need the in-depth

four-day orientation that coordinators are implementing, as well as other in-service sessions.

The Auxiliary of the Royal Victoria Hospital provided wheelchair trays and gel cushions to mobilize our patients better. Extra equipment always lifts our spirits. However, when we become patients ourselves and have to wear a shirt with no sleeves, make do with a J-cloth to wash, and remain supine because a special chair we need is unavailable, then we sympathize with the patient and nursing viewpoint. We appreciate the help of Esther Blaustein, our Home Care Liaison nurse, who has worked with increasing numbers of patients and families to achieve home care and contributed on the multidisciplinary planning team.

At the end of July we graduated five students from our first post-basic program in the French language. Lise Desbiens, Marilyn Manchen, Geraldine Fitzgerald, and I worked for over a year to prepare for this change for which our secretaries, Lucille Maillé and Suzanne Landry, translated and typed many revisions to meet the requirements of the Ministry of Education. We particularly congratulate Lise Desbiens who documented many of the changes. Our head nurse group assisted in the students' clinical practice. Many doctors and other health care workers contributed their energy and expert knowledge to make this bilingual project a success.

Marilyn Manchen has taken up a new career in the west where I know that her organizational and nursing abilities will be valued. To take over this program, to develop it, and to bring our Nursing Library up to date is a lifetime achievement. We appreciate that Ginette Imbeault followed Miss Manchen so smoothly and ably.

For many months 95 percent of our 131 available beds were filled. The renovated Operating Room will permit surgery on two seizure patients per day rather than one. Norma Isaacs and her staff performed a monumental coordination task to enable this new addition to function smoothly.

Barbara Petrin and her Intensive Care nurses have kept their cool while trying to regulate the intake and output of Intensive Care and Recovery Room patients. Decisions do have to be made regarding the best use of this ultra-specialized facility.

Unfortunately our patient care days on Isolation increased in the past year, increasing our workload enormously. Another priority in the present year will be to reduce days in Isolation.

We have been able to cooperate in admitting patients to specific areas according to neurology services by increasing on-the-job learning and rearranging night staff assignments. This arrangement is now functioning fairly smoothly.

Our patients sustained 173 falls this year, compared to 129 last year. Incident Reports continue to show that the patient's need for privacy must be weighed against the likelihood of a fall in the bathroom; his need for mobility and

freedom must be weighed against the possibility of unsteadiness or sudden seizure activity, especially if his medications have been reduced. Nursing and medical assessment together can sometimes avoid an injury. If a person comes into a highly specialized hospital and leaves with an injury, or even has days added to his stay because of accidents we cannot say that we are giving quality care. I charge every one of us to prevent falls in this present year.

Where are we going?

As I have indicated, we are ready to give total patient care, and then to commence primary nursing care with its continuity component. We are placing a high priority on performance reviews so that staff have a chance to express their needs, their views, and their objectives and to learn of ways to improve our performance. As units are renovated in the coming year, we will also enjoy the results of our earlier planning for Phase IV. It will be a joy to nurse with new vacuum suctions and improved patient bathrooms. Ward 4-South staff and patients have already benefitted from the improvements to two of their patient rooms.

Quality assurance is our goal, and we will be looking at the requirements of the new accreditation program that makes us self-evaluate in a concrete way and document our findings. We can no longer say we give good nursing care; we must measure the quality and report it.

—Caroline E. Robertson, N, BN, MScA
Director of Nursing

Administration

Financial concerns dominate our annual reports because we are all cognizant of the need to minimize waste of any sort in the health care system. We accept our accountability to the people of Quebec for the efficient management of our budgets; but we must have sufficient funds to provide quality patient care. We shall vigourously continue to request facilities and staff needed for a high standard of care.

The achievements of the past year would not have been possible without the cooperation of a large number of dedicated staff members in every department. In the Phase IV construction, plans for a centralized kitchen were minutely studied by the Ministry of Social Affairs. The consulting firm of Jackie Bouilly & Associés, authorized to review the entire question of food services in the Neuro, recommended to the Ministry that our plans for a central kitchen be retained. Concurrently, we carried out the "CP Project" to study the feasibility of purchasing prepared meals from an outside supplier. Thanks to the generous cooperation of Canadian Pacific we supplied one nursing unit with pre-selected and prepared entrées for a period of 28 days. We monitored the quality of the food and the reaction of the patients. The choice was extensive and the patients participated enthusiastically. Quebec has accepted this recommendation and in discussion with our colleagues at the Royal Victoria Hospital we are considering ways and means of improving quality, speeding up service, and reducing the cost of nourishing meals.

Hospital administrators today are confronting the challenge of determining what constitutes a good Hospital Information System. The issues involved are complex and require a high degree of computer literacy and sophistication, in addition to traditional management skills needed to establish priorities for meeting the information needs of the hospital and for improving patient care. With this in mind, we met with Peter Witfield of Syscor, a data processing supply service, as well as with the Royal Victoria Hospital, the Montreal General Hospital, and the Montreal Children's Hospital. As a result of these meetings, a newly formed computer committee is working with John Gallop of Currie, Coopers, and Lybrand, to study our various requirements and to evaluate our already extensive computer resources.

Centralization of laundry services has now been decreed by the Ministry of Social Affairs. Regional Council will pay for an increased linen inventory. While there are many details to work out, we believe that centralization will decrease the frustration of inadequate, lost, or misplaced linen.

Again, with a view towards providing fast, efficient medical care for our employees who become ill during working hours, we are sharing the services of the Staff Health Clinic of the Royal Victoria Hospital. We are grateful to Dr. Lawrence Kramer who has spent a great deal of time with our staff health nurse, Rita Lacombe, to establish a schedule and mutually acceptable staff health policies.

Despite budgetary restraints, certain patient rooms as well as public areas have been upgraded. Windows have been replaced, and new carpeting and newly upholstered furniture placed in our library.

Members of our volunteer group, the Friends of the Neuro, in less than two years have established themselves as valued members of the Neuro family. They have helped to decorate the staff lounge on the ground floor, purchased special stretchers for use in case of fire, provided the department of anesthesia with a self-operated piece of pain-relieving equipment, and planted flowers in front of the hospital. Volunteers take a gift and magazine cart around the hospital twice each week while others sell Neuro T-shirts and tote-bags etc. I extend to them all our warmest thanks.

Next year will be the fiftieth anniversary of the founding of our beloved Neuro, and many projects are under way.

At fifty years of age we stand at the crossroads; change is inevitable, but the responsibility for change lies with each of us, and we must begin by teaching ourselves not to close our minds prematurely to the novel, the surprising, or the seemingly radical.

—Joy Shannon, BA
Associate Director General

Finance

The operating statement of the Montreal Neurological Hospital for the year ending March 31, 1983 follows.

	Amount ($)	%
Expenditure		
Salaries	10,614,266	66.59%
Fringe benefits	889,522	5.58
Medical and surgical supplies	477,874	3.00
Drugs	397,141	2.49
Purchased services	1,039,735	6.52
Repairs	351,184	2.20
Others	2,170,748	13.62
Total expenditure	15,940,470	100.00
Revenues		
Ministry of Social Affairs	11,159,540	67.76%
In-patient	4,004,495	24.31
Out-patient	87,349	0.53
Recoveries	112,052	0.68
Régie Assurance-maladie — Residents' salaries	730,866	4.44
McGill — Teaching support	178,253	1.08
College Ahuntsic — Post-Basic Nursing Program	197,549	1.20
Total	16,470,104	100.00

The statistical patient information is as follows:

Number of admissions	1,758
Patient days	42,660
Number of patients discharged	1,751
Total days stay	42,721
Average days stay	24.40
Occupancy rate	86.58

2,460 purchase orders were placed and 8,700 deliveries made by stores. We participated more in the group purchasing program set up by the CRSSSMM.

A computerized inventory system was established. Credit must be given to Ida Orenbach, who took on extra work to have the system run on time with minimal errors.

We have been slow in collecting hospitalization fees from patients outside Quebec, averaging around three to six months in clearing these accounts. The audit committee approved the hiring of Yvan Matte who joined the hospital on April 26, 1982. Mr. Matte re-organized the accounts receivable area and, within one year, reduced the average collection period to two to three months. Laughlin

Taylor co-ordinated a study into the processing of a patient, concentrating on the flow of documents from the time of admission, through discharge, until the completion of the billing procedure.

The admissions officer, James Gates, provided important support in obtaining from patients before admission information which helped accounts receivable minimize delays in collection.

1982-83 was our second full year in association with the IST-SMA Computer Service Bureau. The staff in the finance department became more adept and comfortable at working with this system in the areas of accounts payable, payroll, and general accounting, which all ran smoothly this year. The government directives on salary adjustments were not made clear until the end of March 1983, adding a factor of uncertainty to the hospital budget program.

—Gean-yuan Pwu, BCom
Director of Finance

Social Work

In adapting to last year's social work staff reductions, we introduced a high risk screening instrument as our primary method of case finding. Although this major change does not exclude referrals, it allows the social worker to be aware of problem situations upon admission rather than at the point of discharge. This early intervention also reduces stress to the patient and family and assists them in getting the most from the medical treatment.

We are quite aware, however, of the gaps in service. The lack of psychosocial counselling to our out-patient population is particularly distressing. We hope that with the development of local community service centres our patients will begin to receive some of the follow-up help they need from the community. We are prepared to increase our consultation role, both to the community agencies who do not have knowledge and expertise in helping the neurologically handicapped patient and to physicians who are uncertain where to refer. We will continue to document material and advocate for services to meet the special needs of our patient population.

Finding alternative resources for our patients who require long-term care remains a priority. This problem is complicated by the fact that many of our patients are young, and many resources are available only for the elderly. Twelve patients were transferred to chronic care hospitals last year. The rate of transfer is slow, often taking two to three years.

Everyone would agree that all patients admitted at the Neuro are at high risk for psychosocial dysfunction. A study we conducted showed that 46 percent of all patients admitted had problems requiring intervention, and we were able to serve only 28 percent. This represented 484 new patients.

Besides direct patient care, we have considerable responsibility for accountability, provision of information, and committee work through the social service network. The reorganization of health and social service resources in Montreal requires discussion, meetings, and completion of reports with little time for preparation. We maintain our McGill teaching function by supervising a social work intern, consulting with management faculty students, and by lecturing at the School of Social Work, the School of Physical Medicine, and the Post-Basic Nursing Program. I am also chairing a committee with the Department of National Health and Welfare in Ottawa to develop national workload measurements for social work in hospitals. A recommendatory committee to the Provincial/Federal Advisory Committee, we are attempting to establish standards for the collection of data across Canada. For the first time social workers will have to agree on the definition of terms and functions.

