nd Annual Report

ONTREAL NEUROLOGICAL INSTITUTE
ONTREAL NEUROLOGICAL HOSPITAL

and the

DEPARTMENT

of

NEUROLOGY

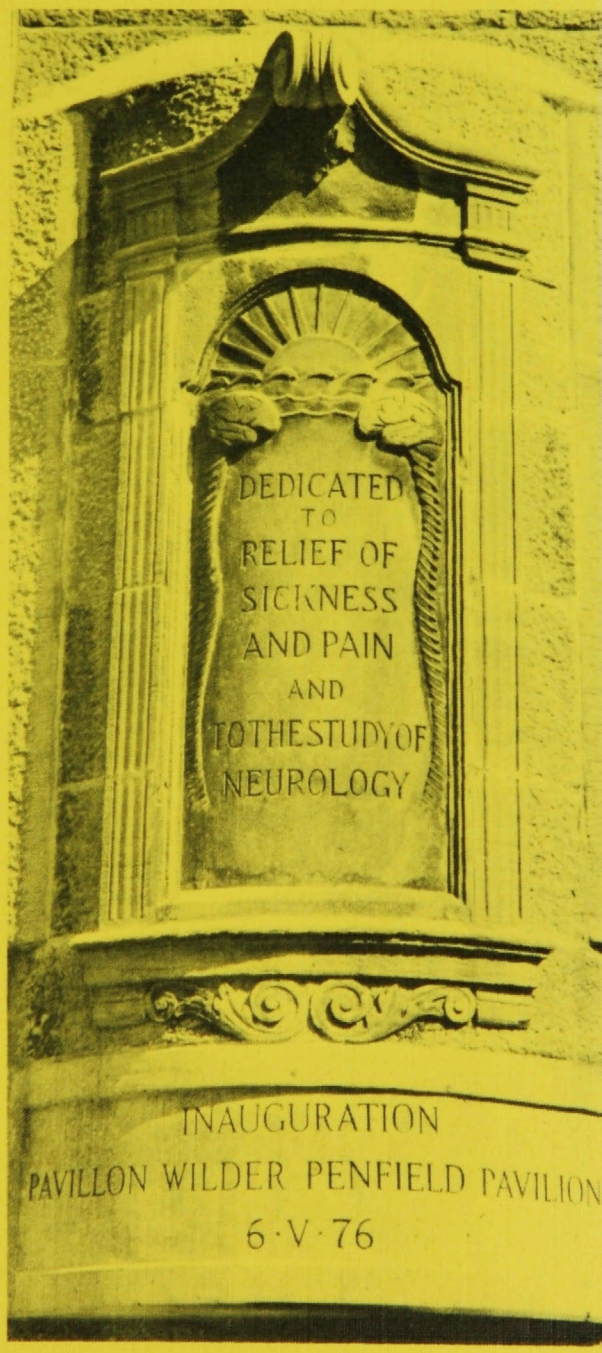
and

NEUROSURGERY

of

McGill University

1976-1977



42nd Annual Report

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(Le rapport annuel français est disponible sur demande)

Contents

EDITORIAL NOTE

These annual reports over the years have gone to universities and governments and to an ever-increasing number of friends, patients and former Fellows of the Hospital and Institute. We again thank especially our editorial team, including Mrs. Rose Slapack, Dr. K. A. C. Elliott, Mrs. Sophie Malecka and our translators Les Traducteurs Médicaux Inc., for putting these materials together so well.

By bringing out this report, we can also identify the work that has been made possible by the help, moral and material, which we receive from so many supporters in so many places. We can mark our progress in the diagnosis and treatment of neurological disorders. Beyond this, we can record our inroads into what Dr. Penfield referred to as the ultimate problem of neurology — "to understand man himself and to analyze the means by which man, the creator of science, has done what he has done". Endowed with the rich legacy which he and so many others have left to us, and with the exciting new resources of the Penfield Pavilion to be available during this coming year, we all look forward to the expansion of our activities in "this continuing fabulous enterprise".

W. F.

A. Jean de Grandpré, Q.C.
President, Board of the Corporation and Board of Directors
Montreal Neurological Hospital
1970 — 1977

Copy of a portrait by Mr. Lynn Buckham commissioned by the Hospital and Bell Canada

Report of the Director
A Quinquennial Review

DR. WILLIAM FEINDEL

This 42nd Annual Report summarizes the research progress in the Institute for the Principal and the Board of Governors of McGill University and reviews the work of the Hospital for the Board of Directors, the Board of the Corporation and the Minister of Social Affairs. It also includes an outline of the teaching activities of the Department of Neurology and Neurosurgery for the Dean of the Faculty of Medicine, McGill University, which in turn will be incorporated in the report of the Principal to be made to the Minister of Education.

We are again indebted to our staff for their succinct statements covering the hospital units and some 15 busy research laboratories. Exciting inroads continue to be made here into our understanding of disorders affecting the brain and nerves and into the mysterious substrates of mind, such as memory, language and learning.

At a recent meeting of the Board of Directors of the Hospital a Resolution was unanimously passed to express the deep appreciation of the Board to Mr. A. Jean de Grandpré who, since April 1970, has been President. In this role, he has freely provided leadership and wise counsel. He has ably guided the hospital affairs through times of considerable financial and structural change. He has always supported the plans of the medical and scientific staff for improvement and expansion. We are grateful to him and his charming chatelaine, Madame Hélène de Grandpré, for their keen interest in the welfare of the Montreal Neurological Hospital and Institute and hope that we may continue to enjoy their personal concern in our future growth. We are pleased that Mr. Taylor Kennedy, a McGill graduate in engineering, has been appointed Mr. de Grandpré's successor and we all look forward to working with him in our hospital affairs.

Topping Off

It has been an exciting year during which our plans for expansion, so long in the paper stage, have become wondrously transmuted into concrete. Excavation began in June 1976, with action from ingenious machines — diggers, rock-breakers, scrapers and lifters — all handled with skill and precision that evoked the admiration of even our neurosurgeons. The hammering of air drills, hooting of the cement dispensers and the general hurry and flurry as each level of concrete rose for the shell of the building, gave us all a great sense of expectation.

At our annual meeting a Neuro version of the "topping off" or "panachage" was presided over by our Principal, Dr. Bell, when a Hippocratic plane tree, with flags of McGill, Quebec and Canada, was hoisted expertly by the crane operator to the 9th floor pinnacle of the Penfield Pavilion.

The tree was the offspring of an ancient one, alleged to be 2500 years old, on the Greek Island of Cos, in the shade of which Hippocrates the Father of Medicine, was said to have taught his students. It was in generous response to my request that Dr. William Gibson, former Fellow and now a distinguished Professor of Medical History, promptly sent this tree by plane (how else!) as his gift from the University of British Columbia. So with this panachage, we proudly put a feather in our institutional hat, we symbolize Dr. Penfield's deep interest in Hippocrates, about whom he wrote an historical novel, and we remind ourselves of the universal and historical role of medicine to which all of us in this Institute and Hospital are dedicated.

Expansion Program

The progress of the Penfield Pavilion emphasizes that over the past five years while I have been Director our most urgent priority has been to secure more space for hospital, teaching and research work, if we were to survive as a centre of excellence in world neurology. Building plans, started in 1968, were stopped by government decree in 1970. Our laboratories had become increasingly cramped and unsafe; our hospital and patient areas, except for neuroradiology and electroencephalography, were out-of-date and rundown, with high maintenance costs; teaching space, already inadequate for a number of years, became even more overcrowded with the increase in the size of the medical class and the burgeoning of our post-graduate, nursing and paramedical instruction. Not only did we find it difficult to initiate new programs, but our key scientists and clinical teachers, without a firm prospect for bettering their resources, became an endangered species here. This situation was confirmed when we reviewed our research activities at the first of three colloquia held at Hovey Manor early in my directorship. Every scientist and teacher there stressed that their greatest need was space.

Fortunately, by the fall of 1972, we were able to convince the staff of the Department of Social Affairs of our serious dilemma, so that there was approval of funds for the most urgent renovations along with authority to resurrect detailed planning for overall expansion. In the meantime, there were other encouraging developments on the McGill scene, with construction of a research institute and the McGill combined x-ray treatment unit at the Montreal General Hospital and addition of outpatient areas at the Montreal Children's Hospital. Expansion projects were also approved by the government for l'Institut de Cardiologie de Montréal, headed by Dr. Paul David, and l'Institut de Recherches Cliniques de Montréal of the Hotel Dieu, directed by Dr. Jacques Genest. It reassured us that if these younger sisters of the Neurological Institute, both modelled in some features after it, were being recognized by the Province, then the Montreal Neurological Hospital and Institute could not be far behind.

Our major expansion project was divided into four phases, to run from 1972 to 1979.

Phase I

Demolition of the fieldhouse superstructure, provision of a parking lot and preparation of plans by staff committees.

