1st Annual Report

MONTREAL NEUROLOGICAL INSTITUTE
MONTREAL NEUROLOGICAL HOSPITAL

and the

DEPARTMENT

of

NEUROLOGY

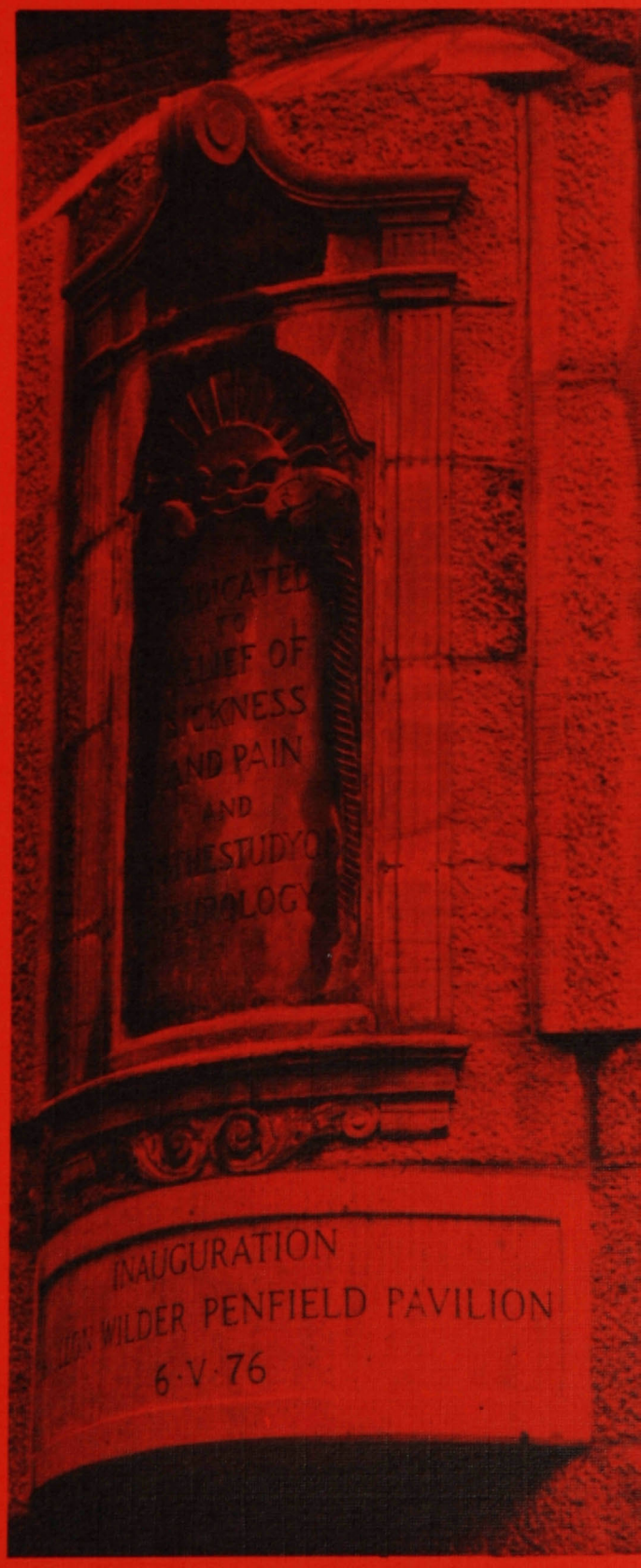
and

NEUROSURGERY

of

McGill University

1975-1976



41st Annual Report

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(Le rapport annuel français est disponible sur demande)

Contents

EDITORIAL NOTE

This forty-first Annual Report marks the beginning of the fifth decade for the Montreal Neurological Institute and the Montreal Neurological Hospital. As in past years, we are again indebted to the rapporteurs on our staff for their concise résumés of a very busy year and their clear outlines of needs for insuring the quality of future work. The editorial arrangements were again supervised by Mrs. Rose Slapack with the able assistance of Dr. K. A. C. Elliott and Mrs. Sophie Malecka, as well as Dr. Maurice Dufresne who was responsible for the French translation.

The passing of Dr. Penfield in April was a saddening event for all of us. This was relieved to some extent when we were able to inaugurate, at our Annual Meeting, the beginning of the new Penfield Pavilion. It seems fitting that the two McGill buildings, now under construction on University Street within a few hundred meters of each other, will serve as permanent tributes to two of the most outstanding scientists who ever brought distinction to this University: Rutherford, for his brilliant analysis of the inner structure of the atom, and Penfield, for his studies on the inner space of the human brain and mind.

William Feindel, M.D.
Chairman, Editorial Committee

Wilder Graves Penfield
January 26, 1891 — April 5, 1976

Report of the Director

DR. WILLIAM FEINDEL

Our reports this year are over-shadowed by the recent death of Wilder Penfield, our Founder and first Director. We are aware that this marks the end of an era, not only for this Institute and University, but for neurology at large.

We are filled with a sense of profound loss and we offer our deepest sympathy to Mrs. Penfield, who, with her loving family, made up such an inseparable part of Dr. Penfield's life.

But the long and rich life of this most remarkable man gives us cause also to rejoice. So much accomplished over so many years, his good works, his inspiration passed on in his writings and teachings, such memories of his warm friendship and the heritage of the Neuro, alive, thriving and expanding — all these temper the loss which so many everywhere must feel at his passing.

As you can imagine, we have received many fine tributes to the memory of Dr. Penfield from all parts of the world. There have been, as well, generous donations which will start a Wilder Penfield Memorial Fund that we would hope could grow to insure the continuation of his wonderful work which he sometimes described as "exciting beginnings".

We are delighted that our Annual Meeting included the unveiling by Dr. Robert Bell, our Principal, of the original dedication plaque of the Institute to inaugurate the construction of the Wilder Penfield Pavilion. It gives all of us (and particularly I know Dr. Rasmussen and Dr. Robb, as well as those who were in on the early planning almost ten years ago) a great sense of satisfaction that this long awaited project is at last under way. It represents a significant third phase in the development of the Institute and Hospital. We will have much-needed resources and space to meet growing demands for patient treatment and for research and teaching. A neurodiagnostic centre to reduce inpatient costs, a modern intensive care unit, new operating rooms to improve patient safety and adequate laboratory areas for our distinguished scientific teams, will together provide a base of operation from which we can all continue to enhance the hospital and research activities which Dr. Penfield started here almost fifty years ago. The project is one of national interest because the special types of surgical and medical treatment offered here, resulting from the work of Dr. Penfield and his many associates, have brought patients to us from all parts of Quebec and Canada and indeed from many other countries of the world. In turn, we have trained doctors, scientists, nurses and many other essential members of the health team who have gone out to develop treatment and research centres near and far. This new Pavilion, indeed, will present a unique opportunity for our Governments and for so many Institute friends to establish a permanent reminder of Wilder Penfield whose contributions have placed him among the greatest neurologists and neurosurgeons of all time.

Honours and Staff Changes

Looking back over each year, among the most gratifying highlights are the recognitions which come to our staff members for distinguished achievement. This year we are proud to note that Dr. Leonhard Wolfe and Dr. Brenda Milner were elected Fellows of the Royal Society of Canada. Dr. Milner also received the distinction of election to membership in the National Academy of Sciences of the United States. Mr. Charles Hodge, whose skill as a medical photographer is known internationally, will receive in June the highest honour of The Biological Photographic Association, the Louis Schmidt Award. Starting with nothing but a box camera and his own talents, in which Dr. Penfield placed great confidence, Charles Hodge has made our photographic unit here at the Institute one of the most original and exciting of any in the field of neurology and neurosurgery. Dr. Hanna Pappius received the 1975 Woman of Achievement Award from the Young Women's Christian Association and Mrs. Alphonsine Howlett received the 1975 Outstanding Citizen Award from the Montreal Citizenship Council.

Last fall, Dr. Preston Robb indicated his wish to retire as Neurologist-in-Chief, a position at the Montreal Neurological Hospital which he had taken over from Dr. Francis McNaughton in 1968. This gives us a fitting opportunity to point out the many substantial contributions that he has made as a teacher, a physician and a steadfast supporter of neurology. He has given unstintingly of his talents here in coordinating the Residency Program at the McGill teaching hospitals and has been widely sought after for his expertise in the field of epilepsy. Throughout all this he has shown a warm sense of comradeship and a devoted loyalty to the hospital. I am particularly grateful to him for his able partnership on the quarter-deck over the past four years, and there is no doubt that when the water would get a bit choppy, Dr. Robb's background in the navy served us in good stead.

To elect a new Neurologist-in-Chief, a joint selection committee was established according to the guidelines in the new contract of affiliation between the teaching hospitals of McGill and the University. This Committee included the Dean and a member selected by the Dean to represent the Faculty of Medicine, and four members from the Council of Physicians of this hospital. In addition, because of our relation to the Institute, two members were added from the scientific staff. The Physician-in-Chief of the Royal Victoria Hospital was also invited to represent their Council of Physicians and Dentists. As Chairman of that thoroughly democratic committee I wish to record my appreciation for the time and effort of the members and for the interest and comments of many members from this and other McGill departments, and from several distinguished external consultants. It was well recognized that this was an important decision not only for neurology at McGill but for neurology in general.

As a result of the committee's deliberations, Dr. Joseph Martin was asked to be Neurologist-in-Chief at the Montreal Neurological Hospital. I am pleased to announce that Dr. Martin has accepted this position. His

appointment has now been approved by the Board of Directors of this hospital and has been forwarded for joint approval by the Faculty of Medicine.

Dr. Martin gained his M.D. at the University of Alberta, being double gold-medallist. After neurological studies at Western Reserve, and a Ph.D. at the University of Rochester, he joined Dr. Donald Baxter in 1970 in the Division of Neurology of the Montreal General Hospital. Here, his productive research made him widely known in the field of neuro-endocrinology and the influence of hormonal reactions in the brain in relation to glandular and metabolic function in other parts of the body. Today this is perhaps one of the most active fields in experimental neurology. Dr. Martin also is a Medical Research Council Associate and with that award, which he received last summer, he joins the distinguished company of Dr. Milner and Dr. Wolfe. We welcome Dr. Martin to what we consider an exciting appointment and to the opportunity for enlarging his role in the Department of Neurology and Neurosurgery. He will take up Dr. Robb's previous responsibility as Program Director for the neurological residents. He will also be Associate Director of the Institute to work with the other Associate Directors, Dr. Peter Gloor and Dr. Gilles Bertrand.

On the neurosurgical side, we welcome Dr. John Little, a native and graduate of Saskatchewan, who brings to us from his Mayo Clinic training new ideas and interest in the surgery of cerebral vascular problems.

Each year so many of the staff have provided such loyal support in all areas of the Hospital and Institute that it is difficult to emphasize individuals. But all of us would agree that Miss Caroline Robertson should be commended for outstanding leadership during the most trying circumstances when our nursing staff were defending their professional negotiations. We are particularly grateful to the senior residents, Dr. Howard Blume and Dr. Richard Branan, for their devotion and hard work in organizing the clinical and teaching activities. Mr. Hector Heavysege was involved in prolonged negotiations in regard to government contracts. When some members of our staff at last receive their retroactive payments or increased salary scales, perhaps they will offer a moment of quiet thanks to Mr. Heavysege and his staff who had to bear the brunt of the recurring computations.

Special Projects

1. *The EMI Spine and Body Scanner*

After three years' experience with the EMI Head Scanner, the first to be installed in Canada, and aided by a special option from the manufacturers, we acquired two weeks ago the first EMI Computerized Spine and Body Scanner to be placed in Canada. This device gives amazing details of the internal structure and organs of the body and promises to make as great an impact on general radiological diagnosis as the Head Scanner did on neurological diagnosis. It will be of particular benefit to patients with disorders of the spinal cord and nerves. It will also be suitable for brain scanning and will provide in addition a facility for diagnosis

of chest and abdominal disorders that will be shared with the other Quebec hospitals, in the same way as we shared the Head Scanner services. The Institute is most grateful to the chief officers and directors of a select number of banks, foundations and corporations listed elsewhere in this volume whose generous contributions made it possible to acquire this pioneer device which will be of untold benefit for many patients. We record our gratitude also to Mr. Colin Webster, a Member of the Board of Directors of our hospital, for his tireless efforts in getting support for this project. The Scanner will be evaluated for its diagnostic value in a variety of disorders. With the expertise that our clinical and research team has now acquired from the use of the Head Scanner, a solid basis for clinical investigation in the rapidly expanding field of Computer Tomography at McGill has been established. It should be possible, for example, to carry out scans of the brain, the lungs, the heart and kidneys in patients with stroke or other circulatory disorders. Certainly, the early detection of cancer and its site will be possible. Refinements in techniques of using tracer materials that can be injected into the circulation or into certain organs could well define metabolic or other functional disturbances without the need to subject the patient to the variety of unpleasant and sometimes hazardous diagnostic tests which we are now compelled to use.

2. *Cerebral Circulation Studies on Stroke*

Our concern with the problem of stroke, that is, bleeding or blockage associated with the blood vessels of the brain, has led to an active experimental program which we have developed over the past 15 years and has given us new understanding of a number of basic aspects of circulatory disorders in the brain. But we need to apply this research information and our organization for this until recently was lacking. With the help of a generous three-year grant from an anonymous donor, we have sharpened our clinical focus in this field.

Most significant has been the detection and differentiation between blood clots and reduced areas of blood flow (known as infarcts) which affect the brain. These can now be resolved by the EMI Computer Tomography. In addition we now have a unique instrument, the Positome, using positron emitting radioactive tracers which allow us to measure in small volumes of brain tissue in a moderately precise manner the quantity of blood flow. Using a computer aid similar to that of the EMI Scanner, this device is now of great value for assessing changes in brain circulation in patients with stroke or tumour. Dr. Yamamoto and Mr. Thompson and our research team have been greatly supported by the physicists at the McGill Cyclotron in this project. With Dr. Robb's support a review of the needs to apply some of these new advances to aid the stroke patient, and to define more rationally a program of treatment, was made jointly with members of staff of the Royal Victoria Hospital cardiovascular unit. Another original approach in our vascular research was initiated by Dr. Branan in conjunction with Dr. Poulsen at the MacDonald-Stewart image

processing laboratory next door. Transfer of visual information of flow in brain blood vessels to digital values of optical density in a computer linked to a display unit promises to provide better resolution and more rapid measurement of brain flow characteristics.

3. *World Health Organization*

In April the Third International Consultation of Collaborating Centres in the Neurosciences of the World Health Organization was held at the Institute with participants from seven other centres. Workshops on CT scanning and on development of epilepsy control centres and plans for programs to be implemented over the next year were presented. This is a new venture of WHO and it seems particularly fitting that the Montreal Neurological Institute has the opportunity to collaborate with other international neurological centres in bringing advantages of present-day methods of treatment to developing countries where the resources are limited and the needs so evident.

4. *International Workshop on the Dynamics of Cerebral edema*

Under the able supervision of Dr. Hanna Pappius and the help of our executive staff, under Mrs. Rose Slapack, this Workshop brought together distinguished experts on a subject of signal importance, both from the research aspects and from the point of view of treatment. At this Institute the problem of cerebral edema has been investigated since World War II when Dr. Penfield prompted Dr. Miguel Prados to carry out experimental work in this area. It was Dr. Prados who was the first to consider steroids for the prevention and treatment of brain edema and these today remain the best means by which the sometimes devastating effects of edema can be reduced.

5. *Endowment Funds and General Support*

Over the past several years I have expressed our gratitude for three major endowment funds. Suitable bronze plaques have now been placed in our front lobby to identify this generous support for our research.

THE WEBSTER BRAIN RESEARCH FUND
OF THE
MONTREAL NEUROLOGICAL INSTITUTE
DEDICATED TO THE MEMORY OF
THE HONOURABLE LORNE C. AND MRS. WEBSTER
BY THEIR SONS, DAUGHTER AND GRANDCHILDREN
TO PROVIDE INCREASING SUPPORT
IN THE UNENDING SEARCH FOR NEW KNOWLEDGE
TO TREAT PATIENTS
WITH DISORDERS OF THE BRAIN AND NERVES
FROM CAUSES NOW UNKNOWN

"TO STRIVE, TO SEEK, TO FIND AND NOT TO YIELD"
ALFRED LORD TENNYSON

"ULYSSES"

JUNE 1972

TANT QUE SE DRESSERONT CES MURS
LE DON GÉNÉREUX
DE
MARIE CHARLEBOIS LETANG
L'INSTITUT NEUROLOGIQUE DE MONTRÉAL
AIDERA SCIENTIFIQUES ET MÉDECINS
À PERCER LES MYSTÈRES DU CERVEAU ET DE L'ESPRIT
"GUÉRIR QUELQUEFOIS, SOULAGER SOUVENT,
CONSOLER TOUJOURS."
ANNO DOMINI 1969

GEORGE MAXWELL BELL
INDOMITABLE SPIRIT, UNFAILING FRIEND,
GAVE GENEROUSLY TO SUPPORT
NEUROLOGICAL RESEARCH
AT THE
MONTREAL NEUROLOGICAL INSTITUTE
AND
McGILL UNIVERSITY
"HE BELIEVED IN THE DIMENSION OF ETERNITY"
ANNO DOMINI 1972

As in the past years I am again most appreciative of the marvellous cooperation and help which all the staff members of this Institute and Hospital have given me in so many ways. We are grateful to the Auxiliary of the R.V.H. for their generous financial support and operation of the coffee shop. Plans are now underway to put a committee to work in order to establish a branch of the Auxiliary at the M.N.H.

I wish to acknowledge a generous donation from Mr. and Mrs. Antoine Massabky which made it possible to commission the fine bronze bust of Dr. Penfield created by Mr. John Dann, a Canadian sculptor. It is our plan to use this as the central feature where Dr. Penfield's books, manuscripts and decorations can be properly placed when the new construction is completed.

Finances and Governmental Restraints

We have had wonderful support again during the past year from the Directors of our Board. To deal with the severe budget restrictions mentioned in the report of our Director of Finance, we have had advice and help from our President, Mr. Jean deGrandpré and from the other members of the Audit Committee, Mr. Peter Leggat and Mr. Colin Webster. Our modest deficit for 1975 is still less than the 1% which we had to meet to be assured that our construction project would not be cut off. Funding of equipment, essential to operate many vital functions of the hospital, is still not assured at an adequate level. As a neurosurgeon, I would not hesitate to consider operating room sterilizers to be essential to the running of an operating room suite — just as gasoline is to the operation of a motor car. But the approval and funds to acquire replacement for sterilizers that were not only useless but dangerous has taken up an incredible amount of time and effort from our own staff and from the government staff during many, many months without at this date being able to arrive at a realistic end point. This is not intended to be a confessional, but merely a statement of fact made with the hope that the recent decentralization of approval and purchase of equipment to the Montreal Regional Council may help to improve this ponderous arrangement.

All of us in the medical community and in the teaching hospitals in particular continue to face major problems each year. One of these is the increasing parochialism, not by any means unique to Quebec, by which each province is accepting fewer scholars from other parts of the world who come here for post-graduate study with a serious commitment to return to their own countries. The Institute has thrived on this interchange in its forty years of existence as have many other Canadian medical centres. In trying to solve our own national problem and control the well recognized difficulty of too rapid influx of non-Canadian physicians, we must avoid reverting to a sort of intellectual feudalism, particularly in science and medicine, where knowledge cannot be restricted by political boundaries.

A continuing and severe pattern of reduced research funding has again

become evident during the past month in regard to the support of research applications submitted to the Medical Research Council of Canada which is responsible for sustaining a major scientific input into our entire Canadian health system. It may not have escaped your notice that the cost of one military aircraft recently described in relation to government negotiations exceeds by some 10 million dollars the total annual budget of the MRC. Is there a possibility that our scale of relative values is suffering some distortion, when the monies directed towards saving lives and improving our health system can be so meager, in comparison to those alloted for machines whose function in part at least is designed to destroy lives? Moreover, the levelling off of medical research support from government sources is out of phase with the opinion of the public, who have made increasing voluntary contributions toward research and medical support in the areas of cancer, heart disease and other specific disorders.

The care of the chronic patient, a complex problem compounded by the low support from the federal health system for nursing home care, and the increasing breakup and mobility of the family unit has resulted in the incongruous increase in the number of long-stay patients in acute care hospitals and even in ultra-specialized hospitals such as this one.

Dr. Penfield in his last book entitled *No Man Alone**, wrote in the epilogue, "There is a gay, generous helpful spirit that has come to dwell in the Montreal Neurological Institute. Many have contributed to it. Many have delighted in it, but none can take it away".

It is with this spirit and aura of excitement that we launch into our Third Foundation with the start of the Penfield Pavilion.

*To be published by Little, Brown & Co., Boston, 1977.

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GABRIEL LEONARD, B.A., D.A.P. (Dublin)

Clinical Psychologist
CLARA STRAUSS, M.A.