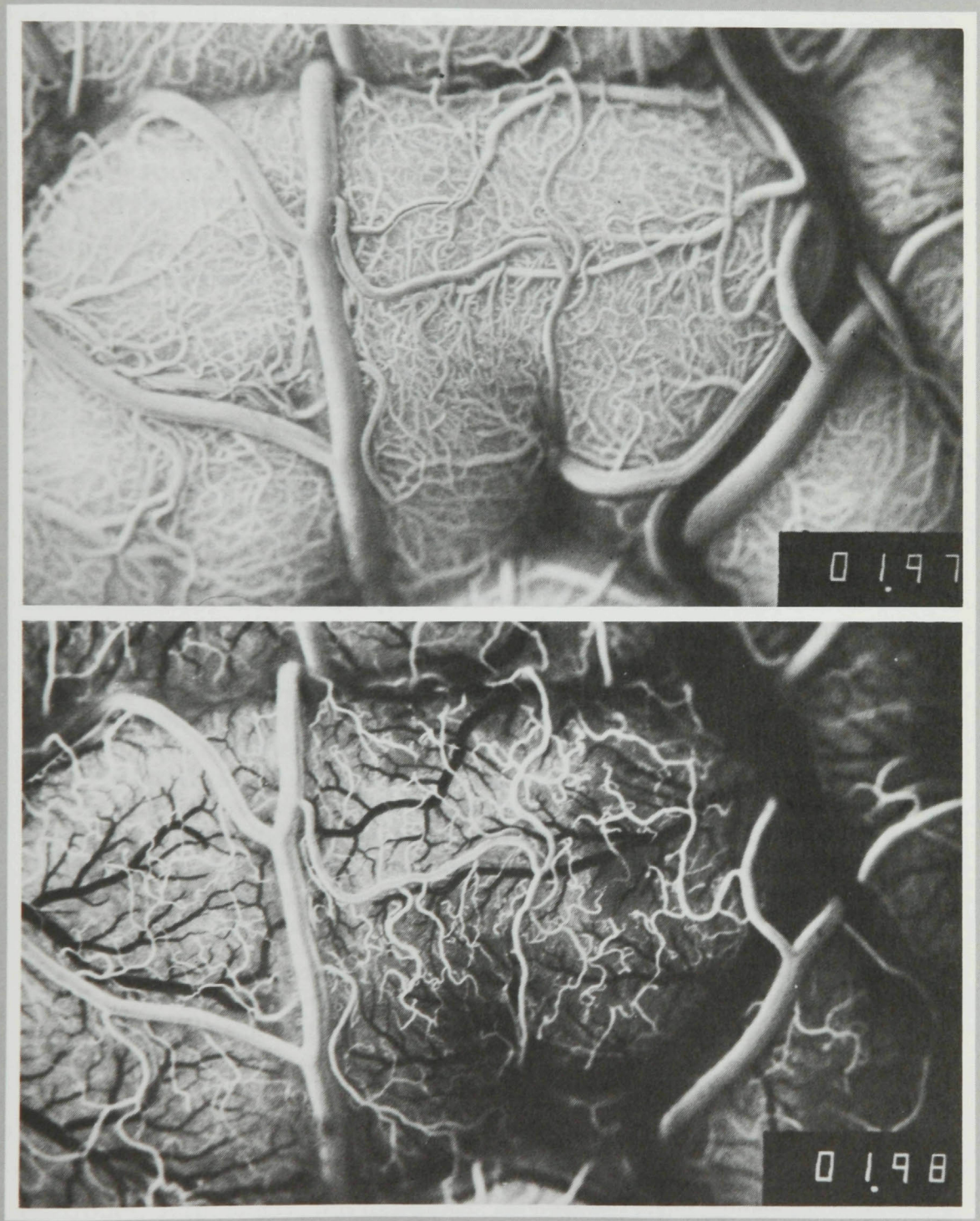
Another first was our participation at the Montreal Neurological Institute's research workshop at Montebello. We were proud to be able to present the interim findings of our four-year study on psychosocial aspects of seizure surgery. Thanks to Judith Ripley, at least three articles are ready for publication and one study is being prepared for presentation at the Social Work Directors' National Conference in Winnipeg this fall.

The McGill Student Volunteer Program, supervised by our department, grew to an extremely active group of 120 students led by 2 co-ordinators and 12 group leaders. They planned imaginative activities for the patients such as a music festival, casino night, dancercise, as well as the old favourite Bingo, and continued their patient visits.

In spite of pressures to accomplish all tasks at the same time, the social work department continues to be dedicated to quality patient care. I would like to thank my co-workers for their openness to change and their continuing support.

—Verna Bound, PSW
Director of Social Work

Research Report



Overleaf, fluorescein angiography photos of Dr. Richard Leblanc's research on cerebral circulation. The top photograph of a dog brain, taken 1.98 seconds after fluorescein injection and 10 minutes after subarachnoid injection of platelet-rich preparation, shows vasospasm of the epicerebral arteries. The bottom picture, taken 1.97 seconds after fluorescein injection and 10 minutes after cortical application of the calcium antagonist, verapamil, shows increased filling of all epicerebral vessels.

Summary of Research and Post-graduate Teaching

Closely related to the clinical treatment and teaching activities within the Montreal Neurological Institute is the work carried out in more than twenty-five individual research units. These range from major research departments—neuropathology, neuropsychology, neurophysiology, neuroanatomy, the Donner Laboratory of Experimental Neurochemistry, and the Cone Laboratory for Neurosurgical Research—to medium-sized units, some of which are crammed into a few rooms crowded with equipment, papers, books, and a bit of bench space for the investigators.

At a three-day research atelier held at Le Château Montebello in November 1982, researchers reviewed the accomplishments of their laboratory units over the past decade. These detailed reports will be published as a separate volume for our 50th Anniversary. The main points of the reports that have been submitted are here extracted to profile the range and variety of scientific activity at the institute and hospital. The list of publications at the end of this report is another reflection of our research activity.

Experimental Neurophysiology
Dr. Pierre Gloor notes that his research team's efforts have been directed towards a better understanding of the neurophysiological mechanisms underlying generalized spike-and-wave discharge, which is the EEG hallmark of cortical reticular epilepsy in man. Using penicillin-induced seizures in cats as a model, the neurophysiology group showed that the midbrain reticular formation is a potent modulator of cortical spike-and-wave discharge but not a generator of this abnormality. The role of the thalamo-cortical relationship and of changes in excitability of cortical neurons in this penicillin model were studied in great detail by successive investigators who demonstrated a closely interlocked, closed-loop neuronal network. An important chemical change in the seizure process is that leakage of glutamate, decrease of glutamic acid of the cortex, and loss of taurine produce a hyperexcitable state in cortical neurons. Behavioural changes in cats showing spike-and-wave discharge mimic faithfully certain features characterized by human generalized seizures. The animal seizures responded to the expected type of anticonvulsant drugs.

Another study on the genesis of slow waves highlighted the importance of white matter involvement and deafferentation of the cortical neurons. A series of studies on the amygdala elucidated the role of this important nucleus in relation to its cortical connections.

Electroencephalography and Clinical Neurophysiology
The team of Olivier, Quesney, Andermann, Gotman, Ives and Gloor studied patients with temporal lobe epilepsy undergoing investigation by depth electrodes. Surprisingly, this more exact method of recording revealed that patients who appear to have bilateral independent temporal lobe epileptic discharge have a dominant location of the seizures on one side. Early results of surgical therapy of these patients have proved quite satisfactory. Stimulation in

the amygdala often produced complex auditory and visual hallucinations as well as memory flashbacks, which earlier had been assigned somewhat exclusively to the temporal neocortex. These findings have important implications in our understanding of the role of the limbic structure in relation to temporal cortex.

Donner Laboratory of Experimental Neurochemistry
This laboratory, recently extensively renovated, has been the site of an impressive range of research studies during the past ten years.

Dr. Hanna Pappius and her associates in the George Goad Laboratory have continued their detailed examination of the causes and possible means of prevention of cerebral edema. A recent application of the deoxyglucose technique to brain metabolism showed that depression of glucose utilization is reversed by anti-inflammatory drugs and by steroids. Dr. Leonhard Wolfe has continued his extensive study of prostaglandins in brain and cerebrospinal fluid, and has shown that thromboxanes are also formed in the brain.

Studies on oligosaccharides and glycoproteins by Dr. François Ng Ying Kin and Dr. Wolfe clarified a number of unusual disorders by characterizing their role in cerebral chemical deficiencies. The identification of dolichols and retinoids as characteristic components in Batten disease was an important finding among a number of studies on the neurochemical aspects of inherited neurological storage diseases. Dr. Wolfe and his team will pursue further studies on these important brain chemicals.

These same researchers have also discovered an accumulation of polyisoprenols in the brain and excessive excretion in urine of patients with lipofuscinoses, findings that have opened up new diagnostic screening techniques. Detailed biochemical studies have been pursued to identify the changes in lysosomal membranes and associated enzymes. Some of these chemical constituents are known to be abnormal in grand mal epilepsy and offer a considerable challenge for investigators.

The neurochemistry group diagnosed a number of families with late onset of G_{M2}59-ganglioside-hexosaminidase-A deficiencies. They plan to investigate these disorders further.

Dr. Antoine Hakim, working with the neurochemistry group, has studied metabolic encephalopathies. He has shown in particular the presence of focal acidosis in thiamine deficiency. He has also initiated a clinical study on the effect of prostacyclin and calcium channel blockers on patients with cerebrovascular problems.

Neuropathology
In neuropathology Dr. Stirling Carpenter and his large team of colleagues have studied various aspects of storage diseases, one contribution being to establish the value of skin biopsy in the diagnosis of neuronal storage disease. One of the first demonstrations of the demyelinative nature of the Guillain-Barré syndrome was

published from this laboratory. A new disorder, adult polyglucosan body disease, was also characterized. Dr. George Karpati and his neuromuscular team worked on various aspects of muscle disorders.

Dr. Yvon Robitaille focussed on the changes in the motor cortex of rat brain in the presence of induced epileptogenic scars. He also studied, with Dr. Allan Sherwin, glutamine synthetase activity in human epileptogenic tissue.