Phase II

In 1973, an addition of three storeys for the Rockefeller Building gave a safe area for radio-isotopes and handling of chemicals and gases, a research laboratory for brain circulation, a women's staff lounge and an area for repair of anaesthesia and hospital equipment.

Phase III

This was the major construction of a 72,000 square foot, nine-storey wing to be known as the Penfield Pavilion, approved by Order-in-Council 3415-75, financed by generous private donations to the Institute with support from the Provincial Government and from the Health Resources Fund of the Federal Government. Although much teaching and laboratory space will be added for undergraduate and post-graduate work, we have so far made no demands for funds from the Faculty of Medicine or the McGill Development Program. This Pavilion will extend the present resources at each level of the Hospital and Institute, providing a modern operating room suite, a proper intensive care unit, new areas for patient treatment, additional teaching and research units, a neuro-diagnostic day centre, as well as safe storage for x-ray, EEG, and hospital records.

Phase IV

This will involve junction of the new and old buildings followed by the upgrading of the obsolete ventilation, electrical, elevator, communication and security services in the old building. This will start early in 1978, after the construction of the Penfield Pavilion has been largely completed, and is expected to continue into 1979.

The cost of the entire project over this seven-year period, including construction, renovation, mechanical, electrical, hospital and scientific equipment and furnishings, will come to 14 million dollars (3.25 million dollars guaranteed from Institute private donations and the remainder shared between the Provincial and Federal budgets). We may note that this total figure is the equivalent of the cost of one mile of autoroute.

Project of National Significance

We have submitted evidence for what we consider to be a valid claim that our expansion project should be considered of national significance for support from a special category of the Health Resources Fund. The Institute has enjoyed over the past 40 years an increasing international reputation and has been regarded generally as the Neurological Institute of Canada. The new Pavilion, in carrying Dr. Penfield's name, will honour one of the most distinguished of Canadian medical scientists and Canadian citizens. We have no doubt that this move will be welcomed by the medical and scientific community across Canada. It offers a wonderful opportunity for the Provincial and Federal Governments to pay tribute to the life and

work of Wilder Penfield and to ensure that the enormous legacy which he made to Canadian medical sciences can be continued.

Colloquia

In 1972-73, a series of three colloquia was held at Hovey Manor, Lake Massewippi. Three major topics were reviewed during these weekend retreats by members of the Institute and the Department. From these, we derived our priorities in research, teaching, and in our academic and hospital organization and coordination. Having initiated the space program, we considered the broadening of our woefully inadequate teaching of neurology and neurosciences at the undergraduate level. I am pleased to say that much more active clinical exposure of undergraduates to neurology and neurosurgery in the new curriculum is now available, though it requires better coordination. We are grateful to all of our teaching staff and particularly to Dr. Donald Lawrence and Dr. Allan Sherwin for supervising these changes and to the University Curriculum Committee for their support.

A thorough discussion at the third colloquium emphasized the advantages of integrating basic and clinical neurosciences, while at the same time allowing flexibility for the growth of clinical and research teams to tackle such demanding problems as epilepsy, multiple sclerosis, neuromuscular disorders, stroke and neuroendocrine disturbances.

These colloquia involved members of our staff, including residents and nurses, with input from the McGill Curriculum Committee. Outside experts from the Royal College, the Quebec Government and from other universities also brought their views to us.

From the colloquium devoted to research, it became also clear that we must secure more outside awards to enhance work which is dependent on our Institute endowment funds. It is a satisfaction to record that our scientific staff, despite inflation and serious levelling of funds of the Medical Research Council of Canada, have over the past five years obtained double the value of research grant awards from this major source. Since these awards are highly competitive, this increase is evidence of the quality as well as the quantity of our research. During the same five-year period there was almost a doubling of our departmental publications, the increase coming mainly from the Institute staff but partly as well from the active research teams at the other McGill hospitals, particularly the Montreal General group.

It was further evident that research funds of the Institute were becoming increasingly encumbered to subsidize university teaching salaries in the Department of Neurology and Neurosurgery. Over the years the Institute had become locked into a formula to the extent that the income from some 3 million dollars of our research endowment now subsidizes teaching in neurology, neurosurgery and the neurosciences for the Faculty of Medicine. This situation obviously strains our resources, puts our research programs at great risk and demands solution.

New Developments

Computer axial tomography (CAT) developed by British scientists was introduced to Canada for the first time when the head scanner was installed at the MNI in 1973. The first EMI body scanner in the country has also been in operation here since 1976. These devices have revolutionized neurological diagnosis and our MNI team members headed by Dr. Roméo Ethier have become recognized experts in this pioneer field.

Positron emission tomography (PET). This unique device, developed by our research team under the direction of Dr. Lucas Yamamoto in collaboration with the Brookhaven National Laboratory, offers a remarkable new approach for brain scanning and measurement of the blood supply and metabolism of the brain with no risk or discomfort to the patient. The production of special radio-active tracers has been carried out with the scientific staff in Radiochemistry and at the Cyclotron Unit of McGill.

X-ray projection microscope. One of the few instruments of its kind in North America, this apparatus, applied to studies of the blood vessels of the brain, is providing important anatomical back-up for our extensive research on cerebral circulation.

Timelapse video and computer monitoring for seizures. An addition to the diagnostic tools to investigate patients with cerebral seizures, this television method coupled with computer-controlled monitoring of the electrical activity of the brain, was developed during the past year. It has expanded the role of telemetering computer diagnosis which has proved so useful in the selection of patients for surgery.

All these new instruments have served patients not only at this hospital but also those referred from other hospitals in Quebec.

Renovations

In addition to our major renovation and construction programs, special funds and donations allowed us to make innovations and many changes that improved our operations.

An EEG telemetering laboratory was set up on 4 South in the former kitchen. A pain clinic was organized with neuro-anaesthesia on 4 North. A new EEG office and reading room was added on the ground floor. Additional space to accommodate neuropsychology and the new services of psychiatry, neurogenetics and neuro-ophthalmology were provided by the technique of internal decompression, not unfamiliar to neurosurgeons.

Major replacements of sterilizer units for the operating room were made. Re-organization of food services for six of the ward units were completed, a tactic which freed the kitchen space on 4 South for telemetering. Work was started on the replacement of the two elevators in the original Rockefeller building.

The capacity of the lecture theatre was increased from 130 to 160 seats. Mr. Harry Marpole planned this by changing the two steep stairways to a single central stairway, thus altering the bilateral cerebellar test, which teachers and students had undergone here over the years, to a midline test. To Dean Cronin's subvention which supported these renovations

we added some "soft money" from the Institute funds to ensure that all the seats were of the same quality. Shortly after this renovation, in 1974, we properly christened this the Hughlings Jackson Amphitheatre. For many years the bronze bust of this famous neurologist has favoured us with his benign gaze during the traditional annual Hughlings Jackson Lecture, the first of which was given in 1935 by Dr. Penfield.

Teaching offices were arranged, in addition to those noted above, for members of our senior staff. Dr. McNaughton became heir to what was formerly the continuous tub room on 4 South. It should occasion no surprise if one day, like Archimedes, he might cry out to us, "Eureka!"

New Programs

Neuropharmacology

The measurement of levels of anticonvulsant drugs in the blood was aided by equipment purchased with the help of the Auxiliary of the Royal Victoria Hospital. Support from the Savoy Foundation allowed Dr. Sherwin, working with Dr. Bernard Graham, to set up a treatment and investigation program jointly with the Savoy Foyer at Ste. Hilaire. The research findings were thus being directly applied to patient treatment. This unit served also as a Provincial centre for these special tests.

Neuro-ophthalmology

A clinical teaching unit was established within the Institute, with equipment costs being shared by the Department of Ophthalmology through the support of its Chairman, Dr. Sean Murphy. The necessary structural changes were covered by a special donation from a friend of the Institute in Alberta. Close liaison with the Montreal Children's Hospital continues and a research program on squint is developing.

Neurogenetics

A small but active team, under Dr. Eva Andermann, has investigated the genetic features in epilepsy and a number of important genetic disorders affecting the Quebec population.

Stroke Research Unit

With a generous donation for a three-year period, clinical extension of our cerebral vascular research work was developed. Computer techniques, the Positron scanner and new diagnostic and treatment methods are bringing new hope to patients afflicted with major neurological problems involving cerebral circulation.

Psychiatric Service

With new funding from the Department of Social Affairs and with the support of Dr. Maurice Dongier, Chairman of Psychiatry, our teaching and research activities have been improved by the appointment of our first in-house psychiatrist, Dr. Louise Demers.

Spinal Treatment Centre

Improved management of patients with spinal disorders, particularly those with paralysis after accidents, has been organized with the Departments of Physical Medicine, Orthopaedic Surgery (Dr. William Fish), and Urology (Dr. John Foote), under the able direction of Dr. Robert Hansebout whose active spinal research supplements this clinical development.