Neurophotographer
C.P. HODGE, R.B.P., F.B.P.A., A.I.M.B.I.

MONTREAL NEUROLOGICAL HOSPITAL

CONSULTING AND ADJUNCT STAFF

Consulting Pathologist ..... Robert H. More, M.D., M.Sc., F.R.C.P.(C)

Honorary Consulting Psychiatrist ..... Robert Cleghorn, M.D., D.Sc., F.R.C.P.(C)

Consulting Psychiatrists ..... Maurice Dongier, M.D.
Heinz Lehmann, M.D., F.R.S.(C)

Honorary Consulting Neurologist ..... Roma Amyot, B.A., M.D.

Consulting Neurologists ..... André Barbeau, B.A., B.P.C.B., M.D., F.R.C.P.(C)
Claude Bélanger, B.A., M.D., F.R.C.P.(C)
Guy Courtois, B.A., M.D., M.Sc., F.R.C.P.(C)
Jean-Léon Desrochers, B.A., M.D., F.R.C.P.(C)
Normand Giard, B.A., M.D., F.R.C.P.(C)
Raymond Lafontaine, B.A., M.D.
Israel Libman, B.A., M.D., C.M., F.R.C.P.(C)
Calvin Melmed, M.D., F.R.C.P.(C)
Charles Olanow, M.D., F.R.C.P.(C)

Adjunct Neurologists ..... Albert Aguayo, M.D., F.R.C.P.(C)
Donald Baxter, M.D., C.M., M.Sc., F.R.C.P.(C)
Sabah Bekhor, M.B., Ch.B., F.R.C.P.(C)
Garth Bray, M.D., F.R.C.P.(C)
Morrison Finlayson, M.B., Ch.B., F.R.C.P.(C)
Peter Humphreys, B.Sc., M.D., C.M.
Mortimer Lechter, B.Sc., M.D.
Joseph Martin, B.S., M.D., F.R.C.P.(C)
Michael Rasminsky, B.A., M.D., Ph.D.
Leo Renaud, B.A., M.D., Ph.D.
Stanley Rothman, A.B., M.D., C.M.
William Sheremata, B.Sc., M.D., F.R.C.P.(C)
William Tatlow, M.D., M.R.C.P., F.R.C.P.(C)
Danica Venecek, M.D.
Gordon Watters, B.A., M.D.

Consulting Neurosurgeons ..... Claude Bertrand, B.A., M.D., F.R.C.S.(C)
Maurice Héon, B.A., M.D., F.R.C.S.(C) F.A.C.S.
Gérard Leblanc, M.D., F.A.C.S., F.R.C.S.(C)
Harold Rosen, B.Sc., M.D., C.M., F.R.C.S.(C), F.A.C.S.

Adjunct Neurosurgeons	John Blundell, M.A., M.D., M.R.C.P. (Lond.), F.R.C.S. (Eng.) Robert Ford, B.A., M.D., F.R.C.S.(C) Robert Hollenberg, M.D., F.R.C.S.(C) Joseph Stratford, M.D., C.M., M.Sc., F.R.C.S.(C)
Honorary Consulting Anaesthetists	Harold R. Griffith M.M., B.A., M.D., C.M., F.A.C.A., F.I.C.A., F.F.A.R.C.S. (Eng.), F.R.C.P.(C)
Consulting Anaesthetist	G. Frederick Brindle, B.A., M.D., C.M., F.R.C.P.(C) Philip Bromage, M.B.B.S., M.R.C.P., L.R.C.P., F.F.A.R.C.S. (Eng.)
Adjunct Physiologist (Anaesthesia)	Kresimir Krnjevic, B.Sc., M.B., Ch.B., Ph.D., F.R.S.C.
Consulting Radiologists	Robert G. Fraser, M.D., F.R.C.P.(C) Jean L. Léger, M.D. Jean Vézina, B.A., B.M., M.D.
Consulting Neuro-Otolaryngologist	Athanasios Katsarkas, M.D., C.M.F.R.C.S.(C)
Consulting Neurophysiatrist	Dorothy Stilwell, M.D., A.B.P.M.R., C.S.P.Q., F.R.C.P.(C)
Consulting Neuropsychiatrist	Louise Demers-Desrosiers, M.D., C.M., C.S.P.Q., F.R.C.P.(C)
Consulting Radiation Therapist	John H. Webster, M.D. (Queens)
Consultant, Employee Health Service	Walter Gregory, M.D., F.R.C.P.(C)
Honorary Consulting Executive Director	Kenneth J. MacKinnon, M.D., C.M., F.R.C.P.(C)
Consulting Executive Director	Douglas MacDonald, B.Eng.
Consultant in Microbiology	S.I. Vas, M.D., Ph.D. C.R.C.P.(C), F.R.C.P.(C)
Consulting Psychologist	M. Sam Rabinovitch, Ph.D.
Consultant in Veterinary Medicine	Leslie Lord, B.Sc., M.Sc., D.V.M.
Consulting Neuropharmacist	Gordon S. Brooks, B.Sc.

ADMINISTRATIVE STAFF OF THE MONTREAL NEUROLOGICAL HOSPITAL

President	A.J. de Grandpré, Q.C.
Director General	William Feindel, M.D.
Administrative Consultant	Charles S. Gurd
Director, Administrative Services	Mrs. Alphonsine Howlett
Director of Nursing	Miss Caroline Robertson, R.N., B.N. M.Sc. (App.)
Director of Finance	Geoffrey Thomas, B. Com. Cert. H.O.M.
Director of Personnel	Hector Heavysege
Director, Social Service	Miss Cynthia Griffin
Administrative Assistant	Winston Rochette
Registrar	Bernard Graham, M.D.
Assistant Registrar	Danica Venecek, M.D.
Planning Officer	Harry G. Marpole

SUPERVISORY OFFICERS

Admitting	Mrs. M. Bernard
Dietician	Mrs. Oresta Podgurny
Employee Health Service	Mrs. J. Mallory, R.N.
Librarian	Mrs. M. Boski, B.A., B.L.S.
Medical Records	Mrs. M. Duffie
Publications	Mrs. R. Slapack

NURSING STAFF

Director of Nursing	Miss Caroline Robertson, R.N., B.N., M.Sc. (App.)
Assistant Director of Nursing (days)	Miss Irene MacMillan, R.N., B.A., M.Sc. (App.)
Assistant Director of Nursing (nights)	Miss Elizabeth Barrowman, R.N.
Nursing Coordinators (nights)	Miss Lillian McAuley, R.N. Mrs. Margaret Smeaton, R.N.
Nursing Coordinators (evenings)	Miss Cecilia Largo, R.N., B.Sc. Miss Linda Maruska, R.N.
Nursing Coordinators (days)	Miss Annie Johnson, R.N. Miss Anne Carney, R.N., B.N.
Assistant Director of Nursing Education	Miss Helena Kryk, R.N., B.N.
Coordinator of Inservice Education	Miss Felicia Skretkowicz, R.N., B.N.
Nurse Clinician Teaching	Miss Elizabeth Roll, R.N., B.N.
Nurse Clinician	Mrs. Linda Robbins, R.N., B.N.
Operating Room Supervisor	Miss Norma Isaacs, R.N., B.N.
V.O.N.	Mrs. Kathleen Douglas, R.N.

HEAD NURSES

Miss Mary Cavanaugh, R.N.
Miss Lucy Dalicandro, R.N.
Miss Marion Everett, R.N.
Mrs. Georgette Jotic, R.N.
Miss Delta MacDonald, R.N.
Mrs. Barbara Petrin, R.N.
Miss Ursula Steiner, R.N.
Mrs. Winsome Wason, R.N.

THE WOMEN'S AUXILIARY OF THE ROYAL VICTORIA HOSPITAL

President ..... Mrs. Theodore Rasmussen

Chairman, M.N.H. Coffee Shop Committee ..... Mrs. G.L. Cheesebrough
Treasurer ..... Mrs. Gordon Mathieson

DEPARTMENT OF VOLUNTEERS OF THE ROYAL VICTORIA HOSPITAL

Director ..... Mrs. Heather McFarland

CLERGY

Rabbi Mordechai Glick ..... *Jewish*
The Reverend Father E. Messier, S.J. ... *Roman Catholic*
The Reverend S.M. McDowell ..... *United*
The Reverend Father G. Novotny, S.J. .. *Roman Catholic*
The Reverend Lionel Temple-Hill ..... *Anglican*

RESIDENT STAFF — JULY 1975 THROUGH JUNE 1976

Senior Neurosurgical Residents ..... Howard Blume, M.D. (Wayne State)
July — December 1975
Richard Branan, M.D. (Colorado)
January — June 1976

NEUROLOGICAL SERVICES

Residents: 6 mos. on this service

E. Bass, M.D. (McGill)
E. Kratzenberg, M.D. (Nancy) (4 mos.)
K. Laxer, M.D. (California)
R. Nudleman, M.D. (Queen's)
H. Sadowski, M.D. (Toronto) (2 mos.)
Jean-Guy Villemure, M.D. (Laval)

Assistant Residents: 6 mos. on this service

J. Apantaku, M.D. (Edinburgh)
W. Becker, M.D. (Manitoba) (4 mos.)
K. Hoyte, M.D. (Queen's)
E. Kratzenberg, M.D.
H. Sadowski, M.D. (2 mos.)
R.Yufe, M.D. (McGill)

R.V.H. Resident Consultants: 2 mos. on this service

W. Becker, M.D.
E. Kratzenberg, M.D.
H.Sadowski, M.D.
D. Schomer, M.D. (Michigan State) (6 mos.)

R.V.H. Rotators

W. Baxter, M.D.
C. Cohen, M.D.
J. Herman, M.D.
P. Herscovitch, M.D.
B. Hoffmann, M.D.
P. Hwang, M.D.
O.L. Kon, M.D.
K. Joiner, M.D.
D. MacDonald, M.D.
B. McBride, M.D.
W. McKenna, M.D.
A. Monticello, M.D.
Z. Munk, M.D.
R. Parkinson, M.D.
S. Prichard, M.D.
D. Rahal, M.D.
L. Ridsdale, M.D.
T Smith, M.D.
D. Stewart, M.D.
B. Unikowsky, M.D.

Montreal General Hospital: 6 mos. on this service

W. Becker, M.D.
J. Dawlings, M.D. (E.E.G.)
R. Dickson, M.D. (Saskatchewan) (EMG) (1 year)
K. Laxer, M.D.

Montreal General Hospital Assistant Residents: 6 mos. on this service

P. Camfield, M.D. (Harvard)
K. Hoyte, M.D.
S. Jiaravuthisan, M.D. (Univ. of Mahidol, Bangkok)
H. Sadowski, M.D.

Montreal Children's Hospital Residents: 6 mos. on this service

P. Camfield, M.D. (E.E.G.)
L. Charron, M.D. (Sherbrooke)
B. Rosenblatt, M.D. (McGill) (E.E.G.)
J. Wasserman, M.D. (Jefferson)

Montreal Children's Hospital Assistant Residents: 6 mos. on this service

S. Gauthier, M.D. (Sherbrooke)
S. Jiaravuthisan, M.D.
L.-H. Lebrun, M.D. (Montréal)
J. Rubin, M.D. (McGill)
R. Yufe, M.D.

Jewish General Hospital Residents: 6 mos. on this service

S. Gauthier, M.D.
K. Nudleman, M.D.

NEUROSURGICAL SERVICES

Residents: 6 mos. on this service

H. Blume, M.D.
R. Branan, M.D.
E. Kuchner, M.D. (Chicago)
H. Ortegon, M.D. (Yucatan)

Assistant Residents: 6 mos. on this service

E.J. Arpin, M.D. (Manitoba)
G. Blomquist, M.D. (Vanderbilt)
T. Hardy, M.D. (Howard)
J. Martinez-Leyva, M.D. (Mexico)
J. St. John, M.D. (Wayne State)*

R.V.H. Residents (Emergency Service)

M. Gibson, M.D.
J. Godreau, M.D.
J. Hellman, M.D.
T. Smith, M.D.
K. Wright, M.D.

Montreal General Hospital Residents: 6 mos. on this service

M. Lewin, M.D. (Cath. Univ. of Chile) J. St. John, M.D.

Montreal General Hospital Assistant Residents: 6 mos. on this service

V. Smart-Abbey, M.D. (McGill)
J. Wells, M.D. (Tulane)

Montreal Children's Hospital Residents: 6 mos. on this service

P. Gorman, M.D. (Ottawa)
V. Smart-Abbey, M.D.*
J.-G. Villemure, M.D.*

Neurological Research:

Ilo Leppik, M.D. (Pennsylvania) MRC Fellow

Neurosurgical Research

Cone Laboratory:
Yoku Nakagawa, M.D. (Hokkaido)
Christina Sahlin, M.D. (Umea)
Tohru Soejima, M.D. (Kyushu)

Spinal Surgery:
Eugene Kuchner, M.D.*

*3 mos. on this service

DEPARTMENT OF NURSING EDUCATION
POST BASIC CLINICAL PROGRAM IN
NEUROLOGICAL AND NEUROSURGICAL NURSING

Class from Sept. 1, 1975 — Feb. 16, 1976

Allen, Miss Rosalind
Boudrias, Miss Marie
Brown, Miss Patricia L.
Caron, Mrs. Louise M.
Chinnick, Miss Bonnie Louise
Garavito, Miss Cecilia
Isenbarger, Miss Janice Kay
Jardine, Miss Margaret Lynn
Kerr, Miss Patricia
Loh, Miss Kim Fong

Class from Mar. 1, 1976 — July 30, 1976

Brodeur, Miss Pamela
Bromberg, Mrs. Anna Lena
Cabugnason, Miss Fe
Cassidy, Miss Susan F.
Madej, Mrs. Suzanne
Miller, Miss Susan H.
O'Neill, Mrs. Sophia
Panicker, Mrs. Susan
Pryce, Miss Muriel

MONTREAL NEUROLOGICAL INSTITUTE AND McGILL UNIVERSITY TEACHING STAFF

Department of Neurology and Neurosurgery, Faculty of Medicine

Chairman of Department and William Cone Professor of Neurosurgery	William Feindel
Professor Emeritus, Neurology	Francis McNaughton
Professors, Neurology	Donald Baxter Preston Robb
Professors, Neurosurgery	Gilles Bertrand Theodore Rasmussen Joseph Stratford
Associate Professors, Neurology	Albert Aguayo Frederick Andermann Garth Bray J.B.R. Cosgrove Andrew Eisen Irving Heller George Karpati Donald G. Lawrence Israel Libman Joseph Martin Allan Sherwin Gordon Watters
Assistant Professors, Neurology	Morrison Finlayson Bernard Graham Michael Rasminsky Leo Renaud William Sheremata W.F.T. Tatlow Ivan F. Woods
Lecturers, Neurology	Eva Andermann Michel Aubé Sabah Bekhor Peter Humphreys Mortimer Lechter Calvin Melmed Stanley Rothman
Associate Professors, Neurosurgery	John Blundell Robert Hansebout
Assistant Professors, Neurosurgery	Carl Dila Robert Ford André Olivier
Lecturers, Neurosurgery	Robert Hollenberg John Little
Assistant Professor, Neurosurgical Research	Lucas Yamamoto
Professor, Neurophysiology	Pierre Gloor
Assistant Professor, Clinical Neurophysiology	Katherine Metrakos

Lecturers, Neuroelectronics ..... John Richard Ives
Christopher Thompson

Professor Emeritus, Neurochemistry ..... K.A.C. Elliott

Professor, Neurochemistry ..... Leonhard Wolfe

Associate Professor, Neurochemistry ..... Hanna Pappius

Associate Professor, Neuroradiology ..... Roméo Éthier

Assistant Professor, Neuroradiology ..... Denis Melançon

Lecturer, Neuroradiology ..... Garry Bélanger

Professor, Anaesthesia ..... Richard Gilbert

Associate Professor, Anaesthesia ..... Davy Trop

Assistant Professors, Anaesthesia ..... Richard Catchlove
Mary Morris

Lecturer, Anaesthesia ..... Luis F. Cuadrado

Associate Professors, Neuropathology ..... Stirling Carpenter
Gordon Mathieson

Professor, Neuropsychology ..... Brenda Milner

Lecturer, Neuropsychology ..... Laughlin Taylor

Lecturer, Clinical Psychology ..... Clara Strauss

Associate Professor, Neuroanatomy ..... Donald G. Lawrence

Assistant Professor, Neuroanatomy ..... Allan Morton

Lecturer, Neuroanatomy ..... Charles Olanow

Associate Professor, Neuro-ophthalmology ... Trevor H. Kirkham

Assistant Professor, Neuro-endocrinology ... Paul Brazeau

Representative to the Council of the Faculty of Graduate Studies and Research

Professor Pierre Gloor

EXECUTIVE COMMITTEE OF THE MONTREAL NEUROLOGICAL INSTITUTE

William Feindel, M.D., *Chairman*

Gilles Bertrand, M.D.
Roméo Éthier, M.D.
Pierre Gloor, M.D.
Francis McNaughton, M.D.
Gordon Mathieson, M.D.
Preston Robb, M.D.
Leonhard Wolfe, M.D.
Mrs. Rose Slapack, (Secretary)

EXECUTIVE STAFF OF THE MONTREAL NEUROLOGICAL INSTITUTE

Director ..... William Feindel, M.D.
Assistant Director (Education) ..... Preston Robb, M.D.
Assistant Director (Research) ..... Pierre Gloor, M.D.
Executive Secretary ..... Mrs. Sophie Malecka

Bottom Row: Drs. T. Kirkham, J.B.R. Cosgrove, Mrs. A. Howlett, Dr. P. Robb, Dean R.P. Cronin, Dr. Miller Fisher (Hughlings Jackson Lecturer), Principal Robert E. Bell, Drs. W. Feindel, G. Bertrand, Miss C. Robertson, Miss C. Griffin, Drs. F. McNaughton, R. Gilliatt, T. Rasmussen.

Second Row: Drs. I. Heller, M. Aubé, J. Woods, A. Eisen, G. Karpati, B. Milner, L. Wolfe, S. Carpenter, Mrs. C. Strauss, Drs. H. Pappius, G. Mathieson, F. Andermann, L. Demers, R. Ethier, A. Sherwin.

Third Row: Mr. L. Taylor, Drs. M. Vanasse, E. Andermann, Mrs. M. Bernard, Miss L. Blitzer, Drs. J. Barnes, P. Gloor, D. Trop, C. Dila, J. Little, M. Lewin, P. Gorman, H. Blume, Mrs. C. Douglas.

Fourth Row: Drs. R. Baker, C. Cohen, K. Nudleman, A. Bellavance, P. Bourgeon, Mr. G. Leonard, Mrs. M.K.Ajersch, Drs. A. Olivier, E. Kuchner, L. Yamamoto, C. Sahlin, Y. Nakagawa, D. Schomer.

Fifth Row: Dr. M. Gotman, Ms. D. Cosandey, Mr. D. Skuce, Miss L. Dansky, Drs. T. Hardy, G. Bélanger, D.S. Taylor, E. Arpin, T. Soejima, Mr. J. Gotman, Dr. D. Lawrence, Mr. E. Meyer.

Sixth Row: Drs. N.M.K.Ng, J. Musgrave, A. Pellegnini, Mssrs. J. Ives, C. Thompson, Drs. I. Leppik, N. Schaul, Mr. G. Thomas, Drs. G. Scotti, C. Milner, J. Martinez-Leyva, R. Branon, J.-G. Villemure, H. Ortegon.

Bottom Row — Left to Right: Miss N. Siddons-Grey, Miss A. Johnson, Mrs. B. Petrin, Miss H. Kryk, Miss C.E. Robertson, Miss I. MacMillan, Mrs. J. Mallory, Miss E. Roll, Miss A. Carney.

Second Row: Mrs. F. Murphy, Mrs. L. Gorman, Miss M. Cavanaugh, Miss E. Barrowman, Miss J. Green, Mrs. M. Chance, Mrs. G. Gyarmati, Mrs. N. Aifantis.

Third Row: Miss E. Conception, Mr. R. Somera, Miss K. Lackey, Mrs. L. Robbins, Miss L. Dalicandro, Mrs. E. Aucoin, Miss M. Everett, Miss F. Skretkowicz.

Top Row: Mrs. N. Inoue, Mr. B. Yule, Mrs. H. Keevweer, Mrs. E. Pennycooke, Miss Y. Camson, Mr. L. McKenzie, Mr. C. Aifantis.

Neurology

DR. PRESTON ROBB

There have been many positive events in Neurology during the past year. The ward service continued to be active. We have had an excellent variety of patients, but the turnover was slowed down because of difficulty in placing patients who have completed their investigation and treatment, the long-stay patient. This problem is worse than ever. The C.T. Scan has speeded up investigation and reduced the number of invasive procedures, and enabled us to hold the line on length of stay. Dr. Feindel is to be congratulated on the initiative he showed in getting the C.T. Scan, and now the spine and body scanner which has arrived and soon will be operational.