Neuroanatomy

Dr. Barbara Jones has made important findings in the mechanisms of the sleep-waking cycle through a combined approach using anatomical localization of the neuronal systems in the brainstem that are integral to the sleep cycle, neuroanatomic demonstration of the projections from the brainstem, and neurochemical identification of the neurotransmitters involved. Selective transections of the descending pathways from the pontine neuroadrenaline locus coeruleus neurons did not affect paradoxical sleep, while interruption of reticular connections and projections between the medulla and pons completely eliminated it. These studies are expected to improve our understanding of the pathological disturbances of the sleep cycle. Further studies showed the association of catecholamine neurons with blood vessels in the rat brainstem.

Dr. Donald Lawrence, during a year's sabbatical leave in Australia, has studied spinal motor mechanisms, using horseradish peroxidase techniques to identify the cellular components.

Also in neuroanatomy, Dr. Alain Beaudet and his associates have studied opioid receptor sites in the rat brain as well as interactions between monoaminergic and peptidergic neurons in the brainstem. Studies were also initiated into cholinergic afferents to the rat spinal cord. An important three-dimensional study of Nissl bodies in the primary sensory and lower motor neurons was carried out with Dr. Alain Rambourg of France and Dr. Yves Clermont of McGill's anatomy department.

Dr. Serge Gauthier studied the sympathoadrenal system with the objective of determining the functional anatomy of descending supraspinal pathways that control the sympathetic outflow of the adrenal chromaffin cells. He revealed an interplay between descending and segmental fibres and neurons in adrenal medullary regulation. Collaborating with the Douglas Research Centre he initiated a study in Alzheimer and Parkinson diseases. He hopes to determine the extent and nature of chemical changes in the nucleus basalis of Meynert.

Research on Epilepsy

Because of the longstanding interest of the hospital and institute staff in treating focal epilepsy, a wide range of research projects has been undertaken in this area. Dr. Jean Gotman, John Ives, and their associates have developed automatic and quantified analysis of the electroencephalogram by computer. Important practical results of these studies include the development of a patient monitoring system. A

television camera records the patient's seizure pattern while the computer records the relevant abnormality in the brain's electrical discharge. This has helped us identify whether epileptic abnormality is generalized or local and has been immensely useful when we select patients for surgical treatment.

Another study involving computers has identified the side of origin from which the brain might have initiated spike-and-wave activity. This also has proved useful when surgeons are considering section of the corpus callosum in this unusual group of patients. Dr. Gotman and his team have also refined automatic spike recognition and produced a summary print-out. This in turn allows quantitative studies of the frequency and distribution of spike activity in seizure patients. The computer analysis of EEGs has been invaluable in patients undergoing PET studies to demonstrate metabolic changes between seizures, and, in some unusual examples, during or immediately after seizures.

Dr. Allan Sherwin has studied patients with focal epilepsy from a chemical point of view. His earlier studies examined the value of different types of anticonvulsant medication and correlated the clinical course with the plasma levels of the drugs. In another substantial study, Dr. Sherwin and his research team measured glutamine synthetase, an enzyme largely contained in glial cells, and correlated this with the spiking and nonspiking regions of human epileptic cortex identified during surgical treatment.

Dr. Luis Felipé Quesney studied the problem of motor sensitivity in epileptic patients. He demonstrated that apomorphine, a dopamine receptor agonist, abolishes both the electrographic and clinical features of epileptic photosensitivity in patients. This led him to postulate a common dopaminergic mechanism in the genesis of this type of photosensitivity. His findings supported the hypothesis that epileptic photosensitivity is related to a deficit in cortical dopaminergic neurotransmission.

Dr. Massimo Avoli, also a member of the neurophysiological unit, has elucidated the roles of thalamus and cortex in the mechanism of generalized spike-and-wave discharges in experimental penicillin epilepsy. He demonstrated that neurons at both levels undergo rhythmic oscillations during this type of discharge. Three populations of neurons within the thalamus were identified in relation to the frequency of their discharges. A study of excitation-inhibition in these neuronal systems was also carried out. Further studies on *in vitro* brain slices are planned to clarify the cellular mechanism of epileptic discharge and the differences between neurons in epileptic and non-epileptic human cortex.

In an extensive study of the somatosensory system of the peripheral as well as the central nervous system, Dr. Robert Dykes and Dr. Pierre Landry mapped this cortical region in a monkey and found that the homunculus was more complex than originally described. Extensive study detailed the differences between the deep proprioceptive sensory input and that of the cutaneous mechanoreceptors. Multiple maps were confirmed for the cortex, the dorsal column nuclei, and the thalamus. Studies of the peripheral nervous system provided important

information on the mechanism of regrowth of damaged axons and the explanation of parasthesiae following nerve injury. Evidence from these studies supports the hypothesis of parallel processing of different modalities of somatosensory information.

Social Work
Judith Ripley, a researcher attached to the Social Work department, has begun to evaluate the effectiveness of elective surgery for seizures. Her study analyses a group of seizure patients to assess the impact of surgery on the individual's psychosocial functioning over a period of time. As far as possible the elements involved in the evaluation are quantitated within a well developed framework. The follow-up study on these patients will be most informative in an area where so far we have quite inadequate information about the long-term rehabilitation of post-operative patients.

Neurogenetics
Under the direction of Dr. Eva Andermann, studies in neurogenetics have expanded steadily to provide important information on genetic components of neurological disorders. Because of Quebec's unusual pattern of settlement and its relatively immobile population, the neurogenetics group has been able to make significant discoveries regarding genetic disorders in Quebec. The genetics of epilepsy will continue to be examined for the possible effects of anticonvulsant drugs during pregnancy and a number of genetically important neurological diseases will continue to be categorized.

Neuropsychology
Dr. Brenda Milner's leadership of this group is assured for at least another three years as a result of continued MRC support and deferred retirement from her university appointment. In the past five years important additions have been made to this team for the study of cortical localization, particularly of the human brain. These include Dr. Michael Petrides, and a host of graduate and post-doctoral associates. This group is unique in that it has access to surgical patients who have had precisely defined surgical ablation for the treatment of epilepsy. Documentation of this clinical material has expanded our understanding of the functional aspects of various human cortical areas, especially those relating to speech and memory.

In neuropsychological studies on patients with temporal lobe lesions Dr. Marilyn Jones-Gotman reviewed 100 patients with unilateral cortical excisions as compared to 34 normal control subjects. Patients with right frontal central lesions were the most impaired both by being perseverative in their output and in producing a low number of novel designs. Encroachment on hippocampal structures beyond 1.5 cm produced a significantly poorer recall than did smaller hippocampal excisions. The evidence suggests that the hippocampus must function to organize, or put into context, or otherwise manipulate material in a way that helps in its later recall.

Brain Imaging
Computed tomography has revolutionized the approach to early and precise localization of brain and spinal disorders. Dr. Terence Peters has made a number of improvements in CT imaging, including a multi-planar imaging system that has been adapted by the manufacturers of the scanner. Much of the mathematical and computational manipulation for CT can be adapted to positron emission tomography and eventually to nuclear magnetic resonance scanning. Powerful computer systems in several of our laboratories, coordinated by our computer engineering staff, have provided the institute and hospital with great strength in this diagnostic and research area. Dr. Peters and Dr. André Olivier have studied the application of CT and stereotaxic surgery and their findings will be directly transferable to the three-dimensional NMR images.

Future directions in brain scanning will involve coordination and correlation of the results from these various complementary techniques.

PET imaging, which provides such remarkable information on the chemical activity and blood flow in the brain, depends upon a core of radiochemists under the leadership of Dr. Mirko Diksic. He and his team have been extremely active in producing medical tracers for measuring cerebral blood flow, oxygen utilization, and glucose utilization in the brain. In addition, a number of antitumor drugs including BCNU have been synthesized and labelled with positron-emitting elements. The radiochemical unit has produced a good myelin tracer and improved positron-labelled tracers for measuring cerebral blood flow. A wide range of the substances this unit has developed are being applied in the clinical projects of the PET research program.

Neurosurgery
The institute and hospital continue to be the most active world centre for the surgical treatment of epilepsy. Activity in this area has continued to expand with 90 surgical cases reported for 1982, the largest number in any one year in the long history of this work which began with Dr. Penfield. This surgical case load relies on extensive neurodiagnostic support from EEG and imaging techniques and provides clinical study cases for Dr. Brenda Milner's psychological team. A major PET program supplements the vigorous experimental approaches to epilepsy carried out in the laboratories. Dr. André Olivier has concentrated on special techniques of electrode implantation in the brain. This program will continue to expand because of the increasing demand for this valuable method. Dr. Theodore Rasmussen has maintained his long-term follow-up of the institute's seizure surgery. His reports provide the most substantial data available anywhere in this field. In the next five years we propose to computerize this follow-up so that the series of some 2,300 cases can be documented and classified.

Under the leadership of Drs. Gilles Bertrand with his associates, Drs. André Olivier and Jean-Guy Villemure, stereotaxic neurosurgery (placement of surgical probes for deep biopsy or stimulation and interruption of deep brain pathways) has been highly developed at the institute using modern computer-controlled

techniques. Patients undergo these procedures for involuntary movements, Parkinsonism, epilepsy, and safe biopsy of deep brain tumors. This program is now being expanded for the treatment of pain by brain stimulation. Another potential application of the method is insertion of tissue implants in certain parts of the brain to replace depleted local neurotransmitter chemicals.

Dr. Jean-Guy Villemure has conducted studies of cerebrospinal fluid dynamics in normal pressure hydrocephalus. With the PET team he has examined the influence of intravenous mannitol on the permeability of the blood tumor barrier. In patients with high grade gliomas, concentration of positron-emitting tracers was enhanced in the tumor site after infusion of mannitol. The technique would obviously be applicable to a method for increasing an antitumor agent within the brain tumor without necessarily increasing the systemic dose of these moderately toxic drugs.

Dr. Richard Leblanc studied experimental vasospasm using visualization of the vessel calibre, fluorescein angiography to measure circulation times, and radioisotopic blood flow procedures. He concluded that the platelet fraction of whole blood contains highly spasmogenic factors affecting not only the larger vessels at the base of the brain but also the smaller epicerebral vessels. These detrimental effects are promptly reversed by the topical application of a calcium channel blocker, Verapamil. His work suggests that calcium antagonists may find a prominent place in the treatment of the delayed ischemic deficit that follows vasospasm in patients with subarachnoid hemorrhage.