Computer Centre

New aspects of the PDP-12, initially secured by MRC funds for neurophysiological analysis, have been developed to support programs in stereotactic surgery, cerebral circulation measurements, clinical EEG analysis and the new Positron apparatus.

Neuromuscular Research

An active and expert team from various disciplines has continued a combined scientific attack on muscle and nerve disorders, utilizing techniques of chemistry, electronmicroscopy and electrical recording.

Neuroendocrinology

With the appointment of Dr. Joseph Martin as Neurologist-in-Chief, the study of endocrine changes during seizure activity and sleep has been started and a closer liaison has been made with the neuroendocrine research groups at the Montreal General Hospital and the Royal Victoria Hospital.

Neuroarchives

Much valuable material relating to the history of the MNH and MNI is being collected and classified. In particular, the Penfield Papers are being sorted and catalogued in preparation for their transfer to the Penfield Room which will be available with the new construction.

New Staff

For the first few years of this past quinquennium it was difficult to recruit new staff because of our space shortage. With the Penfield Pavilion now looming to the south of us, we have started to strengthen certain areas in the Institute and in joint operations with the other McGill teaching hospitals. Dr. Joseph Martin took over in August, 1976, as Neurologist-in-Chief at the Montreal Neurological Hospital and Program Director of the McGill Neurological Residency training, to replace Dr. Preston Robb, who wished to retire from these responsibilities. Dr. Martin's outstanding reputation in neurological research will enhance the attractions of the graduate program here at McGill.

Several joint appointments between the Department of Neurology and Neurosurgery and other McGill departments have been made. These include Dr. Yogesh Patel, a distinguished biochemist who will work with us and with the Department of Medicine at the Royal Victoria Hospital, and Dr. Robert Dykes, an expert in sensory physiology, who will carry out combined work with the Department of Surgery at the RVH. Dr.

Daniel Guitton, after a double doctorate in engineering and in physiology, will return from a year of study in Brussels to investigate the brain control of eye movements, working jointly with Dr. Kirkham here and Dr. George Mandl in physiology.

Dr. Louise Charron came on staff, after an excellent record in her neurological training program, to continue neuromuscular research with Dr. Karpati; she holds at the same time a neurological appointment at the Hotel Dieu. Dr. Barbara Jones, who has worked in the exciting field of chemical tracing of pathways in the brain, joins Dr. Donald Lawrence in our neuroanatomical laboratory and Dr. Bindra and his group in the department of psychology.

Two appointments in neurophysiology include Dr. Jean Gotman who will join our computer team, and Dr. Felipe Quesney who returns after leave of absence at the University of Minnesota to join Dr. Gloor in clinical neurophysiology. Both of these men passed their McGill PhD examinations with flying colours during the past academic year. The addition of these bright young scientists to our staff, working in cooperation with investigators in other McGill departments and bringing new ideas and techniques to our already active group, will have a catalytic effect on neurology and neurosurgery at McGill.

I should not fail to mention that at the same time we have been fortunate enough to keep our present distinguished staff, many of whom continued to be approached with tempting offers for positions elsewhere. We can now promise them that, with the new expansion program getting into action in 1978, the resources and opportunities here in the neurosciences, with the unique advantages of combining clinical and research teams, will be unmatched.

International Meetings

We are favoured each year at the Institute with visits from distinguished physicians and scientists besides those who present our annual lectures and seminars. Over the past four years we have also organized three exciting international symposia.

In 1973 we held the First International Meeting on Computer Tomography, taking advantage of the fact that we had one of the first three of these remarkable new devices in North America. In April 1976 the MNI, as one of the collaborating centres in neurosciences of the World Health Organization, sponsored a meeting of a group representing eight world centres in neurology, to review how modern methods could best be applied to neurological problems in developing countries. Shortly after that, in May 1976, under the able leadership of Dr. Hanna Pappius, a most successful International Workshop on Cerebral Edema took place.

Our scientific and clinical staff continue to participate actively in many national and international societies. Because of this and the many Fellows who trained here, as well as the increasing number of patients referred here from many parts, there are few countries in the world where the Neuro does not have representation.

Wilder Penfield (1891 — 1976)

In our reports last year we paid tribute to our Founder-Director, Wilder Penfield, who died on April 5, 1976, after a long and vigorous life devoted to neurology. He was happily aware of the ongoing momentum of the Institute and had the satisfaction of knowing that the Penfield Pavilion was going ahead. He had completed the manuscript of a partial autobiography which we have continued to shepherd through the publishing process during this past year. Galley proofs were recently returned to the printer and *No Man Alone* should appear in the fall of 1977 from the press of Little, Brown, Boston. It is a fascinating story of his early education and his work as a neurosurgeon, leading up to the foundation of this "fabulous enterprise" — the Montreal Neurological Institute. As a further tribute to Dr. Penfield, papers on various aspects of his scientific work, presented at a Memorial Meeting at the MNI in October, were published this June in a special issue of the Canadian Medical Association Journal.

Dr. Penfield would have been the first to emphasize that, with our expansion and with the addition of new and young scientists and clinicians, our needs for more endowment have become more urgent. In 1953, he despaired so deeply for the future financial support of this Institute, that he felt it must be closed down. But rescue came in the way of the McConnell Wing and substantial research endowment. In the past quarter century, the role of the Institute in world neurology has become assured and we must now reinforce this with new funds by which the work can go forward.

We are planning our Third Foundation of the Montreal Neurological Institute in 1978, the 50th Anniversary of the year when Dr. Penfield and Dr. Cone began neurosurgery at McGill. We hope that the number of burgeoning neuroscientists at McGill and at our sister universities in Quebec will join us in this celebration. It will see the official opening of the Penfield Pavilion and will be marked by scientific and clinical symposia.

This Institute has been part of the scientific and medical fabric of the Province of Quebec. We have served patients from the entire province with our special facilities and we have trained distinguished men and women who have contributed their share in Quebec. The Institute has at the same time acquired, because of the distinguished men and women working here, a world reputation in neurology that has brought, we believe, lustre to McGill, to this City and Province and to Canada and has vindicated the support which many donors have so generously given over the years.

"Individual bilingualism is a personal enrichment and a necessary acquisition, particularly for Quebecers, who live in a country where English is spoken by the vast majority of people, and where the most important discoveries in the field of science and technology are made south and west of the border. I have always favoured institutional bilingualism for Canada". These reassuring words from Dr. Camille Laurin are encouraging to centres like this Institute, which must work in an international milieu. We do not intend to slacken our aim for excellence.

Before closing this report in which I have mentioned highlights of our

progress over the past five years, I am pleased to acknowledge marvellous support and help from many quarters — the University, the Royal Victoria Hospital and the other McGill teaching hospitals, the members of our Hospital and Institute staff, the members of the Corporation, the Directors of the Board of the Hospital and the representatives in the Ministry of Social Affairs and, most of all, we thank our many patients and friends who come to our rescue with material as well as spiritual help, both of which are much needed in the continuation of our work.

As a concluding comment it seems fitting to quote the "first aphorism" from the Hippocratic writings, so well known to many physicians and so pertinent to medical practice, teaching and research today.

"Life is short, the art so long, opportunities fugitive,
Experience deceptive and judgment difficult."

MONTREAL NEUROLOGICAL HOSPITAL

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ROBERT HANSEBOUT, M.D. (Western Ont.), M.Sc., F.R.C.S. (C)
ANDRÉ OLIVIER, B.A., M.D., (Montréal), Ph.D. (Laval), F.R.C.S. (C)

Assistant Neurosurgeons
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JOHN LITTLE, M.D. (Saskatchewan), M.Sc. (Minnesota)

Neuroradiologist
ROMÉO ÉTHIER, B.A., M.D. (Montréal)

Associate Neuroradiologist
DENIS MELANÇON, B.A., M.D. (Montréal)

Assistant Neuroradiologists
GARRY BÉLANGER, B.A., M.D. (Ottawa)
SAUL TAYLOR, M.D. (Toronto), C.S.P.Q., F.R.C.P. (C)

Electroencephalographer and Neurophysiologist
PIERRE GLOOR, M.D. (Basel), Ph.D.

Associate Electroencephalographer
FREDERICK ANDERMANN, B.Sc., M.D. (Montréal), F.R.C.P. (C)

Assistant Electroencephalographers
EVA ANDERMANN, M.D., C.M., M.Sc., Ph.D.
MICHEL AUBÉ, B.A., M.D. (Montréal), F.R.C.P. (C)
IVAN WOODS, M.B., B.Ch., B.A.O. (Univ. Coll., Dublin), M.Sc., F.R.C.P. (C)

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Neurochemist and Medical Research Council Associate
LEONHARD S. WOLFE, M.Sc. (Canterbury), Ph.D. (Cantab.)
M.D. (Western Ont.), F.R.C.P (C), F.R.S.C.