I would like to pass on to Miss Robertson and her staff the many words of appreciation I have had from patients who were amazed and pleased with the excellence of the nursing care they received. It is difficult for me to express adequately how grateful I am for the help and support the nurses of the Institute have given me over the years. As a young naval officer, during the war, I arrived here to do a short residency and was introduced to a superb team of nurses. Five of them are still here. I don't suppose there is any way that we can adequately express our appreciation for the tremendous contribution they have made to the hospital — Miss Elizabeth Barrowman, Miss Mary Cavanaugh, Miss Annie Johnson, Mrs. Joan Mallory and Miss Lillian McAuley.

There is an increased spirit of cooperation between the R.V.H. and the M.N.H. We are most grateful to Drs. McGregor, Monaghan, Fletcher and Rowat. Their efforts have greatly improved the running of the clinics and the consultation service. The latter has expanded to a staff neurologist on the R.V.H. wards for a couple of hours every day, a neurology resident, a medical assistant resident, and an elective student. It is a busy and popular service.

Teaching continues to be a major effort — both graduate and undergraduate. Dr. Donald Lawrence and his team are to be congratulated on their excellent basic science course. Dr. Sherwin has been of great help with the curriculum and the Introduction to Clinical Science Course. The elective program is working well, and is without doubt our best form of clinical teaching. Although things are far from perfect with the new curriculum, significant progress has been made in the undergraduate teaching of neurology.

We have an excellent resident staff who have worked under trying circumstances. I am grateful for their help and understanding. We reduced to two services during the recent six-month period; however, I expect we shall revert to three on July 1st. At the same time, we must consider ways of integrating our residents into an ambulatory diagnostic service.

The residency training program is a McGill function; its success is due to the cooperative spirit among the four hospitals. Dr. Donald Baxter at the Montreal General runs one of the most impressive neurology programs in the country. The demands for admission to the pediatric neurology training program at the Montreal Children's, directed by Dr. Gordon Watters, speaks for its excellence. Dr. Israel Libman at the Jewish General is also developing an excellent program and residents return from there with glowing reports of the clinical experience.

Our research efforts are reported by Dr. Gloor. Let me say that I am proud of our team of physician-scientists who have developed world-wide reputations in the field of muscle diseases, heredo-familial disorders, epilepsy, neuropharmacology and immunology. With the Royal Victoria Hospital steps have already been taken to establish a collaborative clinical and research program in the field of stroke. Cerebrovascular disease is one of the major crippling disorders of our time. It is our hope that significant progress can be made in the treatment and understanding of these disorders.

In 1935, as a member of the executive of the Medical Undergraduate Society, I was invited to the home of Dr. Wilder Penfield. This was the first of a series of encounters and associations with Dr. Penfield which extended over 41 years. I want to express my appreciation for the friendship, the teaching, the advice and support that he gave so generously over the years. He was a remarkable man, a true leader, a man whose way of life was an example to us all.

The Institute was opened in 1934, the culmination of Wilder's dream. One of the great things that he did was to bring Dr. William Cone with him to Montreal. While Dr. Penfield was developing the surgical treatment of epilepsy, and running the Institute, it was Dr. Cone who developed patient care to its highest level. For the most part, the investigation and treatment of patients was hospital-oriented, and required admission for pneumograms, myelograms, and later arteriograms. With the help of the Blue Cross or Q.P.C.A., this could be done at a reasonable cost. Not so today. The extraordinary rise in the cost of hospitalization has forced the government to limit the increase in hospital beds. Yet there is an increase in population, and medicare has greatly increased the demands for neurological consultation. We are in a period of revolution in the delivery of medical care. The shift in emphasis should be from in-patient to out-patient service. At the same time, we have to maintain a high standard of record keeping and care. We would, thus, protect our few beds for surgical patients and patients who must be hospitalized for specific types of investigation. We must establish priorities with our laboratory services, so that investigation can be completed in a reasonable period of time. In neurology, with the advent of the C.T. Scan this should be possible. Patients with epilepsy, back problems, tumors, headaches, should be able to have most of their investigation done on an outpatient basis. At the same time, it must be done quickly so that the patient does not remain in a state of suspense as he waits week after week for the results

of x-rays and other tests. As well, we must reorient our resident teaching experience to enable them to benefit from the change.

In a sense we have reached a crossroad. The government, both federal and provincial, initiated medicare, and now they cannot pay for it. It is up to us to find ways of reducing the cost of a "unit of treatment". That is to reduce the cost of investigating one patient with a particular problem without sacrificing quality, teaching, or the ability to treat people thoughtfully and with kindness. This is a great challenge and I believe the M.N.H., working with the R.V.H., has the potential to meet the challenge and provide leadership in developing this new brand of neurology.

With the ambulatory day care center being planned for the New Wing, along with the C.T. Scan, the splendid facilities of the x-ray, E.E.G., Brain Scan and other laboratories, more patients can and will be investigated on an ambulatory basis. I am sure the total cost will not go down, but more patients will be seen without major budget increases.

From the beginning, the M.N.I., and the hospital, have been a team effort. It is going to be even more important that the team spirit, and the willingness to work together, continue as it has in the past.

Neurosurgery

DR. GILLES BERTRAND

Services:

During 1975, accidents and sickness took a heavy toll from our neurosurgical manpower. This, combined with a chronic shortage of operating room nursing staff and union difficulties during September and October explains a decrease by approximately 7% in the number of operative procedures performed as compared to last year's statistics. This is less of a drop than one might have expected under the circumstances and indicates an increased workload on the shoulders of those who remained to do the work, nursing staff and surgical staff, to whom we must all be grateful.

There were 6 post-operative infections, a rate of 0.85%; they were due not so much to the old "hospital staphylococcus" but to Gram negative organisms which are proving very difficult to control and have caused Dr. Hansebout, Chairman of our Infection Committee, a great deal of worry. This change in the flora of wound infections has also been noted in other hospitals and was the object of a presentation at the last Congress of the Royal College of Physicians and Surgeons of Canada.

In an effort to decrease the rate of urinary infections as well, a programme of intermittent catheterization has been implemented for the paraplegics in the Intensive Care Unit and on the 3 South ward, to replace the indwelling catheters. This already seems to have had a favourable effect on the rate of urinary complications to which these patients are prone.

Our three new sterilisers for the operating room and the central supply department are finally in working order, after months of frustrating financial and technical difficulties. We have also purchased a Radionics high frequency coagulator which has already been put to use for a simpler treatment of tic douloureux and also, in certain stereotaxtic operations, for involuntary movements and pain.

This year has seen a rearrangement of the neurosurgical services from 3 to 2, necessitated by a cut-back in the number of residency training posts. Some of these positions are now filled by residents training in the new specialty programme of Emergency Medicine recently organized at the Royal Victoria Hospital. These residents spend a three-month period on the neurosurgical services and, so far, this has been a mutually satisfying arrangement.

New Staff:

I welcome Dr. John R. Little who joined our neurosurgical staff in January. Dr. Little was born in Regina and studied medicine at the University of Saskatchewan, graduating in 1970. He then took his postgraduate training in neurosurgery at the Mayo Graduate School of Medicine in Rochester, Minnesota. His special interest lies in the surgical treatment of cerebral vascular disorders.

Neurosurgical staff activities:

Dr. Theodore Rasmussen was elected President of the Eastern Association of Electroencephalographers. He was also invited to Duke University as visiting professor in Janauary 1976. He continues to be a member of the American Board of Neurological Surgery and to serve on the Epilepsy Advisory Committee and the Neural Prosthesis Committee of the National Institute of Neurological and Communicable Disorders and Stroke in Bethesda.

Dr. William Feindel was named President-Elect of the American Academy of Neurological Surgeons. He is the second Vice-President of the American Neurological Association, a member of the Board of Directors of the Canadian Stroke Society and President of the Montreal Medico-Chirurgical Society. During the fall of 1975, he was a guest lecturer at the University of Sherbrooke and a guest lecturer also at the Xth Anniversary of the Neurological Institute in Caracas, Venezuela during the XVIth Congreso Latino-Americano de Neurocirurgia in Caracas. He delivered the Kershmann Lecture at the Eastern E.E.G. Society in New York and was invited as a visiting professor to the New York School of Medicine. He was also an invited panelist at the Meeting of the Canadian Cardiovascular Society in Montreal. Dr. Feindel continues as President of the Comité de formation médicale continué de la F.M.S.Q. (neurosurgical section), as Consultant to the World Health Organization Program in neurological disorders and as a member of Committees of many national and International Medical Societies.

We congratulate Dr. Robert Hansebout on his promotion to the rank of Associate Professor of Neurology and Neurosurgery at McGill University and on his re-election to the post of Vice-President of the Association of Neurosurgeons of the Province of Quebec. We are grateful to him also for his continuing role as Head of the Infection Committee and the Emergency Committee of this Hospital.

Dr. André Olivier is a member of the Council of the Association of Neurosurgeons of the Province of Quebec.

Dr. Carl Dila has recently been elected Secretary to the Montreal Neurological Society.

Dr. Gilles Bertrand was invited as visiting professor to the Medical School of the University of South Carolina in Charleston and was also the 1976 William Keith visiting professor to the Department of Surgery of the University of Toronto. He was also a guest speaker on a panel on Parkinson's Disease at the Quebec meeting of the Royal College of Physicians and Surgeons.

This 41st annual report now must end on a very sad note for this year we have lost our "Chief". There could be many "chiefs of this" and "chiefs of that" but, for those who worked with him and particularly for those who had the privilege to be his residents, that name, "the Chief", could apply only to one man, Wilder Penfield. We all miss him, a truly great man.

Graduate Studies and Research

DR. PIERRE GLOOR

When this Institute opened its doors in 1934, neurology was perceived by many as a discipline which, though intellectually satisfying, was bound to be depressing and frustrating for the physician eager to bring cure or relief to those suffering from neurological illness. There was an aura of therapeutic hopelessness attached to neurology in those days. Although there are still many neurological conditions for which we have no effective treatment, this feeling of therapeutic nihilism has largely disappeared, thanks to neurological research, fundamental and applied. Dr. Penfield's foundation address given at the opening of this Institute in 1934, made it clear that he intended the foremost function of this Institute to be a place where physicians and scientists would pool their efforts in the attempt to dissipate our ignorance concerning neurological illness. This goal was to be pursued by physicians who, as he put it, were able to "lead the double professional life; tend to the sick with sympathy and control experiment with critical judgment". Dr. Penfield realized that progress in the search for the relief of neurological sickness was dependent upon increasing our fundamental knowledge of the structure and function of living matter, particularly of the brain, and that this implied a firm committment to basic scientific research. The history of this Institute has borne out the validity of his vision: we are much more capable today than we were in 1934 to provide relief of many neurological illnesses and this has been made possible in many instances as a result of scientific work done in this building or carried out elsewhere by people who received their training here and were caught up in Dr. Penfield's enthusiasm. But, this work is never finished and much still needs to be done.

Research carried out during the past year in the Department of Neurology and Neurosurgery of McGill University has remained faithful to this tradition. I shall illustrate with a few examples how such research, often using the tools of basic science, has advanced our knowledge of human disease, clarified its pathogenesis and etiology, and thus opened up new possibilities of prevention and treatment.

Strokes are one of the leading causes of chronic disability and death in our society. Until recently, few techniques were available for adequately studying the dynamics of the cerebral circulation and discerning the mechanisms which lead to the disturbances of cerebral blood flow that may cause fatal or crippling strokes.

In much of the work done by Dr. Feindel, Dr. Yamamoto and their colleagues in the Cone Laboratory for Neurosurgical Research, new and finer techniques were used for the study of cerebral circulation leading

to considerable advances of our knowledge in this area. The most exciting new development in this field is the Positome, a positron emission tomograph. This is a sophisticated new piece of equipment linked to a computer which allows one to measure, without any invasive techniques and without any discomfort or risk to the patient, localized cerebral blood flow in small and even deep-lying and otherwise quite inaccessible regions of the brain. Mr. Thompson, our computer engineer, has devised methods enabling the computer to produce a pictorial representation of the spatial distribution of blood flow within the living human brain, thus adding to the flexibility and analytical power of this instrument. This new method should greatly expand our ability to probe into the disturbed physiology of cerebral circulation in patients suffering from cerebral vascular disease.

Strokes, tumors, and direct mechanical injury to the brain and spinal cord destroy nervous tissue. They also engender reactions in adjacent parts of uninjured brain and spinal cord which, if uncorrected, can, under certain circumstances, produce additional damage beyond the area of the original injury. Work in several of our laboratories has clarified some of the important mechanisms which enter into play when nervous tissue is injured: there are important biochemical changes which Dr. Pappius has studied in collaboration with Dr. Hansebout; there are repercussions on cerebral blood flow which were investigated by Dr. Yamamoto and his group; there are repercussions upon the functional integrity of the non-injured brain as expressed in the electroencephalogram, changes which are presently under investigation in the neurophysiology laboratory, and finally there remains the quest for methods to minimize the extent of the final lesion in localized trauma, a subject on which promising advances have been made by Dr. Hansebout and his group with regard to acute spinal cord injury.

Much anguish and suffering is generated in a family when a happy and thriving infant begins to develop signs of a relentlessly progressive disease of the brain which inexorably leads to major neurological disability, mental retardation and ultimately death. The knowledge that such a tragedy could recur in another child of the family, because the hereditary origin of the disease is known or suspected, adds to the anguish and bewilderment of the parents. Research has been carried out on a number of these diseases in our Institute during the last year. Progress has been made on two fronts: for some of these conditions the mode of inheritance and the possibility to detect the carrier state in healthy relatives has been investigated by Dr. Eva Andermann and her collaborators; the genetically determined biochemical derangement ultimately responsible for the clinical manifestations has been studied with considerable success by Dr. Wolfe and his associates. He received invaluable assistance from Dr. Carpenter who, with the help of the electron-microscope, was able to define the submicroscopic characteristics of the abnormal chemical material which accumulates in brain cells and which the biochemists were interested in identifying. The practical consequences of this type of research are that it is now possible in some of these conditions, at least,

to detect healthy carriers, to determine in the early stages of pregnancy whether the fetus is affected by the disease and thus relieve much suffering and anxiety by well directed genetic counseling. The more distant goal of actually correcting the biochemical alteration caused by the defective gene is still not within our grasp, but can only be reached by the type of continuing painstaking work done by Dr. Wolfe and his colleagues.

Epilepsy is a heavy burden to carry for any patient suffering from recurrent seizures. In spite of much progress over the last decade, there remain many patients whose seizures are intractable medically or surgically with present day methods of therapy. Depending on the case, this intractability may be caused by our still deficient understanding of the nature of the epileptic process, by our inability to clearly pinpoint in a given patient the origin of the seizures and by our still inadequate knowledge of the action of anticonvulsant drugs. In all these areas, progress has been made during the past year. Research done in the neurophysiology laboratories has clarified the mechanism of generalized epilepsy. These new findings also help us to better understand the relationship between generalized and focal epilepsies. We now believe we have obtained a pretty good grasp of the respective roles of cortical and various subcortical structures in the pathogenesis of what in the past has variably been called "idiopathic", "centrencephalic" or "generalized cortico-reticular epilepsy".

In the field of clinical epilepsy research, we have benefitted from Mr. Ives' further refinements of methods of long term monitoring of epileptic patients whether by a 16-channel cable telemetry system or by a small portable 4 channel cassette recorder which the patient can carry with him unobtrusively at home, at work, or at school. These methods have often allowed us to identify more clearly the nature and the location of the epileptic process in patients. The 16-channel cable telemetry system has been an essential ingredient in the program of chronic stereotaxic depth electrode exploration of the brain of epileptic patients with medically intractable seizures carried out in collaboration with Dr. Olivier.

In the anticonvulsant drug laboratory directed by Dr. Sherwin, the main research interest has been the uptake and distribution of these drugs in the brain in relation to their mechanism of action. Well targeted use of these drugs, tailored to the individual needs of the patient, is now much more feasible.

There are many more research projects which would be worth mentioning, such as the excellent work in neuroendocrinology being carried out by Drs. Martin, Brazeau and Renaud in the laboratories of the Montreal General Hospital, the highly productive work of our neuropsychological team under the direction of Dr. Brenda Milner, research on neuromuscular disorders carried out by Drs. Karpati, Eisen and Carpenter at this Institute and by Drs. Aguayo, Bray and Rasminsky at the Montreal General Hospital, Dr. Lawrence's neuroanatomical investigations, neuroimmunological studies performed by Dr. Sheremata and so on. Further details not given here are found in other reports.

Research costs money, and money buys less and less in these inflationary

times. It is therefore regrettable that the Federal Government has seen fit to freeze the budget of the Medical Research Council of Canada as part of its economy drive. The question may be asked, why should we, as good citizens, object to this; does not everyone have to make a sacrifice to stop the inflationary spiral? The answer to this is that the Medical Research Council has been kept on a short financial leash for several years prior to the recent institution of tough anti-inflationary regulations. Medical research is thus a victim of double jeopardy under these circumstances. It had been forced to make do with less than was necessary before and by not allowing the MRC budget to rise at least in proportion to current inflation, it seems that the Federal Government has decided that medical research ought to be reduced.

The Federal Government's cutback on medical research may well have serious consequences: good research will remain unfunded, less support will be available for training young research scientists, much needed equipment cannot be bought. The competition for what is left will reach an unhealthy level, since grant review committees find themselves in the unenviable position of making decisions that they know will lead to a denial of research funds for projects for which, probably in the opinion of every member of the committee, support should in fact continue to be provided. Decisions are thus forced on MRC which may have damaging consequences for some deserving individuals and institutions.

During the past year, 17 research projects in the Department of Neurology and Neurosurgery at McGill were funded by MRC, twelve of these here at the M.N.I. and five at the Montreal General Hospital. We received five research grants from extragovernmental sources; four from the Muscular Dystrophy Association, three at the M.N.I. and one at the Montreal Children's Hospital, and one from the Multiple Sclerosis Society of Canada. Thus most of our extramural support for research is supplied by the Medical Research Council of Canada. We must therefore make as certain as we can that this source of funds does not dry up. To prevent this, of course, it is most important to produce good research, but in today's ultracompetitive situation, this may no longer be enough.

I feel that I cannot close this year's Annual Report without paying tribute to Dr. Penfield, to whom we owe the existence of this Institute and all it means to us in our personal and professional lives. Dr. Penfield had a dream, and the dream came true. It was like the answer to a prayer perhaps best expressed in one of Dr. Penfield's favorite biblical quotations the famous passage from the book of Job: "Where shall wisdom be found and where is the place of understanding?". I like to think that when Dr. Penfield quoted this passage, as he did quite often, his thoughts turned to this Institute and that it expressed his hope that its noblest function was to be a place of wisdom of the true physician in the Hippocratic and Oslerian tradition, a wisdom nurtured in compassion and in the understanding that comes to those who have learned to ask Mother Nature the right questions with discernment and critical judgment, be it by the bedside or in the experimental laboratory. Whether we have been true

to this ideal and fulfilled the hope, is for others to decide, but there is no question that we are heirs to a legacy that embodies great expectations. Dr. Penfield, wherever your spirit may now dwell, let us assure you that we want to keep your dream alive. You have passed on to us the torch. May we tend this flame you have entrusted to us with the kind of wisdom and understanding that has always been yours.

Administration

MRS. ALPHONSINE HOWLETT

Having always worked in a community context, it was a new experience to be part of the ongoing daily life of a hospital. The special character of the Montreal Neurological Institute has made it that much more interesting.

The spirit of collaboration among the staff, working in the interest of the patients, while at the same time having to work within the limitations set by a budget controlled by government, is no mean feat.

The admission and discharge policy was reviewed. We appreciate the excellent cooperation of all those concerned in following this policy.

We heartily congratulate Mrs. Podgurny, our dietitian, who gave birth to twin girls in December. She was replaced during her leave by Mlle. Danielle Cantin whose competence and charm were heart warming. In March, Mrs. Podgurny returned full of enthusiasm and ideas for the months ahead. Francophone patients now receive menus in French, turned out by our conscientious printer, Guy Durocher.

We are grateful to Mr. Geoffrey Thomas and his staff in the business office who met our daily requests with such patience and courtesy. The Hospital and Institute Library under Mrs. Boski provided efficient and courteous service.

I have witnessed the tremendous efforts made by Mr. Rochette and his housekeeping staff to maintain the high standards of the hospital. Each day brings to housekeeping a myriad of demands, all urgent for those making the request, and these have been well executed.

The residency for our Post-Graduate Nurses, under the able supervision of Mrs. Monton and Mrs. Shaw, received much needed interior decoration.

Twenty young men and women from McGill University come on a daily basis to read or play cards or visit with the patients. All this is greatly appreciated.

Some 50 employees registered for the French course. Conducted by Madam Farkas and Monsieur Ifergan it was imaginative and interesting.

The highlight this year of the activities of the Clinical Satff Advisory Council was an informative and pleasant Open House. The Council established "a Good Neighbour Fund", chaired by our much respected Director of Personnel, Mr. Hector Heavysege.