Chemical Research

Dr. Heather Durham studied neurotoxic chemicals in the process of aggregating the intermediate-sized filaments of the neuronal cytoskeleton. These studies were extended to observe changes in human skin fibroblasts from tissue culture. Her findings indicate that changes represent a general feature of the cytoskeleton not restricted to neuronal cells. It seems possible that neurotoxic chemicals may be breaking the connections between the cytoskeletal components. This work will answer some of the questions about neurofilament accumulations seen in many neuropathies and in certain degenerative brain diseases.

Dr. Elizabeth Matthew opened a new laboratory for the study of peptides in neuronal cellular function. Simple amino acid compounds are now known to play an important role in the mediation of signals from the brain to cells both within and outside the nervous system. They can produce a wide variety of autonomic, sensory motor, behavioural, and endocrine effects. Dr. Matthew has studied thin slices of intact nervous tissue as well as small pieces of brain tissue grown *in vitro* as ex-plant cultures. Peptidergic systems will be identified in these preparations by means of immunohistochemical techniques. Peptide receptors can be characterized by means of binding assays and receptor radioautography. The goal of these studies is to define the effect of peptides, both short-term and long-term, on neuronal function and eventually to examine several neurological diseases and

psychiatric disorders that have been loosely linked to abnormalities in peptide content.

Neurolinguistics
In a different area of study, Dr. David Caplan has carried out research on the structure and processing of language after brain injury, focussing particularly on the comprehension of syntactic structure. He has isolated basic "devices" in syntax, five of which he has defined in English. He then evaluates use of these devices in patients with various degrees and types of speech impairment. The types and sites of lesions will be correlated with particular patterns of language performance.

Experimental Ophthalmology Laboratory
In this laboratory Dr. Daniel Guitton has used an ingenious magnetic field apparatus for the quantitative tracking of eye movements. General study has focussed on how coordinated eye and head movements are elaborated by the nervous system. In the neurophysiological laboratory the characteristics of eye and head movements in cats have been examined in great detail. Dr. Guitton has shown, for example, that cats can use two rapid eye movement mechanisms when orienting, one being the (phylogenetically older) vestibular quick phase and the other the visually triggered saccade. To complement these studies, Dr. Guitton has also examined the discharge patterns from identified single neurons in vestibular nuclei and superior colliculus.

Dr. Guitton and his associates also attempted to determine how humans orient, using eyes and head, to targets at eccentricities so large that they are beyond the oculomotor range. The most intriguing result has been the emergence of complex "cortical" motor programs to permit visual following. Further study of the contribution of the neck muscles coupled with the vestibular system has produced data analysed by the large computer in the biomedical engineering laboratory. These complex interactions between somatic muscles, ocular muscles, and the brain stem nuclei continue to reveal important control mechanisms governing eye and head movement.

Related studies reported by Dr. Athanasios Katsarkas and his associates concern vestibular oculomotor disturbances in cerebellar dysfunction, inner ear disturbances caused by environmental pressure changes, paroxysmal positional vertigo, and disturbances of the vestibulo-oculomotor system in lesions around the fourth ventricle or in the brainstem. New methods of studying patients with oculomotor vestibular dysfunction have led to interesting findings related to clinical disorders of these systems.

Post-graduate Teaching
In addition to some fifty clinical residents in neurology, neurosurgery, neuroradiology, electroencephalography, neuroophthalmology, and neuroanesthesia, there are about fifty research fellows at the Montreal Neurological Institute attached to the various basic and clinical science research

units. For the clinical fellows much of the teaching takes place on the hospital wards and a rich variety of conferences, seminars, invited lectureships, and workshops continually bring to the forefront for our staff and students the newest findings relating to disorders of the nervous system. Funding for the clinical graduates derives from the Ministry of Social Affairs, with occasional fellowship support from institute funds. During this past year a Penfield Epilepsy Fellowship was established at the institute to support young physicians who wish to extend their knowledge in the clinical or scientific aspects of epilepsy. Fellowships were also started with support from the Clive Baxter Fund and the Arthur Elvidge Fund. Fifteen members of the senior and junior scientific staff are supported from the institute's Killam Scholarship Fund. It is gratifying to note that during the past few years ten Killam scholars were successful in gaining extramural competitive research awards, thus freeing the Killam funds to help other able candidates to establish research projects.

While many of our graduate students are registered in the Faculty of Medicine, others have basic science connections in university departments including psychology, engineering, chemistry, biology, and computer science. These multidisciplinary relations contribute to the rich fabric of the teaching and research programs at the institute.

Summary

It is evident that the wide spectrum of research under way at the institute promises continuing vigorous production for future years. Programs that have existed for a number of years have been strengthened by the addition of young staff members with new techniques, by the improvement of laboratory resources, and by the implementation of new methods for the clinical and experimental examination of the nervous system. Since we now have funds to complete extensive renovation of the research, teaching, and clinical areas of the two older parts of the institute and hospital, we will soon have more effective facilities for our clinical and research teams.

It is hardly necessary to emphasize that this vigorous research activity is an essential basis for training graduate students and for providing a young, vigorous community of scholars who will have an important impact on the teaching of undergraduate students in many university faculties.

Although many physical aspects of the Neuro have had to be altered to adapt to new developments and new techniques, we remain grateful for Dr. Penfield's philosophical concept on which the combined hospital and institute is based. The collaborative teams of scientists and clinicians working together in neuromuscular research, in positron emission tomography, and soon in nuclear magnetic resonance, are examples of the work for which the institute is ideally suited. Indeed, many of our complex programs could not be initiated without the unique interplay provided by a brain research institute within a highly specialized hospital for treatment of brain disorders.

—William Feindel, MD

Education

On November 21, 1983 the Governor-General, His Excellency Edward Schreyer, visited the Montreal Neurological Institute to unveil the cornerstone of the Webster Pavilion and to present Howard Webster, long-time friend and supporter of the Neuro, with the Order of Canada.

Clinical Training Opportunities

Neurology

The Montreal Neurological Hospital, with 135 in-patient beds, and the Montreal Neurological Institute, with over 25 active research laboratories, provide a concentrated training centre for neurology and neurosurgery. A three-year residency training program at McGill in adult and pediatric neurology is designed to meet the requirements of the Professional Corporation of Physicians of Quebec, the Royal College of Physicians and Surgeons of Canada, and the American Board of Psychiatry and Neurology.

The program has two major goals. The first is to develop highly skilled clinicians who have had an above-average exposure to the neurosciences. To this end the program provides a wide variety of clinical and laboratory experiences. The program is also designed to train academic physician-investigators and teachers, and with this goal in mind graduating residents are encouraged to seek further training in one of the neuroscientific disciplines.

The McGill neurology residency program is available to medical graduates who have completed an approved internship and one year of training in internal medicine, or, alternatively, an approved clinical clerkship during the final undergraduate year and one year of straight medical or pediatric internship.

The program provides two years of clinical training and one year of laboratory training. Residents are assigned to different clinical or laboratory services every three to six months. While on clinical services, the residents assume graded responsibility for patient investigation and care under the supervision of the attending staff. Weekly clinical and neuroscientific conferences in each of the McGill teaching hospitals serve as a stimulus for further study. During the training program, residents may also take part in clinical research projects supervised by members of the staff. Every resident is expected to participate in the teaching of medical students and nurses.

It is usual for each resident to rotate through three hospitals in the course of his training. In one of these institutions he will spend a full year. Those in pediatric neurology will spend at least one year in the Montreal Children's Hospital.

The McGill neurology program is university-based, and includes the neurological services of four McGill teaching hospitals:

The Montreal Neurological Hospital, housed in the same building as the Montreal Neurological Institute, has 135 beds for neurology and neurosurgery. It has excellent support facilities in neuroradiology and clinical electrophysiology. There are extensive facilities for research in all the major branches of the neurosciences available within the institute. The MNH also provides neurological and neurosurgical services for the Royal Victoria Hospital.

The Montreal General Hospital has a neurology teaching unit of fifteen beds in a 30-bed neurology and neurosurgery ward. A large consultation service provides the residents with experience in diagnosing and managing the neurological

problems which develop on general and specialty medical and surgical services. An active neuroscience unit is located in the MGH Research Institute.

The Montreal Children's Hospital, a 300-bed institution, houses a 15-bed neurology unit with specially trained nurses and support staff. In addition, there is an active consultation service, and general neurology and specialty clinics are held weekly.

The Jewish General Hospital, a large general hospital with 650 beds, has a 23-bed neurology unit, a large consultation service, and neurology clinics.

In the laboratory year, residents are assigned to one or more of the many diagnostic or research laboratories of the teaching hospitals or research institutes. The laboratory options include, among others, electroencephalography, electromyography, neuropathology, neuroradiology, neuro-ophthalmology and neuro-otology.

Fellowships in the basic sciences and clinical laboratories offer opportunities for training and research lasting one year or more. Such research, additional to the clinical residency training program, may lead to an MSc or PhD degree awarded by the Faculty of Graduate Studies and Research of McGill University.

All inquiries should be addressed to:
Director
Neurology Training Program
Chairman's Office
Department of Neurology and Neurosurgery
McGill University
Montreal Neurological Institute
3801 University Street
Montreal, Quebec H3A 2B4

Neurosurgery

The residency training program in neurosurgery is directed by the staff of the department of neurology and neurosurgery of McGill University. While residents spend most of their time at the Montreal Neurological Hospital and the Montreal Neurological Institute, for six months to one year of their training they also rotate through the neurosurgical services at the Montreal General and the Montreal Children's hospitals, each with over twenty active beds and out-patient services. The length of the program varies depending on the resident's career goals and the qualifying specialty experience in medical and surgical disciplines. Residents with one year of internship and one year of general surgery should plan a minimum of four years of neurosurgical training. Additional time is usually needed for the resident to develop competence in a basic or clinical subject in preparation for an academic career in neurosurgery. Most trainees will spend twelve to eighteen months in one of the laboratory units of the institute working on basic studies. They will also spend thirty months rotating through the various neurosurgical services. Neuropathology, neuroradiology, and electroencephalography are

considered important parts of the resident's training program, but not every resident will be able to include all three in his training period. All residents are expected to share in the teaching of medical students, nurses, and technicians.

Three residents are accepted each year.

Board Examination Requirements
The resident is expected to take the written examination of the American Board of Neurological Surgery--for self-assessment, at any time during his training program, and for credit, as soon as he becomes eligible.