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Clinical Psychologist
CLARA STRAUSS, M.A.

*To March 31/77

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LOUISE DEMERS-DESROSIERS, M.D., C.M.,
C.S.P.Q., F.R.C.P. (C)

Neurophotographer
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Consulting Executive Director	Douglas MacDonald, B.Eng.
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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.

†Deceased May 1977

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Director of Personnel ..... Hector Heavysege
Director, Social Service ..... Miss Cynthia Griffin
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Nursing Coordinators (evenings) ..... Miss Cecilia Largo, R.N., B.Sc.
Miss Linda Maruska, R.N.
Nursing Coordinators (days) ..... Miss Anne Carney, R.N., B.N.
Miss Annie Johnson, R.N.
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Rabbi M. Glick ..... *Hebrew Chaplain*
Pastor Heinz Dahle ..... *Lutheran Chaplain*
Reverend Father Anthony Gabriel ..... *Orthodox Priest*
Reverend Mel McDowell ..... *Protestant Minister*
Sister Brenda Halton ..... *Roman Catholic*
Father George Novotny ..... *Roman Catholic*
Father Noel Rodrigue ..... *Roman Catholic*

Senior Neurosurgical Residents ..... Tyrone Hardy, M.D. (Howard) (3 mos.)
Marcial Lewin, M.D. (Cath. U. of Chile) (5 mos.)
Victor Smart-Abbey, M.D. (McGill) (4 mos.)

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S. Chayasirisobhon, M.D. (Mahidol, Thailand)
S. Jiaravuthisan, M.D. (Mahidol, Thailand)
D. Katz, M.D. (Pennsylvania)
K. Laxer, M.D. (California)
H. Markley, M.D. (Maryland)
J. Stewart, M.D. (West Indies)

Assistant Residents: 6 mos. on this service

J. Carlton, M.D. (Johns Hopkins)
S. Chayasirisobhon, M.D.
A. Hakim, M.D. (Albany Med. Coll.)
S. Jiaravuthisan, M.D.
H. Markley, M.D.
C. Perrot, M.D. (Geneva)
B. Zifkin, M.D. (McGill)

Resident Consultants to RVH

K. Hoyte, M.D. (Queen's (2 mos.)
S. Sadowski, M.D. (Toronto) (4 mos.)
J. Wasserman, M.D. (Jefferson) (6 mos.)

Residents

W. Ellis, M.D.
J. Glaser, M.D.
W. Hooper, M.D.
P. Hwang, M.D.
Sara Meltzer, M.D.
M. Rabinovitch, M.D.
T. Wigmore, M.D.

R.V.H. Rotators

J. Ahuja, M.D.
D. Arnold, M.D.
B. Ballerman, M.D.
A. Brox, M.D.
J. Cameron, M.D.
W. Carey, M.D.
P. Cleland, M.D.
B. Dial, M.D.
G. Fantus, M.D.
D. Gayton, M.D.
R. Hakim, M.D.
J. Hoffer, M.D.
M. Howcroft, M.D.
J. Jolivet, M.D.
A. Langleben, M.D.
F. Lemire, M.D.
M. Manning, M.D.
L. Martin, M.D.
A. Paidra, M.D.
G. Routhier, M.D.
L. Roy, M.D.
B. Schlesinger, M.D.
D. Schreiber, M.D.
W. Smith, M.D.
E. Stanton, M.D.
J. Wiseman, M.D.
Y. Yazer, M.D.

Montreal General Hospital: 6 mos. on this service

K. Hoyte, M.D.
R. Yufe, M.D. (McGill)

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

D. Katz, M.D.
E. Kratzenberg, M.D. (Nancy)
W. Becker, M.D. (EMG) (Manitoba)
A. Hakim, M.D. (EMG)
K. Nudleman, M.D. (Queen's)
K. Silver, M.D. (Saskatchewan)
E. Matthew, M.D. (EEG) (Madras, India)

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

W. Becker, M.D.
P. Camfield, M.D. (Harvard)

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

P. Camfield, M.D.
K. Hoyte, M.D.
E. Kratzenberg, M.D.
E. Matthew, M.D. (EEG)
B. Rosenblatt, M.D. (McGill)
H. Sadowski, M.D.
D. Stowens, M.D. (U. of New York, Brooklyn)
K. Silver, M.D. (EEG)

Jewish General Hospital: 6 mos. on this service

B. Rosenblatt, M.D.
B. Zifkin, M.D.

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M. Lewin, M.D.
V. Smart-Abbey, M.D.
J.-G. Villemure, M.D. (Laval)

Assistant Residents: 6 mos. on this service

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A. Joern, M.D. (Oklahoma)
H. Milam, M.D. (Meharry Med. Coll.)
J. Montes, M.D. (San Luis Potosi)
P. Ragazzo, M.D. (S. Paulo Med. School)

Montreal General Hospital Residents: 6 mos. on this service

J. St. John, M.D. (Wayne State)
J. Wells, M.D. (Tulane)

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

J. Martinez-Leyva, M.D. (Mexico)
C. Taylor, M.D. (Howard)

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

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G. Blomquist, M.D. (Vanderbilt)

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S. Louise F. Charron, M.D. (Sherbrooke)

Neurosurgical Research:

Cone Laboratory:
R. Branan, M.D. (Colorado) (M.R.C. Fellow)
Yoku Nakagawa, M.D. (Hokkaido)
Christina Sahlin, M.D. (Umea, Sweden)
Tohru, Soejima, M.D. (Kyushu, Japan)
Hector Ortegon, M.D. (Yucatan, Mexico) (M.R.C. Research Trainee)

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MGH Research Institute:
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POST BASIC CLINICAL PROGRAM IN
NEUROLOGICAL AND NEUROSURGICAL NURSING

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Neurology

DR. JOSEPH B. MARTIN

I am pleased to report on the neurological activities of the Department of Neurology and Neurosurgery. Fulltime Faculty are located in four teaching hospitals, the Montreal Neurological Hospital, the Montreal General Hospital, the Montreal Children's Hospital, and the Jewish General Hospital. At the Montreal Neurological Hospital we have three neurological services directed respectively by Dr. Irving Heller, Dr. Fred Andermann and myself. We operate ten out-patient clinics weekly at the Royal Victoria Hospital and provide neurological consultation for the Queen Elizabeth, St. Mary's and the Douglas Hospitals. The occupancy rate for the neurologic beds has been maintained at over 90% in all four hospitals. Increasingly, our admissions arrive via the emergency room as we utilize the advantages of out-patient workup and as we continue to serve the community at large through these facilities. A major problem has been the need to care for long-stay patients who occupy 15 to 30% of our active treatment beds because we are unable to find appropriate placement for their chronic care. I wish to express my thanks to Miss Robertson and the nursing staff for their support and help; we recognize that the contribution of the neurologists to patient care is minimal in comparison with theirs. We are grateful also to the other members of the hospital staff who provide the services which we so often appear to take for granted.

Our neurological training program is in good health. We have excellent applicants for the upcoming year despite the imposition of a quota of 15% from outside Canada. On behalf of the neurological staff, I want to thank the resident staff for their help, dedication and eagerness to carry on the day to day responsibilities of patient care. I hope we have, in turn, provided the residents with the teaching and leadership that they have a right to expect. Through rotations to the four teaching hospitals they provide an important cohesive force to integrate the overall activities of the department.

In the past year here at the Montreal Neurological Hospital a major effort has been made to increase our contacts with the Royal Victoria Hospital both in terms of teaching and in patient care. The consultation service at the R.V.H. has been busy. We have attempted to provide our expertise punctually, efficiently and, I hope, cheerfully. As a new experiment, we have extended our Neurology Grand Rounds to the R.V.H. on alternate Fridays, a move that has been well received by the staff of both hospitals. Neurology as it is currently practised, increasingly involves interactions with internal medicine and I beleive that these contacts are important for the future development of neurology in terms of optimal patient care, teaching and basic research.

Research

Neurological research at McGill has had a very productive year. At the Montreal Neurological Institute Doctors George Karpati, Andrew Eisen and Stirling Carpenter have been active in studying a variety of disorders that affect muscle and nerve. Dr. Allan Sherwin has continued his studies on mechanisms of epilepsy and the use of anticonvulsant drugs. At the Montreal General Hospital, Doctors Albert Aguayo, Garth Bray and Michael Rasminsky have been intensively studying function and disorders in peripheral nerve. Dr. Leo Renaud and Dr. Paul Brazeau, together with my own research team, have been engaged in the study of neuro-endocrine mechanisms and of the effects of hormones on brain function. A number of clinical studies have been ongoing at the Montreal Children's Hospital where Doctors Gordon Watters, Peter Humphreys, Stanley Rothman and Katherine Metrakos have been investigating migraine, seizure disorders and neuromuscular disease.