The Annual Reitman Christmas luncheon was enjoyed by some 400 members of staff. Mr. Sam Reitman, Mr. & Mrs. Cyril Reitman and Mrs. Sara Salomon, Mrs. Cyril Reitman's mother, honoured the party by their presence.

The Health Systems Engineers of the Montreal Joint Hospital Institute, after an analysis of our purchasing and material control, recommended that purchasing be centralized. Our new Materials Manager, Mr. Bryan

Malley was appointed in February. We all wish him well in this important task.

It has been a privilege for me to work closely with Miss Robertson. The problems faced by a Director of Nursing in a ultra-specialized hospital in Quebec are indeed challenging.

It was a sad day for all when Dr. Penfield died on April 5. On learning this sorrowful news Leonard Parsons, a well known staff member, composed a tribute to Dr. Penfield from which I quote:

"For the gift of life is not rightfully ours to hold forever
But your gift to mankind will never be forgotten"

Financial Report

MR. GEOFFREY F. THOMAS

Financial statements measure the competence with which we use the resources that are provided to operate the Institution and reflect the collective efforts of all of us who work here.

A brief outline of these efforts reveals that, in 1975, total operating expenditures amounted to $7,166,839.00 — an increase of 6% over 1974, and of 0.9% above the approved budget. Total income earned was $7,109,185 — an increase of 2% over 1974, and of 0.1% below the approved budget. The net effect is that the 1975 operations resulted in a deficit of $57,654.

A further comparison of the gross admissible expenses and real admissible revenues with the approved budget shows that the global component, administered by the department heads, was overspent by $110,882, while the detailed component was underspent by $43,530 for a net overexpenditure of $67,352. Total net admissible revenues amounted to $8,670 over the budget, giving rise to a net admissible deficit of $58,682.

This admissible deficit is usually claimed from the Ministry of Social Affairs as a year-end settlement. In 1975, the Ministry advised that this deficit will no longer be paid. Consequently, serious efforts will have to be made to contain the cost of operations within the limits of the approved budget. This objective is made more difficult by the Ministry's decision to trim 2.5% from an anticipated 3.2% increase in the hospital budget for the new fiscal year 1976-77, thereby allowing only 0.7% increase to cope with rising inflation and normal increases in salary echelons. The ingenuity of hospital administrators and department heads to keep within these guidelines has been challenged, and the results will be the object of close and critical scrutiny over the coming months.

The Ministry of Social Affairs has also announced a new policy regarding the financing of capital equipment. In essence, revenues from

private and semi-private rooms will be shared on a 45 — 45 — 10% basis between the Regional Council, the Hospital and the Ministry respectively for the purchase of needed equipment. Regional Councils will deal with equipment requests below one million dollars and will finance up to 80% of the cost, while the hospital will have to finance 20%. Requests involving expenditures over one million dollars will be referred to the Ministry. It is anticipated that these new methods will prove more responsive to the needs of hospital for more funds to replace obsolete and inefficient machinery.

In 1975, the Hospital admitted 1952 patients, who received 41,742 days of care, compared with 2,211 patients for 45,037 days of care in 1974. During the year, 1952 patients were discharged with an average length of stay of 18.9 days, compared with 2,212 patients with an average length of stay of 20.5 days in 1974. The occupancy rate in 1975 was 85%, compared with 91% in 1974.

Hospitals are recongised as being labour-intensive organisations. For this reason, salaries and wages consumed 70% of total expenditures vs 73% in 1974; Medical and Surgical Supplies used 3%, Drugs 2% and Fringe Benefits 14% — the same as in 1974 — while other supplies and services utilised 21% compared with 18% in 1974.

Collective agreements, in some sectors, are in the process of being finalised, and the conclusion of these negotiations will be a welcome relief to all of us — patients and employees alike.

We are fortunate that at the founding of this Institution, and as a condition of the original Rockefeller Foundation grant, separate budgets were established for research and for hospital operations, an arrangement that Dr. Penfield promoted and maintained over the years. This arrangement, particularly, facilitated an easy transition in identifying costs when the provincial hospital insurance scheme was established in 1961.

We have all benefited from Dr. Penfield's humanitarianism, his striving for excellence, his ability for hard work and his high regard for his fellowman. He was a man of simple and profound faith, of deep moral and religious convictions, and a man among men.

In closing, I would like to express my thanks to the members of the Board of Directors and my staff for their valuable support over the past year.

Department of Nursing

MISS CAROLINE ROBERTSON

During 1975, the emphasis has been on nursing practice, helping staff to learn and evaluation of care.

My special tribute this year is to the staff who continue to carry out the turnings, the mouth care, the tub baths, the listening and the caring functions that lead to good neurological nursing. For example, we gave 41,742 baths and fed patients 125,622 times in 1975! Our nursing practice committee has begun an audit program to evaluate nursing care and an intermittent catheterization program for spinal injury patients.

In the Intensive Care Unit, our Head Nurse, Mrs. Barbara Petrin, and Nurse Clinician, Mrs. Linda Robbins, are providing a climate for team work and learning. A comparison study of staffing needs and increasing workload in the I.C.U. from 1970 — 1975 has more fully demonstrated the budget needs of that area.

Two of our nurses who retired, Miss Delta MacDonald and Mrs. Flora Murray between them gave 50 years of effective service to our patients. Miss Geraldine Hart of In-Service Education left for further studies and was replaced by Miss Felicia Skretkowicz.

We welcome Mrs. Frances Murphy now in charge of 3 North — East Unit.

We wish to thank the medical, professional, auxiliary and administrative services who provide the help which allows us to devote our time to nursing and the management of nursing practice.

Thirty-one students completed the Post-basic Program in Neurological and Neurosurgical Nursing. Fifty-five nurses had a formal orientation program; 21 of these also completed the two-month professional training requirement for the Order of Nurses of Quebec. Fourteen part-time nurses, 16 auxiliary staff and 12 summer relief students learned the requirements of their positions. A total of 82 under-graduate students practised nursing with us.

The Montreal Neurological Hospital continues to attract staff from all over the world, but low remuneration, problems of accommodation and transportation have contributed to turnover.

Our aim for 1976 is to keep staff with us, in the Neuro family, to improve continuity of care that leads to quality nursing.

Social Service Department

Director ..... Miss Cynthia Griffin, B.A., M.S.W., P.S.W.
Social Workers:
Mrs. Saroj Gupta, B.A., M.S.W., P.S.W.
Mrs. Irena Liebich, B.A., M.S.W., P.S.W.
Miss Kathleen Macdonald, B.A., B.S.W., P.S.W.
Miss Noella Vaillancourt, B.A., M.S.S.
Miss Monica Wilde, B.A., M.S.W., P.S.W.

We have now completed a full year during which the social workers' employer has been the Ville Marie Social Service Centre, but, in accor-

dance with a contract of service provided in Bill 65, we are based in the hospital centre as before with relationships essentially unchanged.

Fears of centralization, bureaucracy and lack of participation in planning and decision-making, and frustration over the slowness of desired changes, such as increase in the quantity, quality and accessibility of resources for long-term care still exist but they are becoming less intense, in part because increasingly cohesive groups of hospital social workers, including those of our department, continuously review the most effective ways of providing services to patients and families in the hospital and in the community.

The recent re-organization in the assignments of the medical staff to the neurology and neurosurgery services has resulted in a change, on an experimental basis, in the assignment of individual social workers to wards instead of to particular services. The social worker now relates more knowledgably to a specific group of patients and ward staff and participates more constructively in ward conferences in which the VON liaison and the social worker can provide a link to the community. We hope for more case conferences with all the pertinent disciplines participating and sometimes with patients and family members too. A communications problem in our working relationships with doctors for both in-hospital and ambulatory patients has arisen in this transition period and this will require further review and adjustments.

We have had an unusual series of staff changes both of social workers and of secretaries. Special mention is due to Mrs. Irena Liebich who, for many months, following the resignation of Miss Ann Chant, was the sole social worker to cope with the stress-ridden seizure clinic patients. We have been impressed also by the equanimity with which our senior secretary, Mrs. Manon Gagnon, has handled the pressure by patients and families and by social workers and other hospital staff.

Our involvement with the concerns of both centres (hospital and social service) is one example of our dual allegiance. Another is our membership on the Clinical Staff Advisory Council of both centres; our department is represented on the executive of one and on the main standing committee of the other. Still another affiliation was with the McGill School of Social Work which assigned a Bachelor's level student to us for field work.

Again this year two-thirds of the patients and families helped by social workers were from neurology and one-third from neurosurgery. Of those from neurology three-quarters were out-patients; from neurosurgery the numbers of in-patients to out-patients were about equal. The high incidence of neurology out-patients results from the large numbers of the young and middle-aged with neurological conditions such as epilepsy and multiple sclerosis; for them a myriad of inter-related medical, social and emotional problems are truly long-term, not just for months or years but for decades, requiring continuing or periodic help with adjustments and re-adjustments for themselves and family members.

For in-patients, the major reason for referral to social service was for

help with discharge plans. This can involve the whole gamut of related social and psycho-social problems, but special comment must be made about that perenially frustrating concrete problem of finding appropriate resources for the chronically-ill, with home-help and placement possibilities in desperately short supply. The following typical remarks illustrate part of the problem:

(1) Chorus of doctors, nurses and other hospital staff to social workers — "Mr. X. no longer needs to be in this hospital; he is taking up a bed unnecessarily and preventing admission for really sick patients";
(2) Social worker, excitedly, "A chronic care bed is available for Mrs. L. after *only seven* months on the waiting list";
(3) Typical responses from long-term care institutions to which patients were referred:
    (a) "There's a shortage of nurses and your patient requires too much care";
    (b) "We have all the long-term neurology patients we can handle; they've been here for years";
    (c) "Your patient is not eligible for our hospital; try a nursing home or hébergement." Nursing home reply, "My dear, we're not equipped to look after your patient; he belongs in a chronic care hospital".

Compounding the problem are two restrictions by which we are bound: (1) The November 1973 directive from Quebec, still in effect, which states that if appropriate resources are not available, the patient must be kept in the active treatment hospital; and (2) A recent resolution (passed by a representative group of the 167 Ville Marie hospital social service staff) in which we agreed that we would not refer to or even recommend a placement facility which does not have an appropriate license UNLESS follow-up by an inter-disciplinary team could be assured. We recognize that this increases immediate problems, but we feel that we can no longer be a party to perpetuating inadequate care; we hope too that this may be one means of exerting pressure where it will be most effective.

We must pay tribute to the continuous devotion of those whose donations of time and/or funds have helped to ease the burdens of so many patients, through the countless hours by the RVH Volunteers in their cheerful blue smocks and the contributions to our clinical relief funds by individuals and organizations, including the RVH Women's Auxiliary, multiple sclerosis associations, In His Name Society and the CJAD Christmas Fund. No matter how much is provided for by government funds, there will always be unmet health-related needs, particularly for marginal income patients, e.g. for wheel chair rental for a convalescent period, or to provide transportation so that physically (and sometimes emotionally) handicapped patients may keep appointments at the hospital.

We regard our dual allegiance as an opportunity to help provide improved, better coordinated services and resources for our patients. Toward this end, we look forward to ever-closer collaboration with other members of the multi-discipline team at MNH and with our colleagues in Ville Marie and other social service centres and regions.

Clinical Laboratories

DR. GORDON MATHIESON

This report provides a brief overview of outstanding facts and general trends on activities of ten different laboratories with a hospital service function.

We record achievement and difficulty, success and unfulfilled dreams. As regards difficulty, two main themes emerge: lack of space and obsolescence of equipment. Clinical psychology is especially hard pressed for space, as was recorded in last year's Annual Report. Their patient case load has remained essentially unchanged, but more time is now spent with each patient, and the proportion of more complex and collaborative examinations has increased. These activities on the part of five full time psychologists have produced a secretarial backlog in completing reports.

In pleasant contrast we can record that the brain scan laboratory has been relocated in spacious quarters which also meet new federal regulations on safe handling of radioisotopes. This laboratory reports a 22% increase in brain scans for the 1975 calendar year.

Dr. Sherwin's Neuropharmacology Laboratory continues to perform anticonvulsant assays, for not only our own patients but those of other McGill hospitals. This laboratory is developing new techniques and has been involved in teaching those in other centers who wish to apply this valuable tool in the control of epilepsy.

No one can deny that this has been a year of financial stringency and retrenchment. Of necessity medical laboratories are equipped with expensive apparatus. With the passage of time some of this equipment becomes outmoded and other items just plain wear out. There is thus a constant need to replace equipment if the laboratories are to continue functioning efficiently. EEG, the anaesthesia laboratory, and neuropathology have major problems of obsolescence of equipment. In the anaesthesia laboratory, the blood gas analyser and the flame photometer are over fifteen years old and should be replaced. In neuropathology the microscopes are gradually being rehabilitated or replaced. Dr. Gloor reports that the operating room corticography equipment requires replacement; at present it needs frequent, time-consuming repairs.

Last year we expressed concern at a decline in our autopsy rate to 49.5% in calendar 1974. For calendar 1975 the figure is marginally improved at 52%, (64% if medico-légal cases done extramurally are included), but still lags far behind the figures which obtained about a decade ago, which ran at about the 80% level. Muscle biopsy is being increasingly used in the diagnosis of neuromuscular disease, there were 205 such examinations during 1975, up 19% from 1974.

Techniques for the measurement of workloads in laboratories are much in vogue, and some figures were given last year, together with a warning that they must be viewed with caution. This year we have a clear

example of the hazard of taking figures at their face value: the radiology department is booked solidly for three months ahead, and is busier than last year, yet there were 331 less examinations reported in the statistical returns for 1975 than for 1974. Complexity as well as numbers contribute to the workload. The pattern of radiological investigation is rapidly changing. While computerized scans increased from 2,480 in 1974, to 3,700 in 1975, there were approximately 1,600 less conventional X-ray examinations. This inclued 100 fewer pneumograms, and 140 fewer angiograms.

In EEG special overnight or weekend monitoring with computer assistance are becoming more frequent. As a result there is a need for a small computer facility separate from that used for research. A second full-time electroencephalographer and clinical neurophysiologist would be of great assistance to Dr. Gloor especially for involved procedures such as depth electrode recording.

Despite its cramped quarters, the EMG laboratory has carried out more work than in the previous year, but on fewer patients, again reflecting the tendency for laboratory examinations to become more complex and more demanding of time, equipment and personnel.

Some laboratories provide extensive outpatient diagnostic services. The table shows that the number of outpatients studied in the EMG laboratory, in EEG, and in the computer tomography unit exceeded in each case the corresponding number of inpatients. In many ways this is as it should be. The expense of hospital admission is obviated or patient stay reduced. These highly specialised, capital intensive facilities with accompanying technical and professional expertise become available as a regional, indeed to some extent a provincial, reference centre. None the less we must bear in mind that these laboratories were originally planned as inpatient facilities and a high volume of extra outpatient work places an additional burden on their budgets and personnel.

	Number of patients		
	EMG	*EEG*	*CT Scan*
Outpatients	840	1955	2139
Inpatients	339	1807	1533

I have spoken at some length of the difficulties caused by lack of space and aging equipment, because these things need to be said. There is however something which we can affirm without fear of contradiction or challenge: these 10 laboratories are going concerns, doing good work, adapting to the changing environment, and looking confidently to the future.

Neuro-Anaesthesia

Senior Consultant ..... R.G.B. Gilbert, M.B., B.S., F.R.C.P.(C) F.F.A.R.C.S., F.A.C.A., C.S.P.Q.

Anaesthetist ..... Davy Trop, M.A., M.D., M.Sc., F.R.C.P.(C) F.A.C.A., C.S.P.Q.

Assistant Anaesthetists ..... Jennifer A. Barnes, M.B., Ch.B., C.S.P.Q.
Richard F.H. Catchlove, M.B., B.S., M.Sc., F.F.A.R.C.S.
Luis F. Cuadrado, M.D., D.A.B.A., C.S.P.Q.
Mary E. Morris, M.D., F.R.C.P.(C), Ph.D., C.S.P.Q.

Pain Clinic Consultant: ..... A.R. Ramsay, M.D., F.R.C.P.(C), C.S.P.Q.

Fellows: 3 mos. on this service:

N. Avendano, M.D. (Santiago)
N. Jaspar-Sergysels, M.D. (Brussels)*
I. Kocur, M.D. (Palacky, Czechoslovakia)
V.D. Martinez-Gamba, M.D. (Asuncion)
V.S. Tam, M.D. (Tai Wan)
H. Yazer, M.D. (Dalhousie)

Head Nurse, Anaesthesia & Pain Unit ..... A. Kelly, R.N.

Head Technician, Inhalation Therapy ..... W. Garneau

Laboratory Technician: ..... V. Panicker, R.T.

*6 mos. on this service

We are slowly learning to cope with a number of residents varying from one to three at a time, each of them staying for only three months. This situation, which arises from Provincial policies regarding training of foreign graduates, has put much strain on the attending staff as more hours have to be spent in the operating rooms for the direct supervision of the patient. We cannot rely any longer on anaesthetic trainees for the day and night coverage of the Intensive Care Unit. As a result very little time is left for research and academic activities.

For the first six months we were greatly helped by anaesthetic technicians; however two left in January for personal reasons and we experienced great difficulty in replacing them. Night and week-end coverage in the operating room and the I.C.U. is difficult to arrange. Under the present restrictions it is extremely difficult to assure proper respiratory care to the patient.

In the I.C.U. area 14,200 hours of assisted or controlled ventilation were provided; 657 patient-days with tracheostomy and 584 patient-days on respirators were recorded. Approximately 10,000 hours of respiratory care were provided to these patients by the nurses as there is no inhalation therapy technician on duty between 16:00-8:00 hours.

The monitoring equipment for anaesthesia in the operating room area is obsolete; it should be urgently updated. In the C.I.U. area we were fortunate in receiving two cardiac monitors from the Women's Auxiliary in the past year, and one from a research grant, but we feel a total of three cardiac monitors is inadequate to allow us to care for all patients in our 12 beds in I.C.U.

The total anaesthetic workload in the operating suite and the x-ray

department has decreased by about 20%. New advanced technology in radiology has cut the number of general anaesthetics in this area. Impending strike situations during the year and difficulties in bookings of cases in the O.R.s reduced the number of surgical procedures.

The Pain Clinic has fared well during the year. Although the number of diagnostic and therapeutic procedures has not increased from the past years, the follow-up of patients has improved. Doctors Catchlove and Ramsay have achieved a unique team in the Montreal area for the evaluation of the patients. Miss A. Kelly has the difficult role of keeping in continuous contact with the patients and her input in the clinic has been very valuable.

Neuroradiology

Radiologist ..... Roméo Ethier, B.A., M.D.

Associate Radiologist ..... Denis Melançon, B.A., M.D.

Assistant Radiologists ..... Garry Bélanger, M.D.
Saul Taylor, M.D.

Clinical Fellows:
Karl Ter Brugge, M.D. (Utrecht)
Curtis Milner, M.D. (Queen's)
Giuseppe Scotti, M.D. (Milan)
Stanley Tchang, M.D. (Saskatchewan)

Neurosurgery Residents: 3 mos. on this service
Richard Branan, M.D.*
Arun Ginde, M.D.
Eugene Kuchner, M.D.
Jorge Martinez-Leyva, M.D.
Victor Smart-Abbey, M.D.
Jean-Jacques Villemure, M.D.

Rotators: 4 mos. on this service
Fernand Bédard, M.D. (RVH)
Geoffrey DeCaires, M.D. (RVH)
Gilles Lévesque, M.D. (MCH)
Bernard Lewandowski, M.D. (RVH)
Gunther Plattner, M.D. (RVH)
Joel Rubenstein, M.D. (JGH)**
Edouard Yeghiayan, M.D. (RVH)

*6 mos. on this service
**1 month on this service

Computed Tomography has created a formidable impact on the X-Ray department and its operation. The machine is operated 16 hours a day in order to cope with the most urgent problems that are referred to us. The less urgent problems are given appointments up to three months after the initial request.

Because of the massive demand and pressure, we took upon ourselves to operate the machine on Saturdays, despite the fact that additional help was refused by the Government. Our EMI-scanner is probably one of the best and most used pieces of X-Ray equipment in the Province. It is frustrating to be refused additional help when it is so badly needed and deserved. Many neurologists and neurosurgeons are refraining from referring patients mainly because of the difficulty of obtaining an early

appointment. It seems clear that many other units will have to be installed throughout the Province.

Although C.T. units are expensive machines, they represent a sound economical investment. Our pneumoencephalograms have decreased by 54% and our angiograms by 27% since the installation of the scanner. I suspect that arteriography will go down even further. It is interesting to note that, despite the fact that we did nearly 4000 C.T. examinations in 1975, the total number of cases was slightly less than last year. However, the statistics could have been influenced by the closure of one ward for some months.