Research
Twenty-five research laboratories at the Montreal Neurological Institute and several at the Montreal General Hospital Research Institute provide ample opportunity for residents to participate in research projects under the supervision of the neurosurgical and neuroscientific staff. Research can lead to an MSc or PhD degree in the Faculty of Graduate Studies and Research at McGill University.

Special Features
Wilder Penfield and William Cone started the neurosurgical training program at McGill University in 1928. Six years later the Montreal Neurological Institute, a combined hospital and research centre, was opened with 50 beds. In 1954 the hospital expanded to 135 beds for neurology and neurosurgery, and in 1978 a major addition to the institute and hospital, the Penfield Pavilion, was opened with enlarged research, teaching, and clinical areas. From the beginning the neurosurgical program had an international flavour, with MNI trainees coming from, and returning to, many countries. The first modern neurosurgical units in Norway, India, and China, to name only a few, were initiated by former residents of the Montreal Neurological Institute.

A vigorous neurosciences research community at the Montreal Neurological Institute reinforces the academic excellence of the residency program. The surgical treatment of epilepsy is an area of particular interest and expertise; a follow-up series of more than 2,000 surgical cases represents the largest group study of its kind. Computerized stereotactic surgery, advanced vascular surgery, and procedures using microneurosurgical methods are well developed.

The Montreal Neurological Institute has a reputation for innovation — it was the first neurological centre in Canada and one of the first three in North America to acquire the EMI head scanner. It was one of the first to acquire a body scanner, with which a high resolution spinal scanning program has recently been developed. It was the first medical centre in Canada, and one of a half-dozen in the world, to exploit positron emission tomography. The first bismuth germanate positron camera available for clinical research, developed by the MNI's research team, has been in use since 1978. A mini-cyclotron, the first medical cyclotron in Canada, was installed in 1981 to provide tracers for a wide range of metabolic studies on brain and muscle.

A knowledge of French is important for the resident, and many opportunities are provided to learn the language. French-speaking patients and staff members mix daily with the English-speaking staff. McGill's Faculty of Medicine, under whose auspices the residency program is run, is the oldest, the most widely recognized, and the most international of all Canadian medical schools. Montreal, a cosmopolitan city of two million people, offers a wide variety of cultural activities.

All inquiries should be addressed to:
The Director
Montreal Neurological Institute
McGill University
3801 University Street
Montreal, Quebec
H3A 2B4

Courses of Instruction in the Faculty of Graduate Studies and Research

In the Faculty of Graduate Studies and Research, courses are offered leading to the Master of Science and Doctor of Philosophy degrees. (See McGill booklet, "Faculty of Graduate Studies and Research.") Through the year the following elective courses are given for graduate students, fellows, and residents. They are open to undergraduates by arrangement.

Neurosciences Seminar
531-602D This is a course of weekly seminars given during the academic year and designed to present over a two-year period a concise, up-to-date review of the basic neurological disciplines. Members of the Montreal Neurological Institute, related McGill departments, and visiting neuroscientists.

Neurophysiology
531-611A Seminars and group discussion in neurophysiology. Professor Gloor and staff.

Neuroanatomy
531-610A Lectures together with medical undergraduates in Course *524-121B*, "Interdisciplinary Course in the Central Nervous System."
531-621A Seminars and group discussions in neuroanatomy. By special arrangement. Professor Lawrence and staff.

Clinical Conferences
531-630H Colloquium in clinical and basic aspects of the nervous system. Professor Feindel and staff.
531-631H Seizure and EEG conference. Professors Andermann, Gloor, Olivier, Taylor, and Rasmussen.
531-632H Clinical neurology conference.

Neurochemistry
531-640H Seminars in neurochemistry additional to those provided in Course *531-602H*. By special arrangement. Professors Wolfe and Pappius.

Neuropathology
531-650H Six or twelve months laboratory work in neuropathology.
531-651H Conference in neuropathology. Professor Carpenter and staff.
531-652H Slide session in neuropathology.

Neuroradiology
531-660H Practical instruction in techniques and interpretation.
531-661A Lecture demonstrations. Professor Éthier and staff.

Electroencephalography and Clinical Neurophysiology
531-670H Laboratory work in electroencephalography, minimum six months with active participation, seminars, and clinical conferences. Professor Gloor and staff.

Neuropsychology
531-680H Training in research methods for selected graduate students. Professor Milner and staff.

Post-Basic Program in Neurological and Neurosurgical Nursing

This program is designed to enhance the knowledge gained in basic nursing education. Its objective is improved nursing care of patients with a variety of neurological and neurosurgical conditions. The nurse is taught to apply new knowledge to total patient care, which involves not only attending to the patients' physical needs but also teaching them about their condition and helping them adapt to the changes brough on by the disorder.

Courses begin in March and September, and are limited to sixteen students. Learning experiences include actual patient care, lectures, demonstrations, laboratory visits, seminars, multidisciplinary discussions, self-teaching projects, and preparation of special studies. A new library faciliates the program. On completion of the course requirements a certificate is granted.

Eileen Flanagan began the post-basic program in neurological-neurosurgical nursing soon after the hospital opened in 1934. Since then the Montreal Neurological Hospital has had over 1,100 graduates from thirty-four countries. To become a "Neuro nurse" is to enter a colleague relationship with other nurses who can share their experience and acquired knowledge to the benefit of patient care.

Fellows' Society

The Fellows' Society of the Montreal Neurological Institute benefitted from renewed enthusiasm during the 1982-1983 academic year. Dr. Reed Kaplan's many contributions to the society during his two-year presidency were of great value.

The 1983 Fellows' Dinner was held in May at the Ritz-Carlton Hotel. Dr. David Dubuisson, resident in neurosurgery, and Dr. Thomas Staunton, resident in neurology, received the annual Penfield Awards for Excellence. A special award was presented to Dr. Edith Hamel for her progress in scientific research.

Dr. Douglas Watt of McGill University's Aviation Medical Research Unit gave the Fellows' Day lecture for 1983 on his work in aerospace medicine. This year the Fellows' Day address will be given in September to coincide with the celebration of the 50th Anniversary of the institute.

The society is also sponsoring competition for clinical and research papers in honour of the 50th Anniversary. Active members of the society are invited to submit current work; the winning paper, chosen by a panel of judges, will be presented in September 1984 and the essayist will receive a handsome prize.

On the non-academic front, the Centaur Theatre again made available to members a number of complimentary tickets. This gracious offer has been much appreciated. The society also acquired a set of season tickets to Montreal Canadiens' games—tickets that were not slow to find their way to the membership.

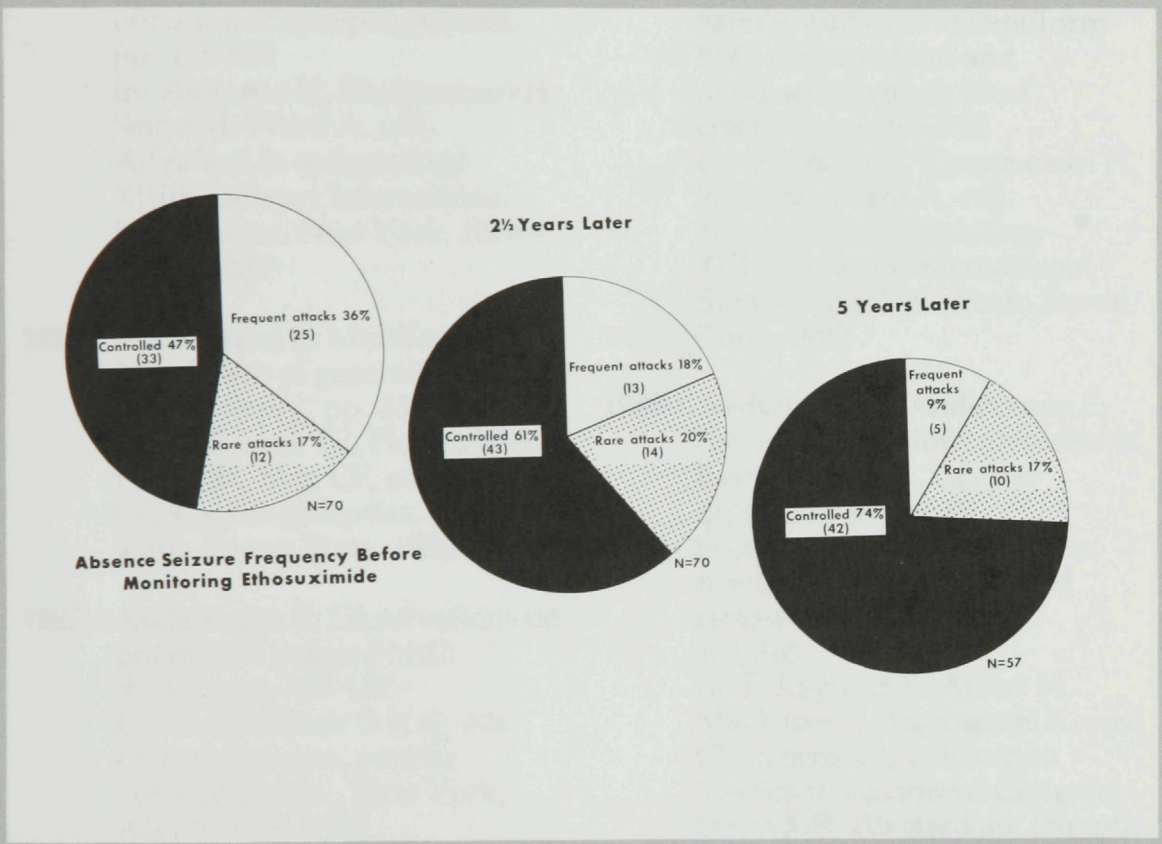
The first party of the 1983-1984 academic year took place October 22 at Thomson House and "a good time was had by all." Other social activities are planned, including a revival of the annual doctors-nurses hockey game, and of course, the annual Fellows' Dinner.

The Executive Committee of the Fellows' Society includes Dr. Rees Cosgrove, Dr. Michelle Sammaritano, and Dr. Jane Tyler. The organization has also found much aid and comfort from the efforts of Dr. Victoria Lees, Geneviève Limoges, and Iris Shestowsky. The society needs to bolster its financial base, progressively more tenuous in inflationary times. Dividends from the society's modest capital investment no longer cover our operating costs. Contributions to the Lewis Reford Fellows' Fund of the MNI would therefore be most welcome.

To all Fellows, past and present, I wish to extend my very best wishes for an active and prosperous 50th Anniversary year.