The neurologists at McGill published more than 60 papers in 1976. We were strongly represented at the Annual Meeting of the American Academy of Neurology where we presented nine papers.

These are, in some ways, difficult times in Quebec, but I would like to emphasize that McGill is continuing to make major contributions to neurology in teaching, clinical care and in research. No one has left our ranks in the past year and we will be adding four new faculty members in the various neurological units of the teaching hospitals during the current year. At the Montreal General Hospital, Dr. Bruce Livett has recently arrived from Melbourne, Australia. Dr. Louise Charron is joining the neuromuscular group at the Montreal Neurological Institute and Dr. Yogesh Patel, who has been awarded a Medical Research Council Scholarship, will be joining our department with a joint appointment with the department of medicine at the Royal Victoria Hospital. Dr. Edward Bass, one of our former residents, will be joining the neurological unit at the Jewish General Hospital.

Thus I can report that neurology at McGill is vigorous and thriving. I look forward to the years ahead as a time of growth and of increasing excellence.

Neurosurgery

DR. GILLES BERTRAND

1976 has been a good year for the neurosurgical services. Those of us who had suffered illness and injury recovered. Thanks to the untiring efforts of the house staff, headed by Doctors Richard Branan and Tyrone Hardy and later by Doctors Jean-Guy Villemure and Marcial Lewin to name only a few, and with the support of Miss Norma Isaacs and her operating room team, we were able to carry out 810 operations, 659 of which were major craniotomies and laminectomies, a substantial increase over the preceding years. There were 83 operations for excision of an epileptic focus, a record in the history of the Institute. There was also a larger number of brain tumours and twice as many pituitary tumours as last year. Yet, I am happy to report that of these 810 procedures, only three were followed by infection, a post-operative infection rate of less than 0.4%.

This year also saw the establishment of what might be called weekly "spinal rounds", headed by Dr. Robert Hansebout with the help of Dr. William Fish of the Royal Victoria Hospital, Department of Orthopaedics. We all hope that this is a prelude to what will eventually become a spinal management unit when the Penfield Pavilion and renovations of the present building are completed.

A cerebrovascular clinic has also been created by Doctors Robert Hansebout, Michel Aubé, John Little and William Fish. This should offer more integrated diagnostic, therapeutic and rehabilitation services to the many stroke patients of the Royal Victoria and the Montreal Neurological Hospitals.

The members of the neurosurgical staff have continued to be active in their respective clinical and research projects, some of which have been going on for many years and need not be mentioned again. They have also, as usual, taken part in many extramural activities.

Dr. Theodore Rasmussen is still engaged in the review of various aspects of the focal epilepsies from what is now a fantastic collection of detailed observations. He continues to be consultant to the epilepsy branch of the Neurological Disorders Program of the National Institute of Neurological and Communicative Disorders and Stroke in Bethesda and also to the Sensory Neural Prosthesis Committee of that institution. He also gave the first Osler lecture at the opening ceremonies of the Osler Medical Center in Monterrey, Mexico. A former Fellow of this Institute, Dr. Eduardo Garcia-Flores was the instigator and is now director of this medical center.

Dr. Theodore Rasmussen is still engaged in the review of various aspects induced the seed planted by his predecessor to germinate and we have watched with astonishment this plant, our new Penfield Pavilion grow, week by week, even through the rigours of winter until it reached this

very day its full stature. A lot remains to be done however with tender loving care (and adequate financial irrigation) to bring it to bloom and bear fruit. Long live the gardener!

Dr. Feindel is consultant to the World Health Organization Program in Neurological Disorders and a member of the Inter-American Committee on Neurological Sciences of the Pan-American Health Organization. He was President of the American Academy of Neurological Surgery and President of the Committee on Continuing Medical Education of the Federation of Medical Specialists of the Province of Quebec. He was also visiting professor to the University of Western Ontario.

Dr. Hansebout was re-elected vice-President of the Association of Neurosurgeons of the Province of Quebec. He continues on with his research on spinal trauma, a corollary to his clinical interests in that field.

Dr. André Olivier is also a member of the Council of our Provincial Association of Neurosurgeons. His work on the stereotactic investigation of epileptic foci has provided a solution to many difficult so-called "bitemporal" problems.

Dr. Carl Dila has held for another year the post of secretary to the Montreal Neurological Society. He continued his observations on intracranial pressure monitoring in patients and studied in the laboratory the response of cerebral microcirculation to trauma.

Dr. John Little is to be congratulated for having succeeded in his examinations for Fellowship of the Royal College of Surgeons of Canada and for certification in neurosurgery in the Professional Corporation of Physicians of Quebec.

Dr. Gilles Bertrand was elected Chairman of the Council of Physicians (and Dentists) of the Montreal Neurological Hospital. He is a member of the Council of the World Society for Stereotactic and Functional Neurosurgery and was appointed delegate of the American Academy of Neurological Surgery to the World Federation of Neurosurgical Societies.

Graduate Studies and Research

PIERRE GLOOR, M.D.

The banging and hammering which has been going on almost incessantly next to the old wing of our Institute, as the Penfield Pavilion gradually was rising from its foundation to the top floor, has been the background music which accompanied our research work during the past year. Though several laboratories have temporarily been displaced into even more cramped quarters, we have endured the resulting discomfort as well as the din and noise with equanimity for, by next Annual Meeting, we hope to be able to report on our first experience in working in our new laboratories.

Research performed at this Institute, as well as in the laboratories of the Division of Neurology of the Montreal General Hospital and in the Neurology and Neurosurgery Departments of other McGill Teaching Hospitals, has been a continuation of that pursued in the preceding years. It dealt with a variety of aspects in many branches of the neurosciences, both fundamental and clinical. These included neurochemistry, peripheral and central nervous system neurophysiology, neuroanatomy, neuropsychology, studies on neuromuscular diseases, ultrastructural and light microscopical neuropathology, cerebral circulation studies, anticonvulsant drug pharmacology, studies in spinal cord injury, neurogenetics, neuroimmunology and applications of computer technology to current problems in neuroradiology, cerebral circulation and electroencephalography. It is obvious that this list is far too long to allow me to even summarize all the research projects or to mention the members of the Staff and Fellows involved. The reports of the Laboratory Departments contain some of the details concerning these research activities.

Scientists are commonly pictured as men and women preoccupied with the outer fringes of reality where the familiar world of our everyday human experiences yields to one conceived in terms of particles and events occurring at an increasingly microscopic or even submicroscopic level. Our scientific language is replete with testimony to our fascination with the infinitesimally small: Angströms, Nanograms, Microvolts, Microcuries, etc. It is therefore not surprising that the average citizen, often through his mouthpiece, the politician, wonders aloud whether this fascination with the esoteric and minuscule bears any tangible relationship with everyman's concerns, his fear of disease, his preoccupation about the outcome of illness and his desire for a wholesome and fulfilling life.

One of the most difficult tasks which we, as scientists and citizens, have is to make the public and Government representatives understand that our fascination with this seemingly esoteric world of basic science is socially desirable. It ultimately leads to solutions, often unpredictable, to problems which may be the cause of much human suffering. In this report I am happy to be able to describe a particular example to illustrate this

point. Dr. Wolfe and his assistant Dr. Ng Ying Kin, in collaboration with Dr. Carpenter and Drs. Frederick and Eva Andermann, combining the skills of clinical neurology, neurogenetics, ultrastructural neuropathology and advanced biochemistry have elucidated the cause of Batten's disease, a neurological condition which, although not very common, is always fatal and is particularly tragic because it involves children. Efforts are already underway to develop preventive measures and treatment of this disease in the light of the biochemical findings obtained. In response to news of this breakthrough, members of 4 families affected by Batten's disease have already been referred to us from outside Canada. A further spin-off of this research is that it may throw some light upon the aging process of the nervous system. Dr. Wolfe, with his collaborators, have been able to demonstrate that the cause of this disease is the abnormal accumulation in nerve cells of a chemical, related to vitamin A, which ultimately leads to loss of function of nerve cells. To track this compound down required the most advanced knowledge and techniques of basic chemical research including mass spectrography and measurements of nuclear magnetic resonance. Some of these investigations were carried out in collaboration with the Pulp and Paper Institute of McGill University. This example vividly illustrates the ultimate value to society of fundamental research.

Many other research activities were carried out in the Department of Neurology and Neurosurgery. Significant progress has been made in our understanding of neuromuscular diseases, disturbances of cerebral circulation, epilepsy, neuroendocrine control mechanisms, cognitive functions of the cerebral cortex, spinal trauma and demyelinating diseases. Applied research using computer technology has led to refinements in neuroradiological and electroencephalographic diagnosis and has helped in the elucidation of disturbances of cerebral circulation. The results of these endeavours has been improved diagnosis and treatment of a variety of neurological and neurosurgical conditions.