The members of the radiology department have participated actively in the development of computed tomography, having been involved in18 major meetings or conferences during the year. This, of course, has taxed the manpower of the department. All this work was done despite poor accessibility to the computer system which is available only after 11:00 pm or on Sundays. We are anticipating with great pleasure the use of a remote viewing system which will be part of the Body-scanner. It will provide us with easier access to the patient's record, enabling us to analyse them in our own time.

It has been an exciting but difficult year. We would like to record here magnificent work by every member of the department of Radiology which made this year an enjoyable and fruitful one. Despite a certain uneasiness amongst the X-Ray technicians and nurses, caused by various factors, patients' care in the X-Ray department was not affected. We hope that the government will negotiate a fair contract with hospital employees in order to avoid a deterioration of the good climate between medical and paramedical personnel which has been based, in our department, on mutual understanding and respect.

This year's group of Senior Residents contributed very much to the scientific and human aspects of the department. They spent long week-ends extracting every piece of information from "Emily" (EMI Scanner) in order to represent the hospital at the International Symposium on C.T. scanning.

Post-graduate training in neuroradiology was provided, as in the past, to a mixed group of residents from the radiology and neurosurgery programmes. This combination of radiological and neurological residents always creates a unique atmosphere of cross-fertilization.

We would like to express our gratitude to the medical and paramedical personnel of the department and the hospital for their much appreciated support.

Neurochemistry

Honorary Consultant ..... K.A.C. Elliott, M.Sc., Ph.D., Sc.D., F.R.S.C.

Neurochemist and Medical Research Council Associate ..... Leonhard S. Wolfe, M.Sc., Ph.D., M.D., F.R.C.P.(C), F.R.S.C.

Associate Neurochemist ..... Hanna M. Pappius, M.Sc., Ph.D.

Assistant Neurochemist, Clinical ..... Irving H. Heller, M.D., C.M., M.Sc., Ph.D., F.R.C.P.(C)

Fellows:

N.M.K. Ng Ying Kin, B.Sc., Ph.D. (Wales), Research Fellow.
R.R. Baker, B.Sc., Ph.D., M.R.C. Centennial Fellow.
M. Vanasse, B.A., M.D., F.R.C.P.(C), C.S.P.Q. (E.E.G.), M.R.C. Fellow.
J. Marion, B.Sc., M.R.C. Studentship.

Head Technician ..... Mrs. M. Rostworowski

Technicians, Research .....

Mrs. R. Lau
Mr. M. McHugh
Mrs. P. Skelton
Mrs. H. Szylinger

Clinical

Mrs. M. Liénard-Boisjoli
Mrs. E. Rossin-Arthiat
Mrs. S. Solomon

NEUROCHEMISTRY CLINICAL LABORATORIES

The 7th Floor Neurochemistry Laboratory performed a total of 33,646 tests in 1975, representing a unit total of 133,906. Of this total, 17,298 tests were done on inpatients, 55 on outpatients, and 124 on patients referred from other hospitals, mainly the Royal Victoria Hospital. The remaining tests were performed on routine staff health examinations (179), quality control (260), and methods calibration and standards (15,730).

In the 3rd Floor Ward Laboratory, 26,285 total tests were done, representing a unit total of 183,314. Of all the tests, 10,735 were hematological determinations, 3,421 urinalyses, and 529 miscellaneous. In addition, 7,581 specimens of blood were drawn for analysis in the RVH and Provincial Laboratories and 4,019 samples for analysis in our own 7th Floor Laboratory.

The number of routine hematological, urine and CSF studies have remained relatively stable in recent years, but the number of biochemical studies on blood, particularly those sent to the RVH, has steadily increased.

DONNER LABORATORY OF EXPERIMENTAL NEUROCHEMISTRY

1. *Neurological Diseases* (Dr. L.S. Wolfe, Dr. Ng Ying Kin and Associates).

The methods developed over the past four years for complete structural analysis of oligosaccharides and glycopeptides accumulating in tissues and excreted in the urine in certain ganglioside storage diseases

have been applied to several more lysosomal storage diseases. Tri-, tetra-, and penta-saccharides and glycopeptides have been isolated from urine and liver from a child with mannosidosis (a α-mannosidase deficiency disease). Similar studies are being carried out on a patient with fucosidosis (α-fucosidase deficiency). In collaboration with Dr. Karpati, a patient with the adult form of α,1-4 glucosidase deficiency with progressive skeletal muscle disease has been studied from the chemical viewpoint. Abnormal oligosaccharides containing glucose isolated from the urine appear to be tetrasaccharides. Similar chemical studies are in progress for Lafora body myoclonus epilepsy.

Important advances have been made on the isolation and chemistry of the lysosomal storage material in neurones in Batten's disease, late infantile form. In collaboration with Dr. Stirling Carpenter and Dr. Roy Baker, a highly purified fraction of the autofluorescent curvilinear bodies has been prepared from the brain of a child who recently died from the disease. The morphology of the accumulations is dependant on the lipid-association with a water and organic solvent-insoluble fluorescent material. The fluorescent material appears to be made up of unsaturated polyamide polymers. Contrary to the literature, it is unlikely that it is derived from lipid peroxidation.

2. *Brain prostaglandin and thromboxane synthesis and function* (Dr. L.S.Wolfe Dr. H.M. Pappius and Associates.)

The studies on endogenous prostaglandin biosynthesis by various brain regions from several species has almost reached completion. The endogenous prostaglandin synthesis derives from a stable pool of free arachidonic which is released from membrane lipids immediately after death of the animal. The precursor membrane lipids appear to be specific phospholipids and possibly diglycerides as well. Catecholamines greatly stimulate the synthesis of $PGF_{2\alpha}$.

The most exciting development in prostaglandin research this past year was the chemical characterization of the thromboxanes derived from the prostaglandin endoperoxides. Thromboxane A_2 is a highly labile, exceedingly potent initiator of the platelet release reaction during platelet aggregation and is metabolized into a stable compound thromboxane B_2. We have set up mass spectrometric methods to measure thromboxane B_2 and applied it to cerebral cortex homogenates and slices. We found that brain tissue has considerable capacity for the endogenous synthesis of thromboxane B_2 in addition to prostaglandins. Indeed, in the guinea pig cerebral hemispheres thromboxane is 5 times greater than that of PGE_2 and $PGF_{2\alpha}$. The endoperoxide to thromboxane pathway in brain may be involved in the release of certain neurotransmitters in a similar way to its role in initiating release of serotonin from the α-granules by platelets. Thromboxane A_2 is a potent constrictor of arterial smooth muscle (it was formerly termed rabbit aorta contracting substance) and its rapid formation by platelets suggests that it may be one of the factors causing cerebral vasospasm associated with subarachnoid hemorrhage or cerebral thrombo-embolism.

3. *Studies on cerebral edema* (Dr. H.M. Pappius and Associates).

Our standard freezing lesion model for studies on cerebral edema has turned out to be unsuitable for EEG investigations, because of epileptogenic activity associated with it. A heat coagulation lesion has been developed during the last year which induces edema chemically indistinguishable from that caused by freezing. As with the earlier model, dexamethasone pretreatment diminished only slightly the cerebral edema which develops as a consequence of a standardized lesion, while Furosemide and acetazolamide have a more striking effect. The results with the latter two drugs are compatible with new concepts of mechanisms of resolution of edema, namely drainage through extracellular and CSF spaces, as both inhibit CSF formation. This inhibition may allow faster drainage of the extravasated edema fluid through channels which normally accommodate considerable amounts of bulk CSF flow.

The studies with Dr. Neil Schaul indicate that moderate edema in the cat does not result in EEG abnormalities. Slow waves occur only when severe edema leads to secondary disturbances of deep midline structures.

Our efforts to implicate thromboxanes or prostaglandins in processes involved in the formation of edema were unsuccessful, as a number of drugs known to inhibit prostaglandin synthetase, including indomethacin and acetylsalicylic acid, were shown to be without effect on the extent of edema which develops in response to a standardized freezing or coagulation lesion.

A collaboration with Dr. Klatzo and his colleagues at The National Institute for Neurological and Communicative Disorders and Stroke (NINCDS) on effects of unilateral carotid occludion in gerbil is continuing. It seems clear that some changes in water and electrolyte content of the affected tissue occur before a breakdown in the blood-brain barrier can be demonstrated. Our efforts are now directed to showing whether these early effects of ischemia are reversible.

Honours

Dr. Wolfe was recommended by the Faculty of Graduate Studies of the University of Cambridge for admission to the Sc.D. degree, and has been elected to Fellowship of the Royal Society of Canada. During the year he was invited speaker in symposia at the Florence Conference on Prostaglandins and the Brooklyn Conference on Sphingolipidoses and Allied Disorders. He was a Visiting Professor at the University of Vermont, and organiser of a Session on Metabolic Transformations of Arachidonic Acid at the Vail Conference on Prostaglandins.

Dr. Pappius has become a Member of the Advisory Editorial Board of the Journal of Neurochemistry, and was a member of the Membership Committee of the American Society for Neurochemistry. She was invited to lecture in the Department of Neurosurgery, University of Mainz and at the NINCDS in Bethesda. She is also a member of the Cerebral Edema Study Group of the Joint Committee for Stroke Resources sponsored by the American Neurological Association and the National Institute of Health.

Electroencephalography and Clinical Neurophysiology

Consultant ..... Herbert Jasper, O.C., Ph.D., D. ès Sci., M.D., C.M., F.R.S.C.

Electroencephalographer and Clinical Neurophysiologist ..... Pierre Gloor, M.D., Ph.D.

Associate Electroencephalographer ..... Frederick Andermann, M.D., F.R.C.P.(C)

Assistant Electroencephalographers ..... Eva Andermann, M.D., C.M., Ph.D.
Michel Aubé, M.D., F.R.C.P.(C)
Ivan Woods, M.D., B.Ch., B.A.O., M.Sc., F.R.C.P.(C)

Biomedical Engineer ..... John Ives, M.Sc.

Computer Systems Engineer ..... Christopher Thompson, M.Sc.

Assistant Computer Engineer ..... Jean Gotman, E.S.E., M.E.

Fellows: 6 months on this service

John Apantaku, M.D. (Ibadan, Nigeria) (Oct.-Dec., 1975)
André Bellavance, M.D.* (Montréal)
Michael Jones, M.D.* (British Columbia)
Ilo Leppik, M.D. (Pennsylvania)
Elizabeth Matthew, M.D. (Madras)
Hector Ortegon, M.D. (Yucatan)
John Stewart, M.D. (West Indies)
Antonio Trottier, M.D. (Ottawa)

*One year on this service

Chief Technician ..... Mrs. K. Crystal, R.N.

Clinical Service Functions:

In 1975, 3,762 examinations were performed in the EEG laboratory, about the same number as last year. The number of electrocorticograms taken during neurosurgical operations for the relief of intractable epilepsy was 56. Although all EEG examinations customarily performed in other EEG laboratories are performed in our department, the profile of our activities deviates substantially from that of the usual clinical EEG laboratory, because of the very high number of specialized studies particularly aimed at the detailed diagnostic analysis of complex seizure problems with the view of determining whether the patient is suitable for surgical treatment. Also, recently, more searching studies have been carried out in order to evaluate the best anticonvulsant regime for a given patient. Highly specialized techniques, such as the frequent use of chronic sphenoidal wire electrode recordings, 16-channel cable telemetry recordings, 4-channel cassette EEG recordings on ambulatory patients and exploration with stereotaxically implanted chronic depth electrodes, account for a large amount of professional time spent by technical personnel and physicians in our laboratory.

We are undoubtedly in the forefront in exploring new methodologies for the diagnostic EEG workup of epileptic patients; nevertheless, we risk falling behind in the diagnostic exploitation of other new neurophysiological techniques which involve the recording of evoked sensory potentials for a variety of neurological and neurosurgical conditions.

The early diagnosis of multiple sclerosis, of compression lesions of the optic nerve and visual pathways, of brain stem lesions and the assessment of acute spinal cord injury are areas in which evoked potentials have proved very useful. Although we do have the necessary equipment to carry out these studies, it would be unrealistic at present to contemplate the use of these methods without increasing our manpower. Unless the position of a second full-time clinical neurophysiologist, which has remained vacant for so many years, is filled, it will be next to impossible to contemplate the introduction of these new important methods of diagnosis.

Research Activities:

1) *Computer analysis of clinical electroencephalograms* (J. Gotman, P. Gloor, C.J. Thompson and J. Ives).

Much progress has been made in developing automatic recognition methods of spike and sharp wave discharges of epileptic nature in scalp electroencephalograms. A program developed by Mr. Gotman now allows one to obtain quantitative and reliable localizing information from scalp derived EEGs with a minimum of false positives or false negatives. Steps have been undertaken to test clinical validity and usefulness of this method.

2) *Studies of the pattern of secretion of pituitary hormones in relation to sleep stages and in response to limbic structure stimulations during stereotaxic depth electrode studies* (Dr. I. Woods, Dr. P. Gloor, Dr. A. Olivier and Dr. M. Jones in collaboration with Dr. G. Tolis of the Department of Endocrinology of the Royal Victoria Hospital).

These studies are designed to investigate the role of temporal lobe structures, particularly its limbic components, for the release of a certain number of pituitary hormones and how the pattern of their release may be altered by epileptogenic temporal lobe lesions. We are still in the data collecting stage of these studies.

3) *Clinical Correlation Studies:* A number of clinical correlation studies have been initiated during this year:
   (i) EEG changes in patients with cerebromacular degeneration (Drs. F. and E. Andermann, P. Gloor, and Michel Vanasse).
   (ii) Studies in pattern sensitive generalized epilepsy (Drs. F. Andermann, A. Wilkins and M. Jones). A very detailed and searching study on this topic has been published in BRAIN which indicated the probable locus of the epileptogenic hypersensitivity in these patients. Presently we are continuing these investigations in the hope of enlarging our clinical material and obtaining a better appreciation of the prevalence of this form of epilepsy which is considered to be extremely rare.
   (iii) A reinvestigation of EEG patterns encountered in destructive lesions of diencephalon, brain stem and the posterior fossa (Drs. P. Gloor and N. Schaul) is still in progress.

Miscellaneous:

Dr. Pierre Gloor has been made an Honorary Member of the German

EEG Society and has been elected President of the American Epilepsy Society for the current year. Dr. Eva Andermann has been an invited participant or guest speaker at a number of scientific meetings in the United States and Canada dealing with neurogenetic problems. Dr. Pierre Gloor has been a member of the Guest Faculty for the course in clinical electroencephalography at the Annual Meeting of the American Academy of Neurology, held in Toronto in April, 1976.

We wish to thank Mrs. Katherine Crystal, R.N. our chief technician, our technical and non-professional staff and the members of the neuroelectronics laboratory for their excellent work and unfailing support.

Electroymyography Laboratory

Head ..... Andrew Eisen, M.D., M.R.C.S., L.R.C.P., F.R.C.P.(C)

Fellow ..... Jeffrey Rubin, M.D. (McGill) (July — December 1975)
Donald Schomer, M.D. (University of Michigan) (January — June 1976)

Technician ..... Margo Henderson

11,079 examinations (equivalent to 278,400 professional units), were performed during this year.

New clinical developments over the last 12 months:

Extensive work has been carried out on the physiology and application of the "F" wave. This has been done in conjunction with Doctors Jeffrey Rubin, Donald Schomer and Calvin Melmed. It was shown that the "F" wave is carried in motor fibres and is independent of afferent input. This has enabled us to study conduction velocities in the central segments of nerves up to the spinal cord and back, regions which are normally not accessible to direct stimulation. This new application has been found useful in differentiating between cervical and lumbar root disease on the one hand, and more peripheral lesions on the other hand. In addition, "F" wave studies have been found useful in the early diagnosis of the Guillain-Barré syndrome, where peripheral conductions may be normal, and in establishing that certain neuropathies affect proximal as well as distal segments of nerves.

With the help of Dr. Calvin Melmed, whom we were delighted to have with us for several months before he sets up Electromyography in the Jewish General Hospital, we have developed techniques for studying the refractory period in sensory fibres of man. We hope that this technique will be of value in early detection of dysfunction of sensory fibres, which would otherwise go undetected or would only be detected by routine methods in advanced stages of the dysfunction.

Animal research:

We have concentrated mainly on the study of ouabain paralysis in the rat, in conjunction with Doctors Karpati and Pappius. This cardiac glycoside produces an interesting paralysis in the rat, which is not due to any immediate dysfunction of the lower motor neurone. However, the muscle membrane appears primed for a more serious dysfunction if in addition to ouabain there is any kind of energy metabolism. Preliminary studies revealed that the normal post-tetanic potentiation that occurs in fast twitch muscle and at slower rates in slow twitch muscle is augmented by ouabain.

Because of the continuing sophistication of our clinical methods, and also the necessity of continuing with basic research projects, we have had to curtail our out-patient load. In order to continue to see the same number of patients, and yet maintain the high standards we hope to, and indeed must, maintain, it is absolutely essential that expansion should occur.

Experimental Neurophysiology

Consultant ..... Herbert Jasper, O.C., Ph.D., D.ès Sci., M.D., C.M., F.R.S.C.

Neurophysiologist ..... Pierre Gloor, M.D., Ph.D.

Biomedical Engineer ..... John Ives, M.Sc.

Computer Systems Engineer ..... Christopher Thompson, M.Sc.

Assistant Computer Systems Engineer ..... Jean Gotman, Engineer, E.S.E., M.E., Killam Scholar

Fellows:

Graham Ball, Ph.D. (McGill) Killam Scholar
John Musgrave, M.D. (Queen's University, Belfast)
Andrea Pellegrini, M.D. (University of Padua)
Luis Felipe Quesney, M.D. (Cath. University, Santiago)
Neil Schaul, M.D. (Downstate, N.Y.)
Douglas Skuce, M.Sc. (McGill) Killam Scholar

Laboratory Supervisor ..... Suzanne Schiller, R.N.

Chief Electronics Technician ..... Edward Puodziunas

Assistant Electronics Technicians ..... Gordon Evans
David Fitzpatrick

Research in the laboratory of neurophysiology has been concerned with three problems:

1. *Mechanism of generalized penicillin epilepsy in the cat as a model of human generalized cortico-reticular epilepsy* (Drs. L.F. Quesney, H. Zumstein, J. Musgrave, A. Pellegrini and P. Gloor)

Work in this area has progressed to the point that we now feel confident that we understand the basic pathophysiology of this form of epilepsy. The fundamental epileptiform disturbance of neuronal activity

resides primarily in the cortex and affects cortical neurons diffusely. However, this cortical form of mild epileptogenic hyperexcitability is subject to a variety of extra-cortical influences which are quite powerful. Neuronal volleys originating from many parts of the brain are capable of precipitating generalized spike and wave discharges. However, those that are the most potent in producing this activation are discharges originating from structures which under normal conditions give rise to barbiturate spindles or recruiting responses. Thus, the intralaminar system of the thalamus in addition to some specific nuclei of the thalamus and some basal ganglia structures seem to be the most potent sources of impulses capable of precipitating diffused generalized cortical epileptic discharge. Conversely, as had been shown previously in this laboratory, the ascending reticular formation exerts a powerful inhibiting effect upon these discharges; thus lesions in this system may also, by depressing the reticular activating drive, increase the likelihood of cortical epileptiform discharge.

Work with radioactive C_{14}-labelled penicillin has clarified the site of action of this convulsant drug in feline generalized epilepsy and confirmed that it is primarily cortical.

In spite of the fact that the midline intralaminar system with its bilateral cortical projections seems to be the most potent trigger for the diffuse cortical discharges, the bilateral synchronization of these, according to work still in progress, seems to depend on callosal connections rather than on thalamo-cortical pathways.

Work presently in progress is designed to study the effect of various lesions on this form of epileptic discharge. The initial work has concentrated on callosal sections and work has been initiated in sectioning some of the subcortical pathways mediating impulses originating from the thalamus.

The importance of these findings is that they reconcile seemingly contradictory observations which in the past have led to apparently mutually exclusive hypotheses regarding the origin of generalized epilepsies.

2. *Mechanism of pathological slow waves in the electroencephalogram* (Drs. G. Ball, N. Schaul and P. Gloor)

Previous work had shown that delta waves in the electroencephalogram were consistently produced by white matter lesions and by lesions of the midbrain reticular formation. Conversely, it became evident that lesions restricted to the cerebral cortex were not associated with delta waves. It has now in addition been shown that vasogenic edema *per se* does not produce slow waves, although when brain edema develops within the rigid confines of an unopened skull, the swelling of a cerebral hemisphere by pressure on deep structures may produce the appearance of slow waves presumably by interfering with the connections arising from the reticular formation. It has been shown further that thalamic lesions can produce delta waves, although they do not do so consistently. The lateral posterior region of the thalamus seems to be the one which most readily

produces slow waves when subjected to a lesion. It has, however, been impossible so far to define fully the conditions which determine the appearance or non-appearance of delta waves in the electroencephalogram following thalamic lesions. Work presently in progress is testing the hypothesis that deafferentation of the cortex from the ascending cholinergic system may be the common denominator in all slow wave activity of the delta type that can be recorded under a variety of conditions.