—Curtis Worthington, MD
President

Publications



Neuropharmacologist Dr. Allan Sherwin monitored blood levels of the anticonvulsant drug ethosuximide. Overleaf, a schematic representation of his research results demonstrates better seizure control.

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(Figures indicate Montreal Neurological Institute reprint numbers.)

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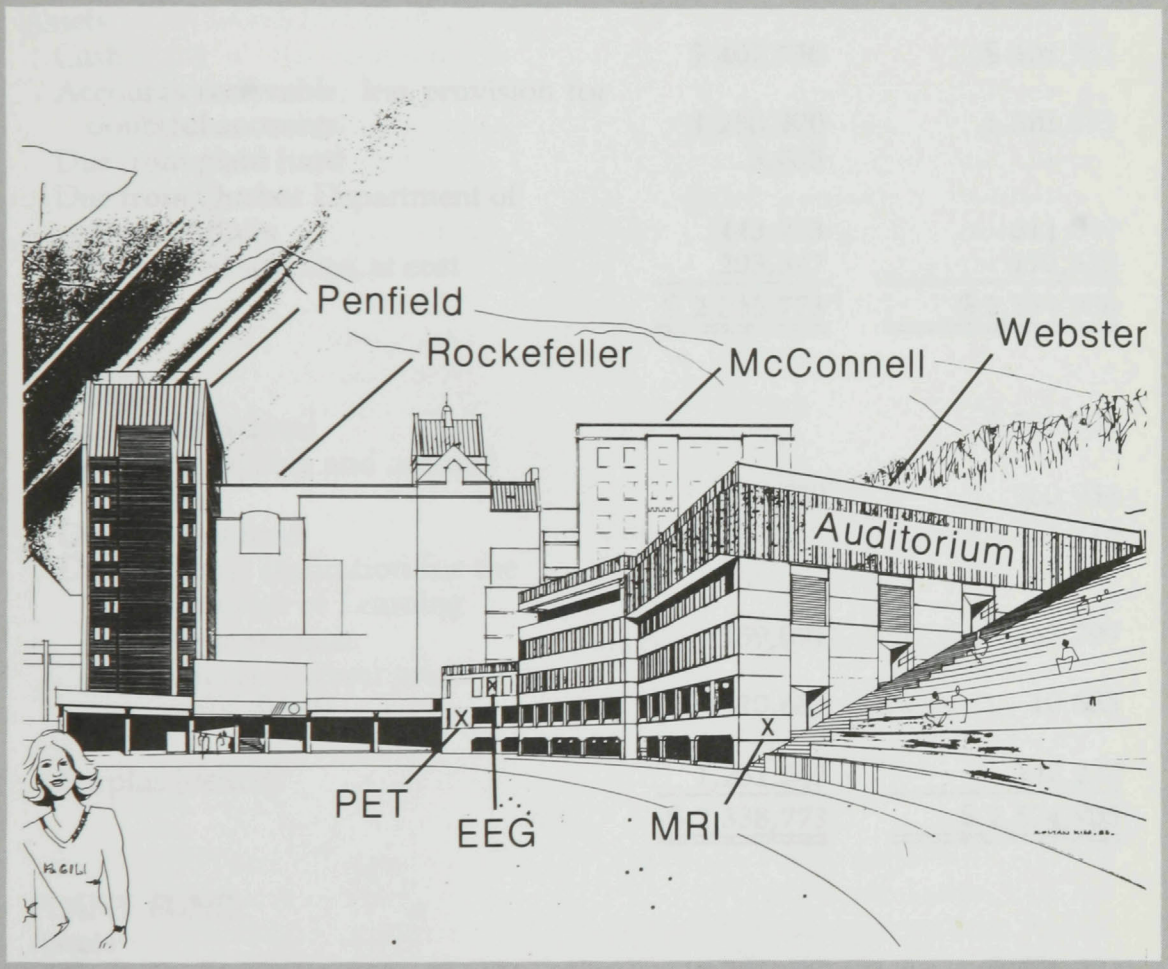
Finances


Penfield
Rockefeller
McConnell
Webster
Auditorium
PET
EEG
MRI

Overleaf, an architect's sketch of the MNI/MNH, showing the four pavilions. The Webster Pavilion, now under construction, will house a Brain Imaging and Communications Centre (for PET, MRI, and EEG), as well as a 330-seat amphitheatre.

Montreal Neurological Hospital

Balance Sheet as at March 31, 1983

GENERAL FUND		1983	1982
Assets			
Cash		$ 407,758	$ 408,761
Accounts receivable, less provision for doubtful accounts		1,280,870	1,382,571
Due from plant fund		3,035	—
Due from Quebec Department of Social Affairs		443,763	611,049
Inventory of supplies, at cost		203,347	172,525
		$ 2,338,773	$ 2,574,906
Liabilities			
Bank indebtedness		—	$ 700,000
Accounts payable and accrued liabilities		937,452	960,934
Due to plant fund		—	223,213
Due to Royal Institution for the Advancement of Learning			
Current account		159,091	437,799
Advances to cover prior years' deficit		10,683	10,683
Surplus (deficit)		1,231,547	242,277
		$ 2,338,773	$ 2,574,906
PLANT FUND			
Assets			
Cash		$ 331,012	$ 804,492
Short-term investments		250,000	—
Due from Montreal Neurological Institute		—	646
Due from general fund		—	223,213
Advance to Royal Institution for the Advancement of Learning, construction project		9,693,229	9,366,486
Fixed assets, at cost			
Equipment	4,620,900		
Less accumulated depreciation	(1,839,190)		
		2,781,710	2,787,720
		$13,055,951	$13,182,557

Liabilities		
Bank loan including interest	$ 1,440,939	$ 1,300,000
Accounts payable and accrued liabilities	43,655	—
Due to general fund	3,035	—
Due to Royal Institution for the Advancement of Learning	—	43,981
Restricted funds, construction project (Note 5)	8,507,774	8,719,444
Capital	3,060,548	3,119,132
	$13,055,951	$13,182,557

Statement of Operations for the year ended March 31, 1983

	1983	1982
Income		
Quebec Department of Social Affairs (Note 2)	$11,159,540	$10,932,405
Revenue from patients	4,091,844	2,956,230
Other income	1,218,720	1,061,826
	16,470,104	14,950,461
Expenses		
Salaries and wages	10,614,266	9,956,015
Fringe benefits	889,522	811,270
Drugs, medical and surgical supplies	875,118	754,149
Services and supplies	3,561,564	2,853,938
	15,940,470	14,375,372
Surplus for the year	$ 529,634	$ 575,089

Statement of Capital Accounts
for the year ended March 31, 1983

	1983	1982
GENERAL FUND		
Surplus (deficit) at beginning of year	$ 242,277	($ 554,455)
Add		
Settlement of prior years' deficit	453,855	—
Prior years' adjustments related to medical specialists	—	314,178
Contribution from the Quebec Department of Social Affairs related to prior year	36,007	1,856
Surplus for the year	529,634	575,089
	$ 1,261,773	$ 336,668
Deduct		
Prior years' adjustments related to interns and residents	30,226	70,783
Miscellaneous adjustments related to prior years	—	23,608
Surplus at end of year	$ 1,231,547	$ 242,277
PLANT FUND		
Capital at beginning of year	$ 3,119,132	$ 3,090,540
Increase in plant capital	230,222	302,816
	3,349,354	3,393,356
Less depreciation on equipment	288,806	274,224
Capital at end of year	$ 3,060,548	$ 3,119,132

Notes to Financial Statements
March 31, 1983

1. *Preparation of financial statements*
These financial statements have been prepared in accordance with the standards and accounting practices required by the directives issued by the Department of Social Affairs pursuant to the Regulations to the Act respecting health and social services of the Province of Quebec.

2. *Quebec Department of Social Affairs*
Income from the Quebec Department of Social Affairs includes the amounts approved to March 29, 1983. The Department may, subsequent to a review of the accounts of the Hospital, modify amounts previously approved which would either give rise to additional amounts becoming due to the Hospital or cause amounts to be subject to reimbursement to the Government.

3. *Construction project*
The final approval of the construction project has been received through Decree No. 887-83 dated May 4, 1983 of the Province of Quebec for an amount of $13,071,982 of which $4,867,290 is the responsibility of the Montreal Neurological Hospital.

4. *Contingent liabilities*
Employees' accumulated sickness benefits, which are not recorded in the accounts but charged to expenses when paid, amounted to approximately $662,000 at March 31, 1983.

An action has been instituted against the Hospital for $375,000. In the opinion of management and legal counsel, the action is unfounded.

5. *Restricted funds, construction project*
Restricted funds as at March 31, 1982 have been restated to include contributions from the building fund of the Montreal Neurological Institute in the amount of $3,394,244. The advance to Royal Institution for the Advancement of Learning, construction projects, has been restated accordingly to reflect total costs of the project. In 1983, construction project costs financed by the Institute have been recorded directly in the Hospital's books.

Auditors' Report

The Board of Directors,
Montreal Neurological Hospital

We have examined the balance sheet of the Montreal Neurological Hospital as at March 31, 1983 and the statements of operations and capital accounts for the year then ended. Our examination was made in accordance with the mandate outlined in Schedule II of the Regulations to the Act respecting health and social services of the Province of Quebec and with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Hospital as at March 31, 1983 and the results of its operations for the year then ended in accordance with the standards and accounting practices required by the directives issued by the Department of Social Affairs pursuant to the Regulations to the Act respecting health and social services.