As everywhere else, the costs of research have gone up and there seems to be no let-up. Good research is not cheap, although the money spent is a good investment in a nation's future. During the last few years, all medical researchers in this country have experienced much anxiety and concern as they watched the progressive shrinkage of the research dollar and the development of an attitude in Government which seemed to indicate that the needs and true social benefits of medical research were misunderstood at the highest level. Fortunately, in the course of the past year, this concern and pessimistic outlook has been replaced by one of cautious optimism as the Federal Government has consented to a 12% increase in the annual budget of the Medical Research Council of Canada. There is a feeling too that a more understanding attitude towards the need for scientific research is discernible among those who govern our land. The time has not yet come, however, to be over optimistic. Unless the present trend continues and firms up into a commitment to steady longterm support for biomedical research, there still will be cause for concern.

The post-graduate educational activities in the Department of Neu-

rology and Neurosurgery have continued to be successful. Ten students were enrolled in our Graduate Studies program. The Neurosciences Seminars held throughout the main part of the academic year have been of a high caliber. The weekly Monday Noon Research Conferences have provided us with a continuous, almost kaleidoscopic, view of the many facets of research activities carried out in our Department. The fact that it is often difficult to find a spot on the program to present one's research results is testimony to the healthy state of our research activities.

Administration

MRS. ALPHONSINE HOWLETT

In 1976, despite government budget restrictions and never-ending, it seems, government regulations, construction worries, too many meetings and just plain winter, the increasing demands have been for this young administrator (second year on the job) an exciting challenge. The Administrator's job depends on cooperation on the part of staff and this I have had, for the Montreal Neurological Hospital is particularly fortunate in the high quality and devotion of its staff.

Our Director of personnel, Mr. Heavysege, and his staff work incessantly for 550 people, each one with individual needs. This has been the year for negotiating collective agreements and contending with ever-changing government regulations concerning job classification.

Mr. Rochette, who is responsible for keeping the physical part of the hospital functioning smoothly has had a busy year. He has dealt with such strange metamorphoses as an air mixer (2 years in the planning) which turned into a trailer, with laundry which disappears and reappears, and so on. He, however, never loses his enthusiasm nor his willingness to try to solve problems. We all say thank you to him and his staff for a job well done.

Mrs. Podgurny is in charge of our Dietary Department, she spends her time making sure that our patients get the required nutritious meals and trying to keep them hot. This is difficult as the meals must be wheeled over from the Royal Victoria kitchens. I hear many good things from patients about the food and the kindness of her staff.

Mr. Bryan Malley, our new materials manager and purchasing agent, has succeeded in centralizing the purchasing in the hospital, at the same time getting quotes for scientific and medical equipment for the new wing. As the government requires three quotes per item this is time-consuming. He is ably supported by a devoted and hardworking staff; Bob Birkett, in charge of stores and Roger Palardy and Grant Perrin, with Guy Desrochers in the printing department.

It has been a pleasure to work with our hard-working Director of Nursing, Miss Caroline Robertson. Our big mutual problem has been the uncertainty of graduate nurses getting into Quebec for our Post-Basic Training Course caused mainly by ambiguous immigration regulations.

Working closely with Miss Cynthia Griffin, in charge of the Social Service Department, has been a happy experience for me. When she retires at the end of May she will be greatly missed by the whole hospital.

Mrs. Joan Mallory, our nurse in charge of Health Services, retired this year. She was a friend to everyone — always so willing to help with our pains and aches. The large number of people able to attend her "going away" party and the generous contributions for the purchase of a TV set as a parting gift testify to the feeling of gratitude felt by all staff. Miss Catherine Desrochers replaced Mrs. Mallory in September of 1976. It is not easy to replace someone who has been part of the hospital staff for

20 years and who had founded the Health Service. However, Miss Desrochers is establishing herself in the hospital as a competent and well organized health nurse and we wish her well.

Mrs. James Smith, who worked for eight years in the admitting office for Mrs. Bernard, our able admitting officer, also retired this year. Her generous contributions to Dr. Cosgrove's Multiple Sclerosis Fund as her retirement gesture is much appreciated.

It was a pleasure for me to cooperate, however marginally, with Dr. Cosgrove and Miss Vanderland in their multiple sclerosis research work. We have been particularly fortunate this year in having 30 student volunteers from McGill University who visit patients each afternoon of the week in groups of 4 or 5. These students, inspired by hearing Dr. Cosgrove and visiting the multiple sclerosis clinic at his invitation, organized a raffle and raised $8,000. for multiple sclerosis research.

The annual Reitman Christmas luncheon was well attended and was as usual an enjoyable occasion. Mr. Sam Reitman, Mr. and Mrs. Cyril Reitman and Mrs. Sara Salomon, Mrs. Cyril Reitman's mother, honoured the party by their presence.

In this age every hospital has to have its "participatory" committees. The committees run by the nurses, such as nursing liaison, infection control, O.R.-I.C.U. are very useful. Important meetings are those of the Board of Directors of the hospital, the Board of Directors of the Montreal Joint Hospital Institute, McGill Council of Teaching Hospitals, Council of Physicians, Long-stay Committee, Building Committee, "Neuro" Committee and the meetings of the Clinical Staff Advisory Council. With regard to the latter I would like to say that Allan Sazant and his hard-working executive of the CSAC should be congratulated on the interesting program of luncheon meetings which they organized this year. Invited speakers were Doctors Martin, Sheremata and Little and Mr. Chris Thompson. The revival of the Newsletter under the editorship of Miss Skretkowicz and the formation of the Constitution and Environment Committees are much to be commended. The meetings at the Montreal Joint Hospital Institute and the McGill Council of Teaching Hospitals are extremely informative and keep us in touch with what is happening in the community and the Province, and often result in joint actions.

The construction of the Penfield Pavilion has involved all of us. For me it has been a privilege to work closely with Mr. Harry Marpole, the hospital consultant for the construction, and to be the liaison between McGill Physical Plant and the government on the subject of equipment and change orders.

Financial Report

MR. GEOFFREY F. THOMAS

All sectors of the economy, including health care institutions, and hospitals in particular, are experiencing very difficult times. Most of you

know that the year-end for hospitals in Quebec was changed from December 31 to March 31 to coincide with that of the government, and in reviewing the financial status for 1976-77, a consolidated report is presented for 15 months: January 1, 1976 to March 31, 1977.

The actual cost of operations for 15 months was $11,393,509. while revenues amounted to $11,175,637, thus showing a net deficit of $217,872. For the first three months a surplus of $108,021 was recorded and for 12 months, a deficit of $325,893.

The operation of any organization can be improved. It is a prerequisite of good management to review and seek better ways of operating more effectively and economically. Hospitals need a sound system to control costs, improved financial management, appropriate planning and effective and timely utilization review.

During the coming months workshops will be organized to deal with expense control and to develop a Budget Manual to guide department heads in better utilization of budget allocations.

Although we have experienced another deficit, which may not be paid by the Ministry of Social Affairs, the results are not discouraging when one considers the ravaging effects of inflation and the levels of salaries and wages resulting from the collective agreements now in force. One can only hope that each of us will intensify our efforts to reduce cost and live within the approved budget.

Finally, I wish to express my thanks to the members of the Board of Directors, to my staff for their loyalty and support, and to all those department heads and other members of the staff who gave me encouragement and help during the past year.

Nursing Department

MISS CAROLINE ROBERTSON

This has been a year of milestones. For example, our Post-basic course in neurological and neurosurgical nursing has graduated over 1000 nurses in this specialty since its beginning in 1934. Under Miss Helena Kryk, the present Assistant Director, nursing education has achieved maturity in "Neuro" teaching; the September 1976 class was her twenty-first.

In July 1976 nurses in Quebec achieved a salary that is demonstrative of their professional responsibility and work in patient care. This basic need, now met, means that energy and motivation can be directed toward improvement of patient care.

Another change is the progression to every second week-end work schedules. This means that only basic care treatments and emergency care are given on weekend when there are only basic quotas of staff. A slightly increased number of staff during mid week allows improved attendance at learning programs and administrative functions. The staff, both full-

time and partime, and patients have cooperated fully. Miss Annie Johnson has performed miracles in management of these schedules.

A beginning has been made in two aspects of nursing care which have become more important recently. Due to the lack of chronic care facilities we are nursing more patients through stages of chronic illness and dying. Realization of this has made us increasingly more aware of the need to improve the quality of daily living for these patients.

Two familiar nursing figures have now retired from our hospital. Miss Norma Siddons-Grey, assistant head nurse 4 east gave us 26 years of effective service. Mrs. Joan Mallory, formerly a member of our nursing group, gave us real support as staff health nurse. We welcome Miss Geraldine Fitzgerald and Miss Catherine Desrochers in their places.

The Penfield Memorial Fund for patient care equipment was started by the nurses as a tribute to Dr. W. Penfield. We hope to use this fund for a patient activities area in the new pavilion.