The relationship of the discharges of single cortical neurons with pathological delta waves has been further investigated especially in relation with slow waves consecutive to thalamic lesions and with those produced by atropine poisoning. The relationships so far found are similar to those that have been established for white matter lesions and mesencephalic reticular formation lesions, but work on this topic is still in progress.

3. *Artificial Intelligence*

Mr. D. Skuce has, in the past year, extended his language (now called LESK, for Language for Expressing Scientific Knowledge) to include *dynamic* facts, i.e. knowledge about change. More than half the essential basic knowledge concerning the physiology of the *synapse* can now be expressed in LESK.

We announce with regret that our Assistant Neurophysiologist, Dr. Stanislav Prelević, has left us in order to undergo training in clinical neurology. We wish him well for his future career.

Meetings:

Dr. Pierre Gloor was invited to participate at a Symposium on Brain Function and Behavior organized by the Harry Frank Guggenheim Foundation which was held in April, 1976 at Millbrook, New York.

Neuropathology

Neuropathologist ..... Gordon Mathieson, M.D., Ch.B., M.Sc., F.R.C.P.(C)

Associate Neuropathologist ..... Stirling Carpenter, A.B., M.D.

Fellows: 6 months on this service:

Elaine J. Arpin, M.D. (Manitoba)
Edward Bass, M.D. (McGill)
Howard Blume, M.D. (Wayne State)
Louise F. Charoon, M.D. (Sherbrooke)
André Gagnon, M.D. (Laval)
Peter Gorman, M.D. (Ottawa)
Louise-Hélène Lebrun, M.D. (Montréal)
Marcial Lewin, M.D. (Univ. of Chile)
Bernard Rosenblatt, M.D. (McGill)
Joseph Wassermann, M.D. (Jefferson Med. College)
John Wells, M.D. (Tulane)

Chief Technicians:

Barbara Nuttall, B.A., A.R.T.
John Gilbert, R.T.

A. *Research Activities:*

Studies of neuromuscular disease, in collaboration with Dr. Karpati, have been Dr. Carpenter's main focus of attention during the past year.

They have shown that in some types of inflammatory myopathies, such as the childhood type of dermatomyositis, the pathogenesis of muscle damage seems to be purely obliteration of the capillary bed, with secondary progressive ischemia of the muscle. Studies of this form of the disease led to a method for quantitating the capillary bed in muscle, and this methodology is now being applied to other forms of polymyositis. The ultrastructure of an experimental myopathy caused by the widely known weed killer 2-4-D, is also being studied. The financial help of the Medical Research Council, and the Muscular Dystrophy Association of Canada, is gratefully acknowledged.

The morphological changes in the brain associated with, and presumably causative of focal cerebral seizures, are under continuing study by Dr. Mathieson.

The nature and three dimensional structure of the curvilinear bodies of Batten's disease are being investigated by Dr. Carpenter in collaboration with the Department of Neurochemistry. The rather frequent occurrence of polyglucosan bodies, which strongly resemble the Lafora body of Lafora's disease in patients who manifestly do not have this disease, is being surveyed in material obtained from the autopsy service of the Department of Pathology.

B. *Hospital Service Function:*

There were 87 deaths in the hospital during 1975, and 45 of these were subject of autopsy examination. A further 11 cases were, for medicolegal reasons, referred to the Coroner's Office. The autopsy rate counting only cases studied by us, is 52%, a slight increase over the 49.5% recorded for 1974. If the cases referred to the coroner are included, then the rate rises to a more respectable 64%. A total of 569 surgical specimens were examined, and 169 samples of CSF were studied by the Sayk sedimentation technique. To a large extent we take these procedures for granted; after all, they have been long established in the Institute. However, some of the equipment required for the proper preparation and examination of these specimens is becoming obsolete, and the replacement of some of our microscopes, for example, is becoming urgent. This problem is closely linked with that of teaching at the resident level, for without first class modern equipment, we cannot expect a high level of performance. Clearly ways must be found to put the maintenance and updating of laboratory equipment required for hospital and teaching services on a realistic basis.

C. *Teaching Duties:*

These naturally fall under two heads, undergraduate and graduate. Dr. Mathieson continues to teach general pathology in the course Pathology 1A and 1B, which take place in phase 1 of the medical curriculum. He also participates in some of the sessions of the Biology of Disease Course, which has been much modified from previous years, and now comes directly under the Faculty. In resident instruction, we continue

with twice weekly slide seminars, which are essentially designed for those in the Neuropathology Laboratory but are open to all comers. The joint Neuromuscular Pathology Review, held on Friday mornings by Drs. Carpenter and Karpati, is more restricted, both as a matter of policy, and because of limitation of space. The two staff neuropathologists contribute to the specialty conference held in the Department of Pathology, with a view to increasing the exposure of general pathology residents to neuropathology. Dr. Carpenter supervises the general pathology residents at brain cutting and consults in problem cases.

Neuro-Isotope Laboratories

BRAIN SCAN DEPARTMENT

Director ..... William H. Feindel, M.D., D.Phil., F.R.C.S.(C), F.A.C.S., F.R.S.C.

Assistant Director ..... Y. Lucas Yamamoto, M.D., Ph.D., A.B.N.M.

Senior Brain Scan Technician ..... Mrs. Cornelia Schofield, R.T.N.M.

Brain Scan Technician ..... Mrs. Cheryl Simmons, R.T.N.M.

The transfer of the Brain Scan Department into the newly established quarters on the second floor of the Montreal Neurological Hospital took place on April 14, 1975. These new quarters were constructed under the guidance of the radiation protection division of the Federal Government for use of medium level radioactive substances including radioactive gases. The establishment of the new quarters at this time was fortunate because the Atomic Energy Control Board announced very rigid regulations for the requirements of the facilities, storage and handling for radioactive substances in October 1975.

Following the long-awaited relocation of the Brain Scan Department, the Dynamic Positron Tomographic Device was finally brought to our Institute. This is our newest and most exciting project to determine quantitative regional cerebral blood flow in subcompartments of the cross section of the head *in vivo* using a non-invasive inhalation technique. With the excellent collaboration of Mr. Chris Thompson of the Computer Laboratory of this Institute, and the Cyclotron Physics Group from McGill University, we have made excellent progress on this project.

In the Brain Scan Laboratory, the total number of radioisotope procedures was 7106 in 1975, which is an increase of about 4% from 1974 in spite of the loss of time during the relocation of the department.

The gamma camera with the Med II computer system and the newly established dynamic positron tomographic device are now providing useful information for assessment of cerebral hemodynamics in humans. There has been a great increase in diagnostic work for the patients with strokes.

THE WILLIAM CONE LABORATORY FOR NEUROSURGICAL RESEARCH

Director	William H. Feindel, M.D., D.Phil., F.R.C.S.(C), F.A.C.S., F.R.S.C.
Assistant Director	Y. Lucas Yamamoto, M.D., Ph.D., A.B.N.M.
Research Fellows	Toru Soejima, M.D., (Kyushu University, Japan) Yoku Nakagawa, M.D., (Hokkaido University, Japan) Christina Sahlin, M.D., (University of Lund, Sweden)
Medical Research Council Trainee	Patrick Murray, M.D., F.R.C.S. (Dublin)
Physicist	Ernst Meyer, M.Sc.
Research Assistant	Andrea Duszczyszyn, B.Sc.
Technicians	Janet Edwards Janet Lynch, B.Sc.
Electronic Technician	George Lootus

The study of the cerebral circulation at the microcirculatory level was continued using our techniques of fluorescein angiography and mini regional cerebral blood flow studies with miniature semiconductor detectors and on-line computer analysis. Our research projects for 1975 were as follows:

1. *Cerebral hemodynamic changes at the microcirculatory level in experimental focal cerebral ischemia.*

The dynamic aspect of cerebral vessel behavior and the development of collateral flow at the microcirculatory level in experimental cerebral ischemia were further investigated in relation to the various methods proposed for treatment of cerebral ischemia, particularly by manipulation of the arterial CO_2 level. This investigation has now been extended to include a new model which involves an enclosed cranium with a transparent window, to simulate clinical conditions as much as possible, rather than the open craniectomy model which we have used before. The effect of hypercapnia in the open craniectomy model appears to be favorable; we have therefore decided to investigate it further with the closed cranium model before experimental results will be applied to clinical conditions.

2. *Cerebral hemodynamic changes following intracranial external and internal carotid anastomosis.*

Microvascular surgical anastomosis between the superficial temporal artery and the distal portion of the occluded middle cerebral artery is being carried out with increasing frequency for treatment of occlusive cerebral vascular disease but little experimental evidence has been provided so far with regard to definite flow pattern changes or benefit of perfusion flow in the ischemic brain. Dr. P. Murray has studied the changes in pattern and rate of microcirculatory flow before and after the anastomosis of the superficial temporal artery and the distal occluded middle

cerebral artery in the dog. A shift of the watershed zone and a significant increase in cerebral blood flow in the parietal region was observed.

3. *The relation of early microcirculatory changes following focal cryogenic lesions to the mechanism of cerebral edema.*

This study on dogs and cats indicated that early venous circulatory disturbance and extensive aggregation of platelets in small cerebral vessels associated with preservation of the abnormal arterial circulation may be an important factor in relation to the mechanisms of cerebral edema. The effect of steroids and indomethacine for preventing microcirculatory disturbance and platelet aggregation in relation to hemodynamic changes are under investigation.

4. *Cerebral vasospasm in relation to prostaglandins and their intermediate substances.*

It has been demonstrated that clinical vasospasm following subarachnoid hemorrhage and head injury has a biphasic character. Vasoactive substances, such as serotonin and norepinephrine stored in platelets, are released during the initial phase of platelet aggregation. Recent studies indicate that E type prostaglandins and their endoperoxides are progressively synthesized and released from the pathological state of blood and damaged brain tissue. We have examined the potency and long lasting vasoactivity of these substances *in vivo* and *in vitro*. Our results, so far, suggest that serotonin contributes in the initial phase of vasospasm but the E type prostaglandins and possibly their endoperoxides are more likely related to the late phase of vasospasm.

5. *Improvement of the methodology for analysis of regional cerebral blood flow.*

The computer program for on-line analysis of xenon clearance curves was further improved by utilizing a better mathematical analysis to identify the degree of shunting or tissue peak in a curve. In addition, krypton clearance studies have been carried out in parallel with the xenon clearance studies in various experimental pathological models to clearly identify the difference between cortical flow and global, regional cerebral blood flow changes. This technique has been applied for better understanding of changes in cortical blood flow in relation to flow pattern changes in fluorescein angiographic studies.

The above research projects are supported by the Medical Research Council of Canada, the Cone Memorial Fund and the Pillow-Vaughan Endowment.

Dr. P. Murray has moved to Queen's University in Kingston, Ontario, and we now have three new research fellows, Dr. Toru Soejima and Dr. Yoku Nakagawa from Japan and Dr. Christina Sahlin from Sweden. Their advent has accelerated our research activities.

Neurological Research

LABORATORY FOR NEUROPHARMACOLOGY

Head ..... Allan L. Sherwin, M.D., Ph.D., F.R.C.P.(C)

MRC Fellow ..... Ilo E. Leppik, M.D.

Technicians ..... Christine D. Harvey, B.Sc., M.Sc. (Pharmacology)
Shirley A. Fayle, B.Sc. (Biology)
Lesley E. Kvalheim
Sylvia O. Charlton, B.A. (Psychology)

Summer Medical Student ..... John J. McAuliffe, B.Sc. (Engineering)

Studies of the distribution of anticonvulsant drugs in brain excised during the course of neurosurgical therapy of epilepsy were continued along with parallel studies in experimental animals. The resultant data provided new insight into the mechanisms of action of these drugs and this knowledge is now being applied to the treatment of patients, especially those presenting as emergencies with status epilepticus. Dr. Leppik demonstrated, by means of direct determination of effective drug concentrations in the brain, that the anticonvulsant effect of a combination of diphenylhydantoin and phenobarbital was the sum of the effects produced by the individual drugs when administered alone.

Mr. McAuliffe developed a new practical approach to determining the therapeutic levels of common anticonvulsant drugs by analysis of saliva. Salivary drug levels were equivalent to the free (biologically active) fraction of the individual drugs in the plasma. This technique, which eliminates the use of needles and permits samples to be collected at home, can be applied for routine monitoring and is of particular value in patients with defects in protein binding, including those with kidney disease. Mr. McAuliffe was awarded a Ciba-Geigy Research Bursary by the Faculty of Medicine for outstanding research by a medical student during a summer or elective period. He presented his work to the annual meeting of the American Academy of Neurology.

A clinical research project designed to study the effectiveness and interactions of various combinations of antiepileptic drugs was initiated at Foyer Savoy.

The service component of the laboratory continued to determine blood anticonvulsant levels for hospitals associated with McGill University and the University of Montreal and samples were received on a regular basis from more distant points including Newfoundland and the Arctic. It is one of the reference laboratories for the quality control program sponsored by the American Epilepsy Foundation and the National Institute of Health and has been actively involved in providing technical assistance to developing countries especially in the Caribbean and Latin America.

Dr. Sherwin has been appointed one of the editors of the journal *Neurology* and continues as a director of the International Bureau for Epilepsy.

LABORATORY FOR NEUROMUSCULAR RESEARCH

Director ..... George Karpati, M.D., F.R.C.P.(C)

Technicians: ..... Carol Allen, B.Sc.
Audrey O'Neil, B.Sc.
Steven Prescott

In 1975, 204 muscle, 109 nerve and 75 skin biopsies were received for histochemical processing and study. A considerable number of these biopsies came from outside of the M.N.H., from several hospitals in the Montreal area and Newfoundland.

Research is directed towards patients and experimental animals.

In patients' research we continue to investigate clues regarding the mechanism(s) of muscle destruction in Duchenne dystrophy. Other diseases in which we obtained new information included: inflammatory myopathies, Werdnig-Hoffman disease, neuronopathies with polyglucosan bodies, neuropathy due to vitamin B_{12} wasting, myopathy with tubular aggregates, juvenile dystonic lipidosis, and a special variety of myotonic dystrophy.

In our experimental work we have completed the projects on mitochondrial and tetrabenazine myopathies. These elucidated mechanisms of muscle damage which are likely to occur in human neuromuscular diseases.

Ongoing work includes experimental pathology of the muscle membrane systems using: (a) ouabain, (b) 2,4-dichlorophenoxyacetiacid, and (c) phospholipase C. By studying these models, we try to understand the morphologic, physiologic and some chemical consequences of experimentally induced and specific membrane disturbance. The relevance of this work to human disease is expected to be considerable.

Investigation of the neuronal trophic effects upon the muscle cell continues by the study of the degree of trophic protection of the muscle which it can derive from a sensory nerve in lieu of a motor nerve.

We have actively participated in the First and Second National Workshops of the Muscular Dystrophy Association of Canada in Hamilton and Kingston, Ontario.

The high spirited team approach to neuromuscular research by Doctors Carpenter and Eisen continues to be a significant factor in our efforts.

MULTIPLE SCLEROSIS LABORATORY

J.B.R. Cosgrove, M.D., M.S., M.Sc. F.R.C.P.(C)

William Sheremata, B.Sc., M.D., F.R.C.P.(C)

Post-Doctoral Fellow ..... Henry Triller, Ph.D.

Graduate Student ..... B. Ruminski, B.Sc.

Chief Technician ..... Alan Sazant, B.Sc.

The long term study of immune responses to encephalitogenic myelin basic protein and paramyxo viruses has continued using two separate assay techniques. We have confirmed the reports of impaired immunity to measles in multiple sclerosis. In contrast, immunity was present in optic neuritis patients while it was evident that in approximately half of other suspect MS patients it was not. Apparent inverse correlation of specific IgG antibody production to myelin basic protein and cellular immune responses and clinical activity has been noted. Comparative studies of myasthenia and multiple sclerosis hypersensitivity responses to acetylcholine receptor protein unexpectedly were seen equally frequent in both. This finding may indicate a possible sharing of immunological aberrations in the two diseases. Work on responses to peripheral nervous system antigens is continuing.

We have shown characteristic elevations of T lymphocyte cells in cerebrospinal fluid during post-infectious encephalomyelitis and exacerbations of multiple sclerosis, which are not present in viral encephalomyelitis. These studies suggest that exacerbations of multiple sclerosis and post-infectious encephalomyelitis are not primary manifestations of viral infection. Studies are continuing but are severely limited by lack of funding.

With Dr. Laurent Gratton, investigation of personality alterations in multiple sclerosis and other nervous system disease is continuing. Other studies are also continuing of humoral as well as cellular hypersensitivity responses in cooperation with Doctors Moscarello, Wood and Eldefrauwi.

NEUROGENETICS

Neurogeneticist ..... Eva Andermann, M.D., Ph.D.
M.R.C. Research Fellow ..... Michel Vanasse, M.D. (from January 1976)
Graduate Student ..... Linda Dansky, B.Sc.
Research Assistant ..... Lilly Blitzer, B.Sc. (from March 1976)
Summer Student ..... Collette Goyer, B.Sc.

Research work in progress

1. *Cerebromacular degeneration in Quebec and Newfoundland* (Drs. E. Andermann, J. C. Jacob, F. Andermann, G. Karpati, S. Carpenter and L. Wolfe).

Our series of over 40 patients affected with this rare group of disorders is one of the largest in the world. Most of the patients come from Newfoundland, where the gene frequency of these disorders appears to be markedly elevated, approaching that of Tay-Sachs disease in Ashkenazi Jews. Dr. Wolfe has shown that peroxidase deficiency is not the primary enzymatic defect. Recently, the characteristic curvilinear bodies have

been isolated and an abnormality in polyamide metabolism is postulated. An intensive search for the enzyme defect(s) is being made. Dr. Michel Vanasse has become actively involved in this study. Once the enzymatic defect has been identified, it is planned to carry out a program of carrier detection and prenatal diagnosis in order to prevent the recurrence of these disorders.

2. *Tay-Sachs disease in French Canadians* (Drs. E. Andermann, C. Scriver, L. Wolfe, R. Gold, G. Patry, R. Lafontaine, G. Geoffroy and F. Andermann).

We have identified six French Canadian families with nine children affected by a disease which is indistinguishable from classical Tay-Sachs disease, with absent hexosaminidase A activity. These families all originate from areas in eastern Quebec, where the consanguinity rate is known to be elevated. We have initiated a carrier detection program in the extended families involving field trips to these areas to set up clinics and obtain blood samples and family linkage data. 650 individuals were tested and 111 or 18% were found to be Tay-Sachs carriers. The carriers were counselled regarding the risks of having affected children, as well as the possibility of prenatal diagnosis. The data have been computerized with the help of Mr. Jean Gotman and other members of the Computer Laboratory. The genealogies are being traced with the help of Mr. Jean Bergeron of the University of Montreal, and a study of the psychological effects of the disease and of the screening program is planned with Dr. Louise Demers.

3. *Sandhoff's disease in French Canadians.* (Drs. E. Andermann, C. Scriver, L. Wolfe, R. Lafontaine, G. Geoffroy and F. Andermann)

We have studied two French Canadian families with four children affected by this rare disease, which is clinically similar to Tay-Sachs disease, but the patients lack both the A and B components of hexosaminidase. The families originate from the Eastern Townships region of Quebec. A carrier detection program is being carried out in the extended families and 35 family members have been tested.

4. *Juvenile Tay-Sachs disease (late onset GM_2 gangliosidosis) in two Lebanese families.* (Drs. E. Andermann, L. Wolfe, S. Carpenter, G. Karpati, D. Grimes and F. Andermann).

This is another rare variant of Tay-Sachs disease in which the patients have a partial or total deficiency of hexosaminidase A. Only 14 cases have been reported in the world literature. We have found this disease in two families originating from adjacent villages in southeast Lebanon. Carrier detection and genetic counselling are being carried out in the extended families and 37 family members have been tested.

5. *Friedreich's Ataxia*

Recently the Canadian Association for Friedreich's Ataxia was formed

new tasks can only be introduced after preliminary speech and memory testing has been carried out. For the past two years we have been training patients to perform an arbitrary sequence of gestures, using the hand and arm ipsilateral to the intended side of Amytal injection; they are then tested for recall of the sequence during inactivation of that hemisphere by the drug. The findings for the first 68 patients show that the gestures tend to be programmed by the dominant hemisphere for speech, in both left-handed and right-handed subjects. A pilot study by Dr. Bryan Kolb also emphasizes the role of the left or speaking hemisphere in the imitation of arbitrary sequences of face or arm movements. This work is part of a more extensive investigation of facial expression and gesture as affected by focal brain lesions.