Montreal, Quebec
June 30, 1983

Charette, Fortier, Hawey and Cie
Touche Ross and Cie
Chartered Accountants

Montreal Neurological Institute

Statement of Income and Expenditure

		Year-ended March 31, 1983		Year-ended March 31, 1982
Opening Balance (Deficit)		$ 514,695		$ (466,121)
Income				
External grants for research and fellowships		2,075,968		2,390,834
Current donations		749,112		556,530
Previous donations decapitalized		718,364		1,685,394
Endowment income		1,814,411		1,516,586
University funds:				
GFT clinical staff: MNH/MNI	285,669		284,077	
Other salary support for teaching	162,246	447,915	150,609	434,686
		6,320,465		6,117,909
Expenditure				
Salaries				
University funds:				
GFT clinical staff MNH/MNI	285,669		284,077	
Other salary support for teaching	162,246	447,915	150,609	434,686
MNI Funds:				
Staff				
GFT clinical	401,504		366,685	
Other teaching	268,781		208,088	
Research	1,089,718		956,816	
Technical: External grants	691,995		616,913	
Technical: MNI funds	236,463		227,430	
Support services	393,007		294,894	
	3,081,468		2,670,826	
Fringe benefits	349,258	3,430,726	316,208	2,987,034
Materials and Supplies		741,671		527,020
Building Services (McGill)		234,382		163,450
Cyclotron and Installation		15,880		883,558
Scientific Equipment		281,880		607,466
Donner Renovations (partial cost)		299,634		—
NMR Scanner (partial cost)		500,000		
				5,603,214
Closing Balance (Deficit)		$ 368,377		$ 514,695

Endowments

1934 Rockefeller Endowment
1951 Donner Canadian Foundation Grant
1954 Lily Griffith McConnell Endowment
1957 Hobart Anderdon Springle Memorial Endowment
1958 Rupert Bruce Memorial Endowment
1959 Percy R. Walters Memorial Endowment
1960 William Cone Memorial Endowment
1963 Walter Chamblet Adams Memorial Endowment
1964 MNI Research Endowment Fund
1966 Izaak Walton Killam Memorial Endowment
1969 Sophie M.C. Letang Memorial Endowment
1972 Senator and Mrs. Lorne Webster Memorial Endowment
1973 G. Maxwell Bell Memorial Endowment
1974 Flora Campbell Memorial Endowment
1975 Cosgrove Multiple Sclerosis Research Fund
1976 Wilder Penfield Memorial Endowment
1978 William D. Munro Memorial Endowment
1980 Clive Baxter Memorial Endowment Research Fund

Fellowship Endowments
1948 Duggan Fellowship
1950 Lewis L. Reford Fellowship
1956 Dr. and Mrs. Charles F. Martin Fellowship
1966 Izaak Walton Killam Memorial Fund for Advanced Studies

Grants for Special Projects
September 1, 1982 to August 31, 1983

Association canadienne de l'ataxie de Friedreich
Dr. Eva Andermann

E.A. Baker Foundation for the Prevention of Blindness, CNIB
Dr. Trevor Kirkham

Medical Research Council of Canada
Career Investigators
Dr. Brenda Milner
Dr. Leonhard Wolfe

Medical Research Council of Canada
Grants
Dr. Massimo Avoli
Dr. Alain Beaudet
Dr. Stirling Carpenter
Dr. Heather Durham
Dr. William Feindel
Dr. Serge Gauthier
Dr. Pierre Gloor
Dr. Jean Gotman
Dr. Daniel Guitton
Dr. Paul Holland
Dr. Barbara Jones
Dr. George Karpati
Dr. Elizabeth Matthew
Dr. Brenda Milner
Dr. Hanna Pappius
Dr. Luis Quesney
Dr. Allan Sherwin
Dr. Leonhard Wolfe
Dr. Lucas Yamamoto

Medical Research Council of Canada
Scholarships
Dr. Alain Beaudet
Dr. Jean Gotman
Dr. Daniel Guitton
Dr. Barbara Jones
Dr. Elizabeth Matthew
Dr. Yogesh Patel

Fonds de la recherche en santé du Québec
Chercheurs-boursiers
Dr. Massimo Avoli
Dr. Robert Dykes
Dr. Paul Holland
Dr. Barbara Jones
Dr. Justine Sergent

Fonds de la recherche en santé du Québec
Subventions à l'établissement
Dr. Massimo Avoli
Dr. David Caplan
Dr. Elizabeth Matthew
Dr. Michael Petrides
Dr. Justine Sergent

Conseil Québecois de la recherche sociale
Verna Bound

Muscular Dystrophy Association of Canada
Dr. Stirling Carpenter
Dr. Heather Durham
Dr. Paul Holland
Dr. George Karpati

Multiple Sclerosis Society of Canada
Dr. J.B.R. Cosgrove

National Institute of Neurological and Communicative Disorders and Stroke
Dr. Robert Zatorre

Savoy Foundation
Dr. Eva Andermann
Dr. Luis Felipe Quesney

Montreal Neurological Institute Grants

Killam Fellow
Antonio Incisa della Rocchetta

Killam Scholars
Elaine Joy Arpin
Alain Beaudet
David Caplan
Mirko Diksic
Heather Durham
Robert Dykes
Serge Gauthier
Jean Gotman
Antoine Hakim
Barbara Jones
George Karpati
Donald Lawrence
Rachel Ochs
Luis Felipe Quesney
Christopher Thompson
Ivan (John) Woods

Donations to Special Funds 1982-1983

Donations to the Montreal Neurological Institute may be made to any of the following funds, or for other purposes as specified by the donor. Receipts for such contributions are valid for income tax purposes in Canada. Donations from the United States will also qualify for income tax purposes if cheques are made out to The Friends of McGill University Inc. and sent to PO Box 441, Elizabethtown, New York 12932 with the notation that they are for the Montreal Neurological Institute. McGill graduates making donations to the university Alumni Fund may indicate that these be credited to the Montreal Neurological Institute.

Alzheimer-Parkinson Research Fund
Josephine Arbour
Leah Balinsky
Nancy H. Bosse
Consolidated Metal Inc.
R. de Wolfe Mackay
Mrs. D. Elias
Mrs. F. Farmer
Anastasia Koutrokois
Leblanc, Mahoney, Howard Inc (in memory of Dr. Gérald Mahoney)
Mr. and Mrs. H. J. MacDonald (in memory of Blanche Wilkinson)
Maurice Maisonneuve
E. Sedat Ornek
Roussel Canada Inc (in memory of Florence Margaret Friedman)
Pierre St-Pierre
Jocelyne Viger
J. Wieliczko
In honour of Mr. and Mrs. William Grimble
In memory of Robert G. Burge
In memory of William W. Denman
In memory of J. Arnold Wells

Anesthesia Research Fund

Audette Multiple Sclerosis Research Fund

Brain Research Fund
A. Murray Vaughan
L. Marguerite Vaughan

Ca

Computer Tomography Research Fund
MNI Radiology Clinic Inc

William Cone Memorial Research Fund
Dr. Percy Black
Mrs. E. L. Dawson (in memory of Wendy Grace, Gail Budd, and Patricia Robertson)
Mildred Flynn
Dr. Ellis B. Keener
Lise Andrée LeBlanc
Peter Leggat
José Mourelo
Mr. and Mrs. De Four Robinson
Sophie Roux
Rose Slapack
Estate of the late Lillian Gamble
In memory of Jeanne Cohen
In memory of Alan Eyles
In memory of Heinz Dieter Schlutz
In memory of Paulina Teplitzchi de Goldenstein

Cosgrove Research Fund
Sylvia L. Bosworth
Monique Coderre
Dr. and Mrs. J. B. R. Cosgrove (in memory of Hermine Dessaulles)
Brigadier J. A. de Lalanne
Jacques Gagnon
Ylusse J. Gauthier
Hélène Gravelle
Joyce Jarand
Susan Jarand
Doreen Jurychuk
Kraft Limited
Yole Londei
Maplewood Chapter 53, OES
Barbara Joan Morris
Dorothy Roseman
Jen Russell
Aileen Tenenbaum

Estate of the late Eugénie Lazure Martineau
In memory of Eunice Cheesman
In memory of Suzanne Gauthier
In memory of Edith M. Green
In memory of Rose Alma Mercier

Harvey Cushing Clinical Relief Fund
Gazette Christmas Fund
In His Name Society
Queen Elizabeth Hotel
Lillian Sandler
Janet Shapiro
Joyce Tymchok (in memory of Michelle Marcotte)
Women's Auxiliary, RVH
In memory of Susan Delaney-Avery
In memory of Louis Magyar

Deane Elliott Brain Research Fund

Gordon Library Fund

Margo Henderson Fund for Research in Electromyography
Mr. and Mrs. N. Ikeman (in memory of Margo Henderson)

Hospital Equipment Fund
Dr. Gustav Blomquist
Abel Feldman
Bill Goodwin (in memory of Marcel Fortin)
Women's Auxiliary, RVH

Mary Massabky Foundation Research Fund
Mary Massabky Foundation Inc

Mary Massabky Scholarship Fund
Mary Massabky Foundation Inc

McNaughton Neuroanatomy Research Fund

Francis McNaughton Neurological Research Fund
E. Jean Clarke
Barbara Duncan (in memory of Mrs. Isabelle Allen)
Nat Finkelstein
Vesta F. Hayden
R. C. Jarvis
Gabrielle McGarrigle
Lyla Miller (in memory of Rachel Fryszman)
J. F. Ross (in memory of Sidney Melville Ross)
Hazel Sutherland
Temple Aysgarth Investments Inc
Jo Anna Townsend
J. Clare Wilcox
In memory of Antoine N. Djandji
In memory of Abel Feldman
In memory of Phyla Feldman
In memory of Isobel M. L. Glenday
In memory of Louis Magyar
In memory of Charles-Raymond Rivet
In memory of Pierre Tondi
In memory of Lorenzo Vincelette

McRae Research Fund
Mr. and Mrs. C. Ivor Murray (in memory of Dr. Donald McRae)

Montreal Neurological Institute Building Fund

Montreal Neurological Institute Neurosurgical Research Fund

Montreal Neurological Institute Staff Loan Fund

Multiple Sclerosis Clinical Relief Fund
Multiple Sclerosis Association
Multiple Sclerosis Golf League
Multiple Sclerosis Golf League (in memory of Edith Green)

Muscular Dystrophy Research Fund

Neurogenetics Research Fund
Association canadienne de l'ataxie de Friedreich
Charles Johnson Charitable Foundation
Charles Johnson
Savoy Foundation