There has been more stability in the staffing of our department, possibly as a result of budget restraints throughout Canada. It is especially important to note that Miss Norma Isaacs, supervisor, and Miss Kimiko Hinenoya, head nurse, have managed the operating room without an adequate quota of trained scrub nurses and have acted as nurse clinician teachers as well.

Although budget restraints permit only one nurse clinician for the whole department we are happy to report that nurses are motivated to learn and that staffing has improved.

It is because of the quality of our head nurses that this hospitals' 11 units of care function so smoothly. They are constantly helping other nurses to be able to function in their absence. People, equipment and procedures change rapidly but our head nurses remain a constant source of reassurance as role models of quality care and as resource persons about their patients. Their interpersonal relationships create a climate of caring, learning and development which is essential to our 24-hour every day service to patients.

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.
Mrs. 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.

My report is on the Social Service Department of this hospital centre and at the same time on a unit of the Ville Marie Social Service Centre, the latter being the social workers' employer for the past two years. The dual affiliation created by Bill 65 is a mixed blessing. As part of a large

developing organization, we still have fears of bureaucracy and centralization but we continue to hope for involvement in any decision-making which will affect our ability to provide services to our patients, many of whom belong outside the Ville Marie system. There are areas, such as resource information, where more centralization can be an asset.

Two-thirds of the patients and families helped by social workers were on neurology services and one-third on neurosurgery. From neurosurgery, with so many serious accident cases, the majority (this year two-thirds) were in-patients. From neurology, three-quarters were out-patients accounted for by the large groups of the young and the middle-aged with long-term conditions like epilepsy or multiple sclerosis who require continuing or periodic help with the manifold interrelated medical, social and psychosocial problems affecting patients and families, and of concern to the whole community.

This year saw encouraging efforts at more effective, comprehensive planning in the recently activated Committee on Stay, and when ward conferences concerned a particular patient they resulted in constructive joint decisions by members of all pertinent disciplines, including M.D.'s. The social workers have also continued to attend weekly ward survey conferences with nurses, physio- and occupational therapists and the VON liaison, who does so much to (in her words) "synchronize the action".

The most frequent reason for referral of in-patients was as usual post-hospital planning. There is always the broad spectrum of social and emotional difficulties (finances, employment, inter-personal relations) which affect future adjustments and require our help, but it is the paucity of resources for home care and for long-term placement which continues to cause such stress for all as exemplified by the following remarks by establishments to which patients were referred — first, from a chronic care hospital: "Your patient's not sick enough for our hospital and he's too young; try a nursing home or hébergement"; and then, the nursing home's reply: "My dear, we're not equipped to care for your patient; he belongs in a chronic hospital".

Indirect service, too, is a part of our professional responsibility and a means of enhancing our primary function of direct services to patients. Social workers participated on committees in the hospital, in the social service centre and, recently, with social work colleagues in French sector hospitals; several attended staff development seminars; one participated in a survey of nursing homes and, important in this teaching centre, two provided field work supervision to McGill School of Social Work B.S.W. students.

For thoughtful and generous contributions of volunteer time and of funds, we wish to thank individuals and organizations including the RVH Auxiliary, multiple sclerosis organizations, In His Name Society and the CJAD Christmas Fund. In this period of spiralling costs, they have made it possible for us to meet otherwise uncovered needs such as transportation, appliances and occasional home help for low-income, disabled patients. I am also happy to announce that the Multiple Sclerosis Association of Montreal has pledged $10,000. for a social worker for a temporary

period which we anticipate will demonstrate an on-going need for social workers in the multiple sclerosis clinic.

I wish there were time to mention each individual staff member and her contributions; however, I must express my special gratitude to Mrs. Kathleen Macdonald for her support through my nearly 18 years at the "Neuro" and for her willingness and ability to take over in any absences of mine.

Finally, even though I shall not be participating in the coming year, except in spirit, I find that I am still thinking about plans for improving services to patients and families through continuing and ever-increasing collaboration with those in the hospital, in the social service centre and elsewhere in the community; all who will be carrying on have my best wishes for success and satisfaction in their endeavours.

Clinical Laboratories and Departments

DR. GORDON MATHIESON

The ten laboratories which are the subject of this report constitute a network designed for the gathering of information. At the centre of the network is the patient. Like all organizations, this one requires skilled personnel, space, equipment, and dare I say it, money. There are two further requirements which may not be so obvious: strong motivation to make this complex system work efficiently and a method for informing the various laboratories exactly how their contribution fits into the total diagnostic picture. This latter requirement is not so well met as I, for one, would like. In the hurried press of events, information concerning final decisions and diagnoses may not always reach every laboratory contributing diagnostic data. Their ability to establish priorities may thereby be impaired.

For the first time in its existence the EEG laboratory exceeded 4000 examinations in a single year. This figure reflects only part of the increase in workload, for last year an unusually large number of patients seeking relief from their seizures had complex problems. In addition, calls upon this department for operating room recording have been exceptionally heavy.

Dr. Gloor feels that there are additional powerful diagnostic techniques which ought to constitute part of his department's repertoire. The use of visual evoked potentials in patients suspected of having multiple sclerosis is one such. Auditory potentials in the diagnosis of brainstem lesions is another. Lack of skilled personnel is the only obstacle to the establishment of these procedures. As we reported last year, an additional clinical neurophysiologist is required to meet this need.

In radiology, there has been a further reduction in conventional radio-

logical techniques such as angiography and pneumoencephalography in response to the development of cranial computer tomography, which has now reached its maximum operating capacity. The body scanner is still in a development phase. The use of finer collimators providing 5mm. tomographic cuts now allows resolution of orbital structures, detail of vertebrae and intervertebral discs.

In last year's report it was recorded that the psychologists were short of space. This year, with more personnel, they are even shorter. It has been said that they are now sitting on one another's laps!

There are in this hospital several laboratories physically small but important, out of all proportion to their size, for the care of critically ill patients: the anaesthesia laboratory is one such. Equipment rehabilitation needs are still unmet and there are problems involved in the financing of ongoing operations. The electrophoresis laboratory is another specialized unit; immune globulins in the CSF are measured and lymphocyte populations in patients with neurological illness, especially multiple sclerosis, are studied.

The brain scan facility records a 5% increase in workload over the previous year. Current use of positron emission tomography allows measurement of regional blood flow, and its application to the evaluation of stroke patients. Further development of this technique aims at increasing its availability.

The clinical neuropharmacology laboratory directed by Dr. Sherwin, carried out nearly 5000 assays of blood levels of antiepileptic drugs. These included numerous specimens sent in from other hospitals. This laboratory is thus becoming a reference centre both for day-to-day work and for advances in methodology.

The upgrading of optical equipment in neuropathology is proceeding but still has some distance to go. Use of muscle biopsy as a diagnostic technique continues to increase. Cytological examination of the cerebrospinal fluid provides a steady workload, but the comment I made at the outset of this report regarding follow up, applies here with special force; the significance of observations made needs to be assessed in the afterlight of final diagnoses. Extensive surveys of pathological lesions underlying focal cerebral seizures continue to contribute to the more ready and confident recognition of patterns of tissue abnormality in epileptic patients. There are many fewer reports of "normal tissue" nowadays.

I think it appropriate to refer to a matter that has been causing considerable distraction recently. Heretofore remuneration of many of the professional laboratory staff has been by McGill University and the hospital budget from QHIS. The 1976 agreement between the Federation of Medical Specialists and the Minister of Social Affairs results in laboratory physicians dealing directly with the Regie. Some of us are rather unwilling to loosen the organizational bond with McGill. To maintain this will require some ingenuity, and the best efforts of our Director General and of Mr. Thomas.

I end this report on a personal note. For more years than I sometimes care to remember, I have run the neuropathology laboratory and have

been administratively responsible for its efficient performance. With the passage of time, and for other cogent reasons, a change in this arrangement has been deemed appropriate. Dr. Stirling Carpenter has now assumed the position of Chief of the laboratory of neuropathology. I know that all concerned will join with me in wishing him the best of good fortune and happiness during the years of his stewardship of this vital element in the complex of laboratories of this hospital.

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: ..... Mounir N. Abou-Madi, M.D., Ch.B., F.R.C.P. (C), D.A.B.A., F.A.C.A. (from April 1, 1977)
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. (to March 31, 1977)
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. (to March 31, 1977)

Fellows: 3 mos. on this service

C. Campbell, M.D. (Dundee)
I. Campbell, M.D. (London)
A. Cohen, M.D. (McGill)
R. Pai, M.D. (Mysore)
J. Sakkova, M.D. (Czechoslovakia)
T.D. Truong, M.D. (Saigon)

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

Inhalation Therapy Technicians:

W. Garneau (Head Technician)
S. Dalpias, R.T.
G. Edgell, R.T. (to Jan. 14, 1977)
Th. Hahnemann, R.T.
P. Rabbitts, R.T.
G. Rousseau, R.T.