In 1975 Gina Jaccarino completed an M.A. thesis on dual memory encoding (verbal and imaginal), as revealed by the effects of temporal-lobe lesions. Her results suggest that verbal coding suffices for the immediate recall of names of pictured objects but that delayed recall is partially dependent on the evocation of a visual image. The evidence for the latter is the deficit, in delayed recall only, shown by patients with right temporal-lobe lesions. In her Ph.D. thesis, Marilyn Jones-Gotman also provided clear evidence of the contribution of the right temporal lobe to visual imagery and of the significant contribution of such imagery to verbal associative learning. Dr. Gotman's most novel finding was obtained, however, with a task that required subjects to produce as many abstract meaningless drawings as they could in a specified time. On this "Design Fluency" task, a major deficit was seen after right frontal and right central lesions, a deficit that may be considered analogous to the word fluency deficit associated with corresponding lesions of the left hemisphere. We wish to thank the many staff members and the relatives of patients who served as control subjects for these experiments. We also thank Dr. John Musgrave for his assistance in the various Amytal studies.

In October, Mr. Taylor returned from sabbatical leave spent partly in the Institute of Neurological Sciences of the Southern General Hospital, Glasgow, and partly in Dr. Freda Newcombe's unit at the Churchill Hospital, Oxford. During his absence Mrs. Ajersch handled his many duties with skill and patience. In this she was ably supported by Mr. Gabriel Leonard and Miss Dominique Cosandey, the latter on leave of absence from Dr. Assal's group in Lausanne.

In October, Dr. Milner was the guest lecturer of the University Center of Virginia and this spring she gave a series of lectures in Northern Italy, as well as attending the London meeting of the European Brain and Behaviour Society. Both she and Mr. Taylor participated in the International Neuropsychology Symposium in Crete, where Dr. Milner reported the results of our recent Amytal studies. In addition, Dr. Jones-Gotman spent a month in Paris, in the neuropsychological laboratory of Prof. F. Lhermitte, from which she returned with many fresh ideas for research.

This year the department played an active role in the Neurosciences

programme of the Institute as well as holding its own weekly seminar. Our visitors included Professor O.L. Zangwill (Cambridge), Dr. Elizabeth Warrington (London), Dr. Mortiner Mishkin (N.I.H.), Professor H.-L. Teuber (M.I.T.) and Professor L. Weiskrantz (Oxford), to each of whom we are indebted for much lively discussion.

Neuroanatomy

Neuroanatomist ..... Donald G. Lawrence, B.Sc., M.D., F.R.C.P.(C)

Teaching Associates ..... Allan Morton, M.D., Ph.D.
Charles Olanow, M.D., F.R.C.P.(C)

Technicians ..... Giovanni Gaggi
Janet Robbins, B.A.

The major contribution of the laboratory continues to be the organization of the CNS Course for first year medical students and the teaching in it of neuroanatomy. The conscientious help of Mr. Gaggi is again acknowledged, particularly in the preparation of material and the setting up of the laboratory classes. Dr. Lawrence again gave a series of lecture-demonstrations, including dissection of the gross anatomy of the brain to residents this year in February, and continues to take part in the clinical neurology teaching at the Montreal General Hospital. Studies were completed on the red nucleus and the development of motor control in monkeys.

Neuro-Ophthalmology

Director ..... Trevor H. Kirkham, M.B., Ch.B. (Manchester)

Fellow ..... Pierre Bourgeon, M.D. (Montréal)

Dr. Kirkham commenced duties as Neuro-Ophthalmologist to the Montreal Neurological Institute in September 1975. A liaison with the Montreal Children's Hospital is being maintained. Clinical neuro-ophthalmology services to the inpatients of the Montreal Neurological and the Royal Victoria Hospitals and outpatient consultations for practising neurologists and ophthalmologists are being given.

Dr. Daniel Guitton, who was appointed research associate, is on an overseas scholarship to study quantitative methods of tracking eye movements in patients.

Neurophotography

Neurophotographer ..... C.P. Hodge, R.B.P., F.B.P.A., A.I.M.B.I.

Assistants ..... Judy Little
Neil Robbins

Graphic Illustrator ..... Madeleine Hartell

The Department has had a very successful and busy year with an increased volume in all areas of the department. The number of teaching slides has greatly increased with at least 50% of the slides requiring duplicates. This is increasing our workload and straining our budget.

The Department was involved in four different research experiments using fluorescein angiography. A total of over 20,000 slides were produced for these research projects.

There is increased use of television now that we have coloured television. We now have several hours of coloured television recorded in cassettes which simplify the playing of this valuable teaching medium.

Neil Robbins attended the Annual Meeting of the Biological Photographic Association in Phoenix, Arizona.

Tumour Registry

DR. ARTHUR R. ELVIDGE

A total number of 229 patients with tumour and tumour suspect, directly and indirectly involving the nervous system, were processed by the Tumour Registry in 1975. The figure includes 96 new cases and 133 readmissions.

Eighty-nine new and 10 readmissions were verified pathologically. Ninety-three new cases and 10 readmissions underwent surgery. The number treated by roentgenotherapy was 28 new cases and 21 readmissions. Mortalities were 18 and autopsy was performed on 12. Clinical visits numbered 96.

The function of the Tumour Registry is to record a follow-up on cases of tumour involving the nervous system, treated at the Montreal Neurological Hospital. The follow-up is complete for all types of tumour involving the nervous system. On special projects it has stored in its files information since 1928.

Library

MARINA BOSKI, B.A., B.L.S.

Inflation has caught up with us over the past year. Prices of periodical subscriptions and books have increased by 30% in some instances. Early in 1976 the average price for a book was $28.00. This limits our purchasing power; last year we were able to purchase only 118 books as compared to 250 in 1974.

Dr. Herbert Jasper donated a large part of his book collection. Dr. F.L. McNaughton donated books of great historical value by Baumes (1805), Sir Charles Bell (1830) and Boerhaave (1735). The Library received a gift of $500. from Mr. Sidney Ross in memory of Miss Caroline Mills.

The past few months emphasized our close relationship with other McGill Libraries. Both the McLennan and the McGill Medical Libraries have always kept a record of our holdings, however, their listings are not up-to-date. In recent months many people came to us for books which have not been among our holdings for many years. We therefore are weeding McGill Medical Library's records of our holdings. We hope that this will result in better use of library resources on the McGill campus.

The Library would welcome more feedback, constructive criticism and suggestions which would provide better means to adapt to users' needs.

The Montreal Neurological Society

President ..... Dr. Gordon Watters
Vice-President ..... Dr. Jules Hardy
Secretary-Treasurer ..... Dr. John Woods

The Society officers for 1976-77 are: President, Dr. Jules Hardy; Vice-President, Dr. Albert Aguayo; Secretary-Treasurer, Dr. Carl Dila.

This year meetings were held once a month from October 1, 1975 to May 5, 1976. The meetings were hosted by the Montreal General Hospital, the Montreal Neurological Hospital, the Notre Dame Hospital, the Montreal Children's Hospital and hôpital Sacré-Cœur. Coffee was served at brief social periods before each meeting.

Papers read before the Society were as follows:

PROF. FRITZ BUCHTHAL, University Institute of Neurophysiology, Copenhagen: "Conduction along sensory nerve fibers in normal and diseased nerves".

DR. WILLIAM H. OLDENDORF, Department of Neurology, University of California, Los Angeles, California: "Blood-brain barrier permeability and the distribution of drugs to the brain".

DR. N. GIARD, DR. N. MARTINEZ, DR. G. BOUVIER: "Présentation de trois cas d'épilepsie tardive du jeune adulte".
DR. C. BERTRAND, DR. N. MARTINEZ, DR. P. MOLINA-NEGRO: "Chirurgie stéréotaxique dans le torticollis spasmodique".
DR. J. HARDY: "Cordotomie sélective micro-chirurgicale par voie cervicale antérieure".
DR. A. AGUAYO, Montreal General Hospital: "Development of the peripheral nervous system".
DR. JOHN SEVER, Department of Neuroepidemiology, National Institute of Health, Bethesda, Maryland: "Multiple sclerosis revisited".
DR. J. MONTPLAISIR: "Les hypersomnies, l'anorcolepsie, les apnées et mouvements anormaux au cours du sommeil, film et discussion à partir d'étude personnelle".
PROF. ROGER GILLIATT, London, England: "The thoracic outlet syndrome and the neurologist".

The Annual Dinner was held on Thursday, May 27, at The Royal St. Lawrence Yacht Club.

Fellows' Society

President ..... Howard Blume, M.D.
Vice-President ..... Donald Schomer, M.D.
Secretary-Treasurer ..... John Wells, M.D.
Representative on Board of Directors ..... Jean-Guy Villemure, M.D.
Post-Graduate Representative ..... Neil Schaul, M.D.
Union Representative ..... Bernard Rosenblatt, M.D.

During the fall and early winter months, weekly journal review sessions were alternately conducted by neurology and neurosurgery residents. In the second half of the academic year a series of bi-weekly resident seminars were held. The speakers and subjects included the following:

Dr. Carl Dila on "Intracranial Pressure and its Monitoring"
Dr. A. Eisen on "EMG and Nerve Conduction"
Dr. H. Pappius on "Cerebral Edema"
Dr. P. Gloor on "The Limbic System"
Dr. G. Belanger on "Posterior Fossa Angiography"
Dr. A. Barbeau on "Parkinsonism"
Dr. B. Milner on "Techniques and Interpretation of Psychological Testing"

The Annual Fellows' Day Lecture on June 4th was on "Dynamics of the Cerebral Spinal Fluid" given by Dr. Keasley Welch, Professor of Neurosurgery, Peter Bent Brigham and Boston Children's Hospitals.

Social activities included the annual July pool party and winter skating party. The Doctors Andermann again graciously hosted a sugaring-off

party enjoyed by all. The year concluded with the Annual Banquet at the Royal St. Lawrence Yacht Club.

We would like to express special thanks to the staff who contributed so much to the resident seminars. We also thank former fellows for their generous financial assistance which enables the programs of the Fellows' Society to continue.

The Officers for 1976-77 are:

President	Kenneth Laxer, M.D.
Vice-President	Jorge Martinez-Leyva, M.D.
Secretary-Treasurer	Robert Yufe, M.D.
Residency Review Committee (*Neurosurgery*)	Jorge Martinez-Leyva, M.D. Jean-Guy Villemure, M.D.
Residency Review Committee (*Neurology*)	Werner Becker, M.D. Donald L. Schomer, M.D.
Representative on the Board of Directors	Donald L. Schomer, M.D.
Union Representative	Bernard Rosenblatt, M.D.

The Montreal Neurological Women's Society

1975-76

President	Peggy Leppik
Vice-President	Betty Blume
Secretary	Jeanne Branon
Treasurer	Jenny Ortegon
Welcoming Committee Chairwomen	Sue Catchlove Nicole Thompson

In response to the changing character of the Women's Society over the past few years, there has been greater emphasis this year on special events than on evening meetings. We started off in August with a family cornroast and hayride at an apple farm in Hemmingford. September saw our first official meeting at Mrs. Feindel's home, which always enjoys a good turnout. In November a small but enthusiastic group went to a ballet class of Les Grands Ballets Canadiens. Our annual Children's Party in December was a smashing success with a performance at Montreal's Youtheatre, followed by refreshments, a wildly frothing punch, and balloons for all. The bake sale was also a great success, as we achieved our goal of $200. to buy the M.N.H. a new lounge wheelchair. An unusually severe winter caused us to postpone the February meeting at Mrs. McNaughton's home, but it was well worth the wait. Joan Ivory spoke on English period

furniture, giving much valuable information for the novice antique hunter. The spring sugaring-off party was again held at the Eastern Township cottage of Doctors Eva and Fred Andermann. Grey skies and mud could not dampen the enthusiasm for lunch and sugar-on-ice at their neighbour's sugar house, and later in the evening everyone relished a gourmet feast and joined in an impromptu sing-along. The May potluck dinner meeting, held at Julia Mathieson's, closed out the year as the new executive assumed office. The new President, Betty Blume distributed a questionnaire designed to encourage discussion and to obtain ideas about the future course the Women's Society should take to meet the changing needs and interests of its membership.

Officers for 1976-77 are:

President ..... Betty Blume

Vice-President ..... Jeanne Branon

Secretary ..... Carol Laxer

Treasurer ..... Marja St. John

Welcoming Committee Chairwomen ..... Betty Blume
Nicole Olivier

Clinical Training Opportunities

NEUROLOGY

The McGill University Neurology Training Program is designed to meet the requirements, in adult and pediatric neurology, of the Professional Corporation of Physicians of Quebec*, the Royal College of Physicians and Surgeons of Canada, and the American Board of Neurology.

The McGill Program is university-based and includes the Neurological Departments and Teaching Units of the Montreal Neurological Institute, the Montreal General Hospital, the Montreal Children's Hospital and the Jewish General Hospital.

Clinical Training — The program provides two full years of clinical training and one year of laboratory training. It is open to medical graduates who have completed an approved interneship during the year of clinical medicine OR an approved clinical clerkship during the final undergraduate year and one year of straight medical or pediatric interneship. A third year of clinical training, combined with student teaching is available at the M.N.H. as a Teaching Fellow. A similar third year of clinical training is available as a Senior Resident in the M.G.H. and M.C.H. Departments of Neurology.

Facilities for research and advanced training in the basic sciences related to neurology are available in each of the teaching hospitals. Selected candidates may register for graduate degrees with the approval of the appropriate laboratory or service head, and program director.

Residents are assigned for a six-month period to one clinical service. It is usual for each resident to rotate to three hospitals in the course of his two-year period of clinical training. He will spend a full year in one of the institutions.

Laboratory Training — As part of the three-year program, laboratory training is available in Electroencephalography, Electromyography, Clinical Neuropharmacology, Clinical Neurophysiology, Neuropathology, and Muscle Pathology. Appointments are for six or twelve months.

Applications for all the above appointments should be made to The Program Director for Neurology, Montreal Neurological Institute, 3801 University Street, Montreal, Quebec H3A 2B4.

* The Professional Corporation of Physicians of Quebec requires, in addition, all graduates of medical schools outside Canada and the U.S. who wish to train in the Province to have the E.C.F.M.G. certificate, and a year of rotating interneship in an approved North American training centre.

NEUROSURGERY

The Department of Neurology and Neurosurgery of McGill University offers opportunities for clinical training in Neurosurgery in three

of the major McGill Teaching Hospitals, the Montreal Neurological Hospital, the Montreal General Hospital and the Montreal Children's Hospital.

The initial appointment is normally made to one of the Institute's Laboratories for a six-or twelve-month period. An interneship and/or a year of general surgical training in an approved hospital is required.

The Assistant Resident appointments are divided into six-month periods with rotation on the three Neurosurgical Services at the Montreal Neurological Hospital and the Neurosurgical Service at the Montreal General Hospital. The Resident appointments, six and twelve months in duration, are rotated among the McGill Teaching Hospitals listed above.

The various Departmental Laboratories will accept Fellows for graduate training by individual arrangement. Residents and Fellows may attend the graduate courses listed below by individual arrangement.

A limited number of training stipends are provided by the Quebec Ministry of Social Affairs and from Institute funds.

Appointments are usually made about one year in advance, with July 1st. the usual starting date.

Applications for all the above appointments should be made to The Director, Montreal Neurological Institute, 3801 University Street, Montreal H3A 2B4, P.Q.

Courses of Instruction

UNDERGRADUATE

The Department of Neurology and Neurosurgery cooperates closely with the Departments of Medicine, Surgery, Pathology, Anatomy and Radiology in their undergraduate teaching. Thus the teaching of neurology, neurosurgery, neuropathology, neuroanatomy and neurological radiology is carried out as part of the regular course planned by the Chairman of each of the above departments. See McGill booklet "Faculty of Medicine". Electives are available in clinical and laboratory subjects.

GRADUATE

In the Faculty of Graduate Studies and Research, courses are offered leading to the degree of Master of Science and Doctor of Philosophy. See McGill booklet "Faculty of Graduate Studies and Research".

Throughout the year, the following elective courses are given for graduate students, Fellows and members of the house staff, and are open to undergraduates by arrangement.

NEUROSCIENCES SEMINAR

G531-602H This is a course of weekly seminars, given during the academic year, designed to present over a 2-year period a concise, up-to-date review of the basic neurological disciplines. Mondays, 4:30 — 6:00 p.m. Professors Gloor, Wolfe, Feindel, and other members of the Department of Neurology and Neurosurgery, and related McGill Departments.

NEUROPHYSIOLOGY

G531-610A Lectures, together with undergraduate Neurology and Neurosurgery Course 2A "Anatomy and Physiology of the Central Nervous System".

G531-611A Seminars and group discussions in Neurophysiology, Professor Gloor.

NEUROANATOMY

G531-621A Seminars and group discussions in neuroanatomy. By special arrangement. Professor Lawrence.

CLINICAL CONFERENCES

G531-630H Colloquium in clinical and basic aspects of the nervous system. Wednesdays 6:30 p.m. monthly during the academic year. Staff and Visiting Lecturers.

G531-631H Seizure and EEG conference — alternate Thursdays 4:30 p.m. Professors Gloor, Andermann, Rasmussen, Milner and Ethier.

NEUROCHEMISTRY

G531-640H Seminars in Neurochemistry in addition to that provided in Course G531-602H. By special arrangement. Professors Wolfe and Pappius.

NEUROPATHOLOGY

G531-650H Six or twelve months laboratory work in Neuropathology.

G531-651H Conference in Neuropathology, alternate Thursdays, 4:30 — 5:30 p.m.

G531-652A Neurological histopathology, an introduction. Ten sessions of 2 hours, course limited to 8 participants. Time to be arranged. Professor Mathieson.

NEURORADIOLOGY

G531-660H Practical instruction in techniques and interpretation.

G531-661A Lecture demonstration (3 months in the fall), Thursdays 4:30 — 5:30 p.m. Professors Ethier and Melançon.

ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY

G531-670H Laboratory work in Electroencephalography (minimum 6 months with active participation, and clinical conferences). Professor Gloor.

NEUROPSYCHOLOGY

G531-680H Training and research methods for selected graduate students. Professor Milner and Staff.

Publications — 1975-76

THE MONTREAL NEUROLOGICAL INSTITUTE AND HOSPITAL AND THE DEPARTMENT OF NEUROLOGY AND NEUROSURGERY OF McGILL UNIVERSITY

**Staff Members of the Montreal General Hospital*

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MONTREAL NEUROLOGICAL HOSPITAL

(Incorporated by Private Act under the laws of the Province of Quebec)

BALANCE SHEET AS AT DECEMBER 31, 1975

GENERAL FUND

ASSETS	1975	1974
Cash	$ —	$ 86,319
Accounts receivable — less provision for doubtful accounts	540,768	613,797
Due from The Quebec Department of Social Affairs		
Operating grants	714,246	653,725
Special grant	—	90,000
Inventory of supplies at cost	160,546	136,325
	$1,415,560	$1,580,166
LIABILITIES		
Bank indebtedness	$ 36,865	$ —
Bank loan	513,397	513,397
Accounts payable and accrued liabilities	79,099	171,050
Due to Royal Institution for the Advancement of Learning		
— Current account	636,088	686,818
— Advances to cover prior years' deficit	11,906	67,383
Capital (note 1)	138,205	141,518
	$1,415,560	$1,580,166

PLANT FUND

ASSETS			
Cash		$ 18,433	$ 16,185
Due from The Quebec Department of Social Affairs		93,536	25,876
Advance to Royal Institution for the Advancement of Learning — construction project		484,204	313,778
Fixed assets, at cost			
Equipment	$2,138,800		
Less: Accumulated depreciation	866,826	1,271,974	1,281,631
		$1,868,147	$1,637,470
LIABILITIES			
Bank loan		$ 60,502	$ 307,519
Accounts payable		—	6,259
Due to Royal Institution for the Advancement of Learning		111,969	42,061
Restricted funds — construction project		423,702	—
Capital		1,271,974	1,281,631
		$1,868,147	$1,637,470

STATEMENT OF OPERATIONS
FOR THE YEAR ENDED DECEMBER 31, 1975

INCOME	1975	1974
Quebec Department of Social Affairs (note 1)	$5,360,411	$5,293,348
Revenue from patients	1,721,858	1,556,835
Grants — Quebec Department of Social Affairs	—	90,000
Other income	26,916	16,343
	7,109,185	6,956,526
EXPENSES		
Salaries and wages	5,036,720	4,953,969
Fringe benefits	302,313	291,262
Drugs, medical and surgical supplies	358,909	303,956
Services and supplies	1,468,897	1,190,323
	7,166,839	6,739,510
Surplus (deficit) for the year	$ (57,654)	$ 217,016

STATEMENT OF GENERAL FUND CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 1975

	1975	1974
Surplus (deficit) at beginning of the year	$ 141,518	$ (563,031)
Add		
Settlement from the Quebec Department of Social Affairs on account of prior years	52,566	513,397
Payment from the Quebec Department of Social Affairs on account of retroactive salary adjustments	1,615	44,866
Surplus for the year	—	217,016
Adjustment of prior years' deficit	160	264
	195,859	212,512
Deduct		
Salary adjustments retroactive to prior years	—	1,615
Deficit for the year	57,654	—
Estimated year end adjustment of offset income for prior years	—	69,379
Capital at end of the year (note 1)	$ 138,205	$ 141,518

STATEMENT OF PLANT FUND CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 1975

	1975	1974
Capital at beginning of the year	$1,281,631	$1,288,807
Increase in plant capital	124,018	127,860
	1,405,649	1,416,667
Less: Depreciation on equipment	133,675	135,036
Capital at end of the year	$1,271,974	$1,281,631

NOTES TO FINANCIAL STATEMENTS
DECEMBER 31, 1975

1. *Quebec Department of Social Affairs*
   Income includes payments from the Government of Quebec to the extent of the amounts approved to March 3, 1976 by the Department of Social Affairs. 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. No provision has been made in the accounts for such eventualities.