Neurological Research Fund
Abbott Laboratories Ltd (in memory of Robert Camp)
Administration and staff of Jay Peak Inc (in memory of Normand Couture)
Noreen S. Annett
Aviation Electric Recreation and Education Association (in memory of Roland Scott)
Bank of Montreal, Treasury Division (Montreal) (in memory of Adi Ghandhi)
Mona Bergeron (in memory of Nancy Bédard)
Mr. and Mrs. John Blocha (in memory of Mrs. H. Jonke)
P. Rémi Catafard
Dr. Simon W. Chiasson
Clinique dentaire Cantin et Laperrière (in memory of Albert Bélanger)
Les compagnons et compagnes de Domrémy-Montréal (in memory of André Léger)
Mr. and Mrs. Anthony Corkhill (in memory of Brian Kinsella)
Guy B. de La Bruère
Suzanne Desroches
Onisim Dolhy
Robert J. Dunn (in honour of Irving Grundman)
Les employés du CLSC Longueuil-Est (in memory of Arthur Bélanger)
Les employés de Revenu Canada, Impôt, Bureaux de Montréal, de Laval, de St-Hubert (in memory of Bernard D'Amour)
August Fuxius
The Gazette News Chapel (in memory of Marcel L'Archevêque)
Grand Chapter of Quebec, Order of the Eastern Star
Mrs. G. Miller Hyde
Taylor J. Kennedy
Pierre Lefebvre Inc (in memory of Gaston Demers)
Pierrette Léger (in memory of Paul Meloche)
Members of the Accounting Department, McGill (in memory of Henry Patrick Lewis)
Eldon McDonald (in memory of Robert Page)
Mr. and Mrs. Ron Mitchell (in memory of Mark Forler)
Sara Pinsky (in memory of Sarah Bialik, Louis Solomon, and Louis Strulovitch)
Mrs. J. G. Shannon
Mr. and Mrs. L. Sheiner (in memory of Mrs. Ted Graves)
Steyning Foundation
In memory of C. Wreford Belson
In memory of Thérèse Brassard
In memory of Albert Chaif
In memory of Gladys Fraser
In memory of Pierrette Gagné
In memory of Robert Henry Glass
In memory of Alain Langlois
In memory of Michelle Marcotte
In memory of Sam Pinsky
In memory of Rolland Roger
In memory of Jean-Baptiste Sylvestre
In memory of Keith Tait
In memory of James Yarnold

Neuro-ophthalmology Research Fund
Hélène Gravelle
Kiwanis Club of Mount Royal
S. B. Roman Foundation
Town of Mount Royal Executive Hockey League

Neurophysiology Research Fund

Neuroradiology Research and Teaching Fund
Philips Electronics Limited
Julia Varga (in memory of Alexander Varga)

Nuclear Magnetic Resonance (NMR) Development Fund

Nursing Funds
Eileen C. Flanagan Nursing Bursary Fund
MNI Nursing Education Fund
Greensboro Medical Arts Centre
Women's Auxiliary, RVH

Olszewski Fund For Neurosurgical Research in Epilepsy

Pain Research Fund
Télé-Direct (Publications) Inc

Penfield Award Fund

Wilder Penfield Memorial Research Fund
Freda Bossy
Fondation Martineau-Drapeau
Linda Kaplan
Mr. and Mrs. William Kaplan
Madeleine Lemaire
Cecelia Oshinsky

Zelda and Leo Posman Research Fund

Reuben Rabinovitch Memorial Library Fund
Dr. and Mrs. Andrew Kelen

Lewis Reford Fellows' Fund

Reitman Research Fund
Cyril Reitman
Reitmans Inc
In memory of Sam Reitman

Sherwin Research Fund
Louis H. Hannach
Andrée Romero
Lorraine Vézina
Rose Wilkins (in memory of John Wilkins)

Special Project Funds
Epilepsy Follow-up and Research Projects
Savoy Foundation Inc
Research in Neuroanatomy
Stroke Research
H Q Marketing Research and Planning Division, Bell Canada (in memory of Mr. Rodgers)

Spinal Cord Research Fund

H.L. Teuber Neuropsychology Research Fund
Janet Allison
Dr. Brenda Milner
Laughlin Taylor

Third Foundation Brain Fund
Diane Beaulieu
Marc Boivert (in memory of Jean Lacoste)
Hugh Bullock
Club Social NCR Montréal (in memory of Guilda Gertrude Hooper)
Dr. Joseph Evans
Lorraine L. Huneau (in memory of Jean Lacoste)
Roger J. Laforce
Dr. Ernest W. Mack
Nancy W. Mailloux (in memory of Jean Lacoste)
Mrs. B. Martin (in memory of Basil Hollingworth)
N. H. McFetridge
Mr. and Mrs. James Phillips (in memory of Basil Hollingworth)
Dr. Theodore Rasmussen
Hyman Wisenthal

In memory of Robert B. Allen
In memory of Geraldine Bailey
In memory of Gem Chippindale
In memory of George Currie
In memory of Dr. M. Arnold Davis
In memory of André Marcil
In memory of Florence Mathewsky
In memory of Raymond Miron
In memory of Werner Rich
In memory of Alexander Varga

Thomas Willis Fund

Suggested Forms for Bequests to the Montreal Neurological Institute

Unrestricted
I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, both the principal and income to be derived therefrom to be used in such manner as the Board of Governors of the said University shall from time to time determine.

Restricted only as to principal
I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, to constitute part of its general endowment funds, the income to be derived therefrom to be used in such manner as the Board of Governors of the said University shall from time to time determine.

Restricted as to purpose
I give and bequeath the sum of _____ dollars to the Montreal Neurological Institute, McGill University, both the principal and the income to be derived therefrom to be used for the purpose of (stating purpose) in such manner as the Board of Governors of the said University shall from time to time determine.

For founding fellowships and student aid
I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, for the purpose of founding in the said University one or more fellowships or bursaries to be known as "_____ Fellowship or Bursary," the net annual income from this fund to be awarded annually in such amounts, under such conditions, and to such recipients as may be determined from time to time in accordance with the directions of the Board of Governors of the said University.

For information and suggestions, contact:
Director
Montreal Neurological Institute
3801 University Street
Montreal H3A 2B4
Quebec
Telephone: (514) 284-4655

Statistics

Classification of Operations
April 1, 1982 to March 31, 1983

Craniotomy and craniectomy		
and excision of epileptogenic focus (lobectomy)	87	
and removal of cerebral tumor	79	
and excision, clipping, or wrapping of aneurysm	32	
and removal of posterior fossa tumor	23	
and hypophysectomy transphenoidal for pituitary or intrasellar tumor	22	
and drainage of subdural hematoma	20	
and removal of arteriovenous malformation	7	
and drainage of intracerebral hematoma	7	
and biopsy	5	
and correction Chiari malformation (plugging of central canal)	4	
and trigeminal rhizotomy, suboccipital	4	
and plastic repair of dura, CSF rhinorrhea, or fistula	4	
and cerebral vascular bypass anastomosis	3	
and excision of epileptogenic focus (hemispherectomy)	3	
and drainage of extra-dural hematoma	3	
and drainage of abscess	2	
and plastic repair of skull defect (plate, bone, acrylic)	2	
and removal of tumor of skull	2	
and removal of foreign body	2	
and excision of abscess	2	
and elevation of depressed skull fracture	2	
and decompression, debridement, and repair of dural laceration	1	
and exploration	1	
and hypophysectomy for pituitary or intrasellar tumor	1	
and incision, drainage, or removal of cyst	1	319
Trepanation		
and drainage of epidural, intracerebral, or subdural space	16	
and drainage of abscess (infection)	5	
and biopsy	4	
Shunt Procedures		
ventricular caval (atrial)	23	
replacement or revision of shunt	10	
ventricular peritoneal	8	
lumbar subarachnoid peritoneal	2	
removal of shunt	1	

Stereotaxic Procedures		
and ventriculography, PEG, angiography (localization)	16	
and lesion (mechanical or neurolytic agent, including electrophysiological localization)	9	
and biopsy or drainage of cyst	8	
and introduction of depth electrodes	5	
and implantation of thalamic stimulating electrodes	2	109
Laminectomy, Hemilaminectomy		
and discoidectomy, lumbar, sacral	39	
and decompression or exploration of spinal cord or cauda equina for stenosis or dentate ligament section, or spondylosis	25	
and discoidectomy, anterior approach, cervical (Cloward)	21	
and removal of tumor, extradural, metastatic bone, etc.	13	
and spinal fusion with bone graft, autogenous or bone bank	12	
and discoidectomy, cervical	7	
and removal of tumor, extramedullary, intradural	6	
and rhizotomy, dorsal	4	
and rhizotomy, torticollis	3	
and spinal fusion with wire, plate, or surgical simplex	3	
and discoidectomy, anterior approach, cervical with arthrodesis	2	
and rhizotomy, ventral	2	
and spinal fusion with Harrington rods, and autogenous or other graft	2	
and antero-lateral cordotomy, lumbar	2	
and decompression or exploration spinal cord, tumor, or vascular malformation	1	
and discoidectomy, thoracic	1	
and incision and drainage of intramedullary cyst (syringomyelia)	1	
and excision or occlusion of arteriovenous malformation of cord	1	
and removal of hematoma	1	
and removal of tumor, intramedullary	1	147
Nerve Exploration		
and neurolysis, transplantation, or decompression or exploration	71	
and avulsion or section	4	
and excision of neuroma	1	
and biopsy	1	
Artery Exploration		
and endarterectomy (patch graft)	35	
and exploration, carotid artery	1	

Wound Reopening		
and evacuation of hematoma	5	
and further removal of brain tissue	2	
and drainage of infection	1	121
Miscellaneous		
muscle biopsy	68	
miscellaneous	13	
tracheostomy	7	
radiofrequency trigeminal rhizotomy	3	
application of stereotaxic frame	1	
division or denervation sternocleido-mastoid muscle for torticollis	1	93

Diagnoses
April 1, 1982 to March 31, 1983

Epilepsy	417
Cerebrovascular disease	227
Intracranial tumors and cysts	210
Functional psychosis and behavior disorders	181
Radiculopathy due to protruded intravertebral discs	139
Craniocerebral trauma	122
Subarachnoid hemorrhage	90
Hydrocephalus	65
Migraine	54
Multiple sclerosis	53
Meningitis	34
Parkinsonism	33
Subdural hematoma	27
Cranial neuropathies	22
Spinal trauma	21
Motor neuron disease	19
Guillain-Barré syndrome	18
Myelopathy (unspecified)	16
Arnold-Chiari malformation	14
Intracranial aneurysms (not ruptured)	13
Median neuropathy	13
Peripheral neuropathy	13
Cerebrospinal fluid rhinorrhea	12
Syringomyelia	12
Myalgia	9
Myopathy	8
Myasthenia gravis	7
Ulnar neuropathy	7
Tuberous sclerosis	4
Alzheimer's disease	3
Intracerebral abscess	3
Muscular dystrophy	2

Causes of Death
April 1, 1982 to March 31, 1983

Cerebral hemorrhage	15	
Intracranial hemorrhage	5	
Subarachnoid hemorrhage	14	
Traumatic subarachnoid, subdural, extradural hemorrhage	4	
Occlusion of cerebral arteries	5	
Malignant brain tumor	21	
Intracranial trauma unspecified	4	
Others	21	89