2. *Contingent Liabilities*
   Employees' accumulated sickness benefits, which are recoverable from the Department of Social Affairs when paid, amounted to $339,032 at December 31, 1975. These sickness benefits are payable when an employee terminates his services and are expensed at that time.
   Subsequent to the year end the Hospital has received additional billings related to 1975, amounting to approximately $100,000. The Hospital has refused payment, and it is management's opinion that these charges will not ultimately be payable.

AUDITORS' REPORT

To the Board of Directors,
Montreal Neurological Hospital.

We have examined the balance sheet of the Montreal Neurological Hospital as at December 31, 1975 and the statements of operations, general fund capital and plant fund capital for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion these financial statements present fairly the financial position of the Hospital as at December 31, 1975 and the results of its operations for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Montreal, Quebec,
April 15, 1976.

TOUCHE ROSS & CO.
Chartered Accountants.

MONTREAL NEUROLOGICAL INSTITUTE

EXPENDITURES — 1975

1. Budgeted Expenditures from M.N.I. Endowment Funds	$626,204	
2. Expenditures from Donations and Special Funds of M.N.I.	551,196	
3. External Grants for Research and Fellowship	419,474	$1,596,874
4. Salaries paid to the Department of Neurology and Neurosurgery from General University Funds for Teaching Services:		
4.1. Georgaphic Full Time Staff (formerly QHIS — Hospital Component)	141,025	
4.2. Teaching Provided to Other Departments (Radiology, Pathology, Biochemistry and Anatomy)	33,464	174,489
Total Expenditures:		$1,771,363

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

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

Medical Research Council of Canada Grants

— Dr. S. Carpenter
— Dr. C. Dila
— Dr. W. Feindel
— Dr. P. Gloor
— Dr. R. Hansebout
— Dr. G. Karpati
— Dr. B. Milner
— Dr. H. Pappius
— Dr. W. Sheremata
— Dr. A. Sherwin
— Dr. L. Wolfe
— Dr. I. Woods

Medical Research Council of Canada Associateships
— Dr. J. Martin
— Dr. B. Milner
— Dr. L. Wolfe

Muscular Dystrophy Association Research Grants
— Dr. S. Carpenter
— Dr. G. Karpati
— Dr. A. Eisen
— Dr. G. Watters

Multiple Sclerosis Society of Canada
— Dr. W. Sheremata

DONATIONS TO SPECIAL FUNDS — 1975-76

ANAESTHESIA RESEARCH FUND

BRAIN RESEARCH FUND

Mr. A. Murray Vaughan	$1,000.00
Mrs. A. Murray Vaughan	1,000.00

CANCER CLINICAL RELIEF FUND

WILLIAM CONE MEMORIAL RESEARCH FUND

Miss Mildred Flynn	100.00
Miss Opal Holst	150.00
Jenckes Charitable Memorial Fund	1,000.00
Mr. John Langdon	500.00
Estate of the late Mr. Zave Levinson	2,000.00
Mr. Aaron Prazoff	500.00
Mr. Robert L. Raley	8.00
Mr. A. Richstone	25.00
Mr. Hugh G. Seybold	50.00
In Memory of the late Dr. Albert Bertrand	520.00
In Memory of the late Miss Gail Budd	30.00
In Memory of the late Mr. F. Dalton Drake	30.00
In Memory of the late Mrs. Robert Feindel	30.00
In Memory of the late Mrs. Gladys Harrison	25.00
In Memory of the late Mrs. Margaret Horn	25.00
In Memory of the late Miss Helen Phizicky	112.00
In Memory of the late Mr. Simon St. Pierre	1,973.00
In Memory of the late Mrs. Hugh Seybold	125.00

COSGROVE RESEARCH FUND

Mr. René Champoux	200.00
Mrs. Lucille Jacobs	10.00
Miss Doreen Jurychuk	10.00
Mr. J.A. de Lalanne	200.00

DICK EPILEPSY FUND

GORDON LIBRARY FUND

HARVEY CUSHING CLINICAL RELIEF FUND

Canadian Cancer Society	175.00
Mrs. Venita Gravel Harwood	30.00

In His Name Society	75.00
Mrs. Lillian Sandler	35.00
Women's Auxiliary, R.V.H.	406.13

HOSPITAL EQUIPMENT FUND

Mr. and Mrs. William Stall	10.00
Women's Auxiliary, R.V.H.	1,609.34

MARY MASSABKY FOUNDATION RESEARCH FUND

M.N.I. BUILDING FUND

M.N.I. NEUROSURGICAL FUND

Mr. Michael Gallaman	250.00
Mrs. Lynn Salsberg	100.00

M.N.I. PARKINSON'S DISEASE FUND

In Memory of the late Mr. John Lawrence McGuire	255.00

M.N.I. STAFF LOAN FUND

MULTIPLE SCLEROSIS CLINICAL RELIEF FUND

Anonymous	10.00
Canadian Schenley Limited	100.00
In Memory of the late Mr. F. Drolet	75.00
Mrs. I. Liebich	10.00
Montreal Association for Multiple Sclerosis	2,000.00
Multiple Sclerosis Golf League	600.00
Women's Auxiliary, R.V.H.	948.48

MULTIPLE SCLEROSIS RESEARCH FUND

Anonymous	10.00
Affiliated Trading Ltd.	25.00
Allied Silks & Velvets Co. Ltd.	25.00
Mr. G. Bender	15.00
Mr. Alfred Bock	40.00
Mr. B. Borenstein	10.00
British Woollens Inc.	25.00
Mr. Nat Caplan	100.00
Century Fur Ltd.	25.00
Clockwise Fashions Ltd.	25.00
Mr. S. Cohen	25.00
Mr. R. Druckman	25.00
Mrs. H. Eisenberg	13.00
Mr. I. Freed	10.00
Mr. Frank Freedman	18.00
Mrs. D. Gasco	1,000.00
Mr. W. Gasco	50.00
Mrs. Hélène Gratton	1,000.00
Mr. I. Greenfield	10.00
Mr. Solly Greenfield	25.00
Guarantee Fit Inc.	50.00
Mr. Joseph Holzel	75.00
In Memory of the late Mrs. Claudette Jospisch	26.00
Mr. Roland Lavallée	160.00
In Memory of the late Mrs. R.A. Marks	65.00
Mrs. Maisie Majnemer	50.00
Mr. A. Najovits	10.00

Mrs. M. Najovits	10.00
Miss Judi Najovits	10.00
Mr. Philip Najovits	250.00
Miss C. Silverman	10.00
Mr. E. Silverman	25.00
Mrs. H. Smith	25.00
Mr. Louis Szucs	50.00
Mr. L. Tabachnik	30.00
Mrs. Ruth E. VanLuven	500.00
Mr. T. Waxman	25.00
Mr. S. White	10.00
Mr. Ely Young	100.00

McNAUGHTON NEUROANATOMY RESEARCH FUND

FRANCIS McNAUGHTON NEUROLOGICAL RESEARCH FUND

Anonymous	70.00
Mrs. Anne Boyd	200.00
In Memory of the late Mr. Martin J. Doyle	45.00
Miss Barbara Duncan	10.00
Mr. Michael Gallaman	250.00
Mr. Wm. G. Lynn	100.00
Mr. Edward Norsworthy	200.00
Mr. Sidney M. Ross	9,500.00
In Memory of the late Dr. George Wood	380.00
Mr. J. Clare Wilcox	100.00

NEUROGENETICS RESEARCH FUND

Association Canadienne de l'ataxie de Friedreich Inc.	18,200.00

NEUROLOGICAL RESEARCH FUND

Friends of the Institute	31.25
Mr. & Mrs. Sonny Lindy	25.00
J.W. McConnell Foundation	5,000.00
Estate of the late Mrs. Shirley O'Neil	1,053.06
Mr. Joseph Porter	100.00
Steyning Foundation	3,000.00
In Memory of the late Mrs. A. Bednar	25.00
In Memory of the late Mrs. Sadie Bridge	387.50
In Memory of the late Mr. Marie-Louis Carrier	74.00
In Memory of the late Mr. Andrew Czetwertynski	25.00
In Memory of the late Mrs. Joanne Day	25.00
In Memory of the late Mrs. Roméo Delcourt	25.00
In Memory of the late Mr. Romana Fenile	25.00
In Memory of the late Mr. James Gill	10.00
In Memory of the late Mr. C. Edouard Grenier	840.00
In Memory of the late Mr. Pierre Harwood	25.00
In Memory of the late Mr. Kim Hutchinson	20.00
In Memory of the late Mr. James Robert Hutton	115.00
In Memory of the late Mrs. Robertina Leblanc	20.00
In Memory of the late Miss Mildred Martin	16.00
In Memory of the late Mr. Robert Stanislas Reid	137.00
In Memory of the late Mr. Charles Victor Smale	157.00
In Memory of the late Mr. George Barry Street	98.00
In Memory of the late Mr. Eric Sutherland	20.00
In Memory of the late Edna Vegh	25.00
In Memory of the late Mr. George Whittaker	175.00

NEUROPHYSIOLOGY RESEARCH FUND

NEURORADIOLOGY RESEARCH AND TEACHING FUND

NURSING FUNDS

EILEEN C. FLANAGAN NURSING BURSARY FUND

M.N.I. NURSING EDUCATION FUND

Women's Auxiliary, R.V.H.	570.85

OAKLAWN FOUNDATION FELLOWSHIP FUND

PENFIELD AWARD FUND

PENFIELD RESEARCH FUND

In Memory of the late Leonia Dann	40.00
In Memory of the late Dr. Wilder Graves Penfield	4,590.00
In Memory of the late Mrs. Hope Seybold	50.00
In Memory of the late Mrs. Annie Sutherland	20.00
Women's Auxiliary, R.V.H.	5,000.00

ZELDA AND LEO POSMAN RESEARCH FUND

Mr. Leonard Cohen	1,000.00
Mr. Mario Cytrynbaum	500.00
Max Gold Jewellery Ltd.	100.00
Delrose Development Corporation	100.00
Mr. B. Druker	100.00
Mr. Saul Engel	100.00
Mr. Pierre Frechette	25.00
Mr. Albert Gorchoff, Jr.	100.00
R. Klewer & Associates Ltd.	5.00
Mr. Leo Posman	1,000.00
Mr. Maurice Rochefort	100.00
Mr. Marvin Rusk	25.00
Mr. Sam Wagman	100.00
Mr. Sasha Walanski	200.00
Mr. B.A. Usheroff	500.00
In Memory of the late Dr. Albert Bertrand	43.00
In Memory of the late Mrs. Ethel Cohen	50.00
In Memory of the late Mr. Abraham Hislop	25.00
In Memory of the late Mrs. Ethel Markland	25.00
In Memory of the late Mrs. Annie Posman	1,158.00

REUBEN RABINOVITCH MEMORIAL FUND

REUBEN RABINOVITCH MEMORIAL LIBRARY FUND

Mr. Leo Posman	250.00
Mr. Sidney M. Ross in Memory of the late Miss Caroline Mills	500.00

LEWIS REFORD FELLOWS' FUND

SHERWIN RESEARCH FUND

Hoffmann-LaRoche Limited	250.00
Mr. M. Jupiter	25.00

SPECIAL PROJECT FUNDS:

EMI-HEAD, SPINE AND BODY SCANNER

Alcan Aluminium Limited
Bank of Montreal
Bank of Nova Scotia
Banque Canadienne Nationale
Bell Canada
Canadian Imperial Bank of Commerce
Canadian Industries Limited
Canadian International Paper Company
Canadian Pacific
The Harold Crabtree Foundation
Drummond, McCall & Company Limited
C.L. Gundy Charitable Foundation
Imasco Limited
Imperial Oil Limited
Massey-Ferguson Industries Limited
Mr. T.H.P. Molson and Hon. H. de M. Molson
Petrofina Canada Limited
Provincial Bank of Canada
Royal Bank of Canada
Royal Trust Company
St. Lawrence Cement Company
Sun Life Assurance Company of Canada
Toronto-Dominion Bank
Wood Gundy Limited

EPILEPSY FOLLOW-UP AND RESEARCH PROJECT	
Savoy Foundation	33,000.00
STROKE RESEARCH	
Anonymous	100,000.00
SPINAL CORD RESEARCH FUND	
Anonymous	25,000.00
Mr. Philip Assal	50.00
In Memory of the late Mr. Leonard Mundy	5.00
In Memory of the late Mrs. Fred Scotcher	450.00
Mrs. Ruth E. VanLuven	500.00
THOMAS WILLIS FUND	
Mr. N. Douglas Johnston	50.00
WOMEN'S AUXILIARY, R.V.H.	
Total donations	9999.80

Donations to the Montreal Neurological Institute may be made to any of the above 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 the *Secretary, Mrs. Ernest Rossiter, Jr., Box 441, Elizabethtown, N.Y. 12932,* with the notation that they are for the Mentreal Neurological Institute.

SUGGESTED FORMS OF BEQUESTS

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, address
The Director
Montreal Neurological Institute
3801 University St.
Montreal H3A 2B4, P.Q.

Craniotomy and Craniectomy

and biopsy	6	
and decompression	6	
and drainage of abscess	2	
and drainage of subdural haematoma	14	
and drainage of intracerebral haematoma	7	
and drainage of extradural haematoma	7	
and elevation depressed skull fracture	1	
and excision of epileptogenic focus (lobectomy)	53	
and excision of epileptogenic focus (hemispherectomy)	1	
and excision, clipping or wrapping of aneurysm	23	
and hypophysectomy for pituitary or intrasellar tumour	1	
and hypophysectomy (transphenoidal) for endocrine control	4	
and hypophysectomy (transphenoidal) for pituity or intrasellar tumour	9	
and plastic repair of dura (CSF, rhinorrhea or fistula)	2	
and plastic repair of skull defect (plate, bone or plastic)	2	
and removal of arteriovenous malformation	2	
and cerebral vascular bypass and anastomosis	2	
and removal of posterior fossa tumour	18	
and removal of cerebral tumour	42	202

Trepanation

and aspiration of cyst	1	
and biopsy	15	
and drainage of subdural space, epidural and intracerebral	17	
and ventricular puncture	6	
and ventriculography	2	41

Shunt Procedure

and ventricular caval	29	
and ventricular peritoneal	13	42

Stereotaxic Procedure

and ventriculography	3	
and second stage	14	17

Laminectomy and Hemilaminectomy

Anterolateral cordotomy — thoracic	4
Decompression or exploration of spinal cord for spondylosis (dentate ligament section)	7
Decompression or exploration of spinal cord (trauma)	5
Decompression or exploration of spinal cord tumour or vascular malformation	3
Discoidectomy — lumbosacral	56
Discoidectomy — cervical	1
Incision and drainage of abscess	1
Incision and drainage of intramedullary cyst (syringomyelia)	7
Removal of tumour — extramedullary, intradural	3
Removal of extradural tumour — metastatic, bone, etc.	11
Rhizotomy	7
Spinal fusion with bone graft — autogenous or bone bank	19
Spinal fusion with wire or plate or surgical simplex	6
Spinal fusion — cervical — occipital	2
Discoidectomy — anterior approach — cervical, Cloward procedure	15

Discoidectomy — anterior approach — cervical	4	151
Nerve Explorations		
Graft	1	
Avulsion or section	11	
Excision of neuroma	1	
Neurolysis, transplantation or decompression or exploration	45	58
Artery Exploration		
Endarterectomy (patch-graft)	5	
Progressive occlusion (Selverstone clamp)	2	7
Wound Re-opening		
Drainage of infection	3	
Evacuation of haematoma	10	
Exploration	1	
Further removal of brain tissue	2	
Removal of bone flap, tantalum plate or wire mesh	3	
Repacking	4	
Resuturing	1	24
Miscellaneous		
Miscellaneous	40	
Nerve blocks	225*	
Tic injection	5*	
Tracheostomy	14	
Muscle biopsy	134	188
TOTAL number of theatre cases		730
Radiological Procedures		
Cerebral angiography		
Percutaneous, carotid, vertebral or subclavian	172	
Catheterization (brachial, femoral or carotid)	242	
Pneumograms under anaesthesia	178	
TOTAL number of x-ray procedures		592

CLASSIFICATION OF DISEASES — 1975

Nervous System Generally		
Multiple Sclerosis	91	
Motor Neurone Disease	26	
Friedreich's Ataxia	1	
Tuberous Sclerosis	5	
Miscellaneous	24	147
Meninges		
Meningocele & Myelomeningocele	1	
Acute Purulent Meningitis	5	
Subdural Haematoma	27	
Subarachnoid Haemorrhage	42	
Adhesive Arachnoiditis	2	
Poliomyelitis	1	
CSF Rhinorrhea	3	
Spinal Arachnoiditis	3	
Miscellaneous	73	157

Brain

Congenital Anomalies	13	
Hydrocephalus	21	
Abscess	4	
Head Injury (Contusion, Laceration, Traumatic Encephalopathy, Concussion, Skull Fracture)	157	
Epilepsy	257	
Arnold-Chiari Deformity	10	
Parkinsonism	16	
Intracerebral Haemorrhage	17	
Intracerebral Haematoma	3	
Alzheimer's disease	5	
Thrombosis, Encephalopathy due to Arteriosclerosis	124	
Cysts	8	
Aneurysm	17	
Encephalitis	7	
Sturge-Weber Syndrome	1	
Arteriovenous Malformation	11	
Miscellaneous	74	745

Tumours

Astrocytoma	29	
Meningeal Fibroblastoma	4	
Craniopharyngioma	3	
Schwannoma	6	
Chromophobe Adenoma of Pituitary	14	
Gliomas	24	
Sarcoma	4	
Metastatic Carcinoma	56	
Brain Tumour Suspected	10	
Myeloma	1	
Angioma	1	
Pinealoma	1	
Medulloblastoma	4	
Neurofibromatosis	4	
Glioblastoma Multiforme	30	
Oligodendroglioma	1	
Meningioma	31	
Chordoma	2	
Miscellaneous	23	248

Spinal Cord

Guillain-Barre Sybdrome	6	
Myelopathy	22	
Syringomyelia	6	
Hydromyelia	2	
Anterior Horn Cell Disease	1	
Diastematomyelia	1	
Spinocerebellar Degeneration Suspected	3	
Spinal Stenosis	5	
Spastic Paraplegia	2	
Miscellaneous	75	123

Cranial & Peripheral Nerves

Optic Neuritis	2	
Trigeminal Neuralgia	21	
Compression Ulnar Nerve	8	
Carpal Tunnel Syndrome	13	
Other Neuralgias	12	

Peripheral Neuropathy	24	
Neuritis	4	
Occipital Neuralgia	2	
Hemifacial Spasm	4	
Retinopathy	2	
6th Nerve Palsy	1	
Oculomotor Paresis	1	
Bell's Palsy	1	
Miscellaneous	48	143
Muscles		
Myasthenia Gravis	18	
Muscular Dystrophy	6	
Myopathy	9	
Muscular Atrophy	8	
Charcot-Marie-Tooth Disease	2	
Miscellaneous	11	54
Mental Disease		
Mental Retardation	6	
Depression	16	
Anxiety State	7	
Conversion Hysteria	11	
Schizophrenia	5	
Behaviour Disorder	12	
Chronic Alcoholism	4	
Miscellaneous	4	65
Other Systems		
Protrusion Disc — Lumbar	61	
Protrusion Disc — Cervical	22	
Fracture and/or Dislocation Vertebral Column	27	
Back Pain	30	
Pain Miscellaneous	23	
Gunshot Wounds	4	
Traumatic Lesions and Infections	6	
Rheumatoid Arthritis	2	
Coronary Insufficiency	1	
Hypoglycemia	2	
Diabetes Mellitus	7	
Osteomyelitis	1	
Hypertension	11	
Osteoarthritis	2	
Cellulitis	1	
Hypothyroidism	2	
Miscellaneous	68	270
TOTAL		1952

Head injury (concussion, contusion, haematoma)	10	
Intracranial aneurysm (haemorrhage, haematoma due to aneurysm)	9	
Cerebrovascular disease (thrombosis, infarction, haemorrhage)	27	
Intracranial tumour, primary	10	
Intracranial tumour, metastatic	6	
Cardiac arrest	9	
Other systems	16	
TOTAL		87

Notes