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

This year has been uneventful with essentially no changes in the surgical workload. Activities in the pain clinic remained at a steady level, if one considers the number of patients followed and treatments given. However, as increasing importance was given to the psychological and social aspects of the pain problems, many more hours were spent with the patients. In the fall, Dr. Catchlove expressed the wish to be relieved from other clinical activities and to concentrate all his efforts to the Pain Unit. This eventually led to his resignation from the attending staff of the anaesthesia department and the relocation of the "holistic pain clinic" to the Royal Victoria Hospital. Dr. A. Ramsay, who had been the psychiatric consultant to the pain unit, departed with Dr. Catchlove. As in past years, our department is carrying the diagnostic and therapeutic aspects of treatment of pain patients with conventional methods.

In early spring, Dr. M. Abou-Madi, a past resident in the department, joined our staff. For the last five years, Dr. Abou-Madi had been a consultant at the Queen Mary Veterans' Hospital where he gained valuable experience in treating elderly patients in their intensive care and pain units. This will be of great assistance to us.

During the year, several anaesthetists from abroad visited the department. Dr. P. Cohen, from Ann Arbor, Michigan, delivered a lecture on "Newer Aspects of Neuro-Anaesthesia" which was very well received.

Residents were present only during the first six months. However, the teaching activities of the members of the department were at an all time high as they were involved in the teaching of anaesthetic technicians, nurses, medical students, and anaesthesia residents inside and outside the institute.

Neuroradiology

Radiologist: ..... Roméo Ethier, M.D.

Associate Radiologists: ..... Denis Melançon, M.D.
Garry Bélanger, M.D.

Assistant Radiologist: ..... Saul Taylor, M.D.

Clinical Fellows:

Louis-Jacques Dubé, M.D. (Laval)
Louis-Paul Kirschner, M.D. (Budapest)
David E. Tubman, M.D. (Saskatchewan)
Eduardo Yeghiayan, M.D. (Alexandria, Egypt)

Neurology Resident: ..... John Stewart, M.D.

Neurosurgery Residents: ..... Elaine Arpin, M.D.
Gustav Blomquist, M.D.

Electives:

Michel D. Beaulieu, M.D.
Lucie Brazeau-Lamontagne, M.D.
David Long
John V. Phillips
John D. McAuliffe

Rotators: 4 mos. on this service

Caroline Blane, M.D.
Guy Breton, M.D.
Sylvester Chuang, M.D. (1 mo.)
Michael Daly, M.D.
David Toms, M.D.
William C. Vézina, M.D.

The big event of this year was the installation and operation of the Body Scanner which has been donated to the Institute by a group of private donors. We reiterate our gratitude to those people who have contributed rather large sums of money to make possible the development and the application of Computed Tomography, not only to the head as we have been doing in the past three years, but also to the rest of the body and particularly to the spine. We anticipate the replacement of our Head Scanner with a new improved design which no longer requires the presence of a water bag between the head and the detectors. With the new system, examinations of the head and of the neck will be feasible. The information provided by both systems will be analysed and reviewed

through an independent viewing system, which will be installed in the near future in the main X-ray viewing room.

Although a sizeable load of in-patient work has been transferred to the Body Scanner Division, the Head Scanner load has remained about the same. Even though it is operated 16 hours a day and also on Saturdays, we do not seem to be able to catch up with an approximately 3-month backlog of out-patient appointments. However, the addition of the Body Scanner has reduced the length of time required to obtain an appointment for in-patients; most in-patients now can be examined within 2 to 4 days. C.T. scanning has become the most important single operation of the department; it represents by itself one third of the total number of examinations performed in the department.

In addition to the teaching commitments of the department, 14 major meetings, 5 of which were International meetings, were attended by members of the department during the year. A total of 18 lectures or papers were delivered at those meetings, most of them related to our experience with computed tomography in various neurological disorders. Again it has been an exciting, busy year. We had our usual number of clinical fellows, residents and electives. They keep stimulating us, as well as adding enthusiasm in the department.

Finally, we would like to thank our colleagues at large for their constant 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., Sc.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), M.R.C. Professional Assistant.
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 ..... *Clinical*

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

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

DONNER LABORATORY OF EXPERIMENTAL NEUROCHEMISTRY

1. *Neurological Diseases* (Dr. L.S. Wolfe, Dr. N.M.K. Ng Ying Kin, Dr. R. Roy Baker, and Dr. M. Vanasse).

In the past year an important advance has been made in the chemical understanding of the storage material in neurones in the late infantile form of Batten disease. In collaboration with Dr. Carpenter we have been able to isolate, in highly purified form, the cytosomes which contain the characteristic lamellated curvilinear bodies. Chemical analysis has shown that these bodies contain phospholipids, cholesterol, free fatty acids associated with a complex derived from a retinoic acid linked to a peptide. The fluorescent characteristics are due to the polyene structure of the vitamin A acid component. This finding is completely new to the understanding of the biochemical nature of this inherited disease, and work is progressing to find out the nature of the enzymatic defect. Cultured cell lines of epidermal cells and fibroblasts are being developed to enable research on the metabolism of (^{3}H)-retinoic acid by these cells. At the present time the metabolic steps in the metabolism of retinoic acid by brain and other tissues are unknown. These studies also have relevance to the whole question of the nature of lipofuscin and age pigment. In collaboration with Dr. Rothman, Montreal Children's Hospital, an infant with Batten disease diagnosed by skin biopsy is being carefully followed clinically and biochemically after being placed on a low vitamin A regime. The hope is that dietary therapy may be a helpful therapeutic approach.

Mannosidosis is an inherited neurological disease of children due to a deficiency of the enzyme α-mannosidase. These patients excrete large amounts of oligosaccharides which contain terminal mannose. The enzyme α-mannosidase is greatly activated by zinc. In collaboration with Dr. R. Desnick, Department of Pediatrics, University of Minnesota, we have studied the urinary excretion of oligosaccharides from four patients before and after supplementation by zinc sulphate. There are indications that the addition of zinc to the diet decreases the excretion of the oligosaccharides.

Several patients suspected of Krabbe disease have been studied from the enzymatic point of view using the radioactively labelled galactyl ceramide. We have made in the past year a prenatal diagnosis of this desease from cultured amniotic cells.

2. *Prostaglandins* (Dr. Wolfe, Jean Marion and associates).

The past year has again witnessed highly interesting developments in prostaglandin research. Perhaps the most exciting is the discovery by the Wellcome Research group in London, U.K., headed by Dr. John R. Vane, of a new prostaglandin formed in vascular endothelium which is a highly potent inhibitor of platelet aggregation and also dilates arterial vessels. The effects of this prostaglandin oppose the actions of the thromboxane A_2 formed from arachidonic acid and the prostaglandin endoperoxides in the early phases of platelet aggregation. The chemical struc-

ture of this prostaglandin has been shown to be 9-deoxy-6,9α-epoxy-Δ^5-$PGF_1\alpha$ (PGI_2 or prostacyclin) by chemists at the Upjohn Co. Kalamazoo, Mich. This structure was identical to that described by Pace-Asciak and Wolfe in 1971, but at that time we had no indication of its biological activity on platelets. The combined activities of the thromboxanes and prostacyclin are transforming understanding of the chemical basis of thrombosis at the present time. Studies are in progress to investigate the role of these prostaglandin endoperoxide products in the acceleration or inhibition of thrombosis in the carotid circulation.

One of the chemical features immediately following ischemia to the brain is the release in brain tissue of a pool of free arachidonic acid, part of which becomes available for the formation of prostaglandin endoperoxides and their products into brain tissue. The release of arachidonic acid occurs through the activation of a membrane phospholipase A_2. We have been able to obtain evidence that phosphatidylinositol is an important precursor of the released arachidonic acid. Of many drugs tried, barbiturates are the most active compounds inhibiting the release of arachidonic acid following ischemia. These studies have important implications and are being actively continued.

3. *Studies on Cerebral Edema* (Dr. H.M. Pappius and Associates).

Studies completed recently show that release of prostaglandins as a result of injury does not contribute to the mechanisms of edema formation and that sodium transport is not involved in resolution of vasogenic edema. Studies in progress concern edema associated with ischemia both in the gerbil model and in cats with occluded middle cerebral artery.

Dr. Wolfe was a Visiting Lecturer to the Institute of Neurology Queen Square and to the Department of Pharmacology, University of Edinburgh, and he received an Sc.D. from Cambridge University. He was a Plenary Lecturer to the Argentinean Biochemical Society and to an International Symposium on Lipids in Argentina. Dr. Wolfe has been made a member of the Advisory Board for Intramural Research of the National Institute of Communicative Disorders and Stroke, N.I.H., for a 3-year period.

Dr. Pappius organized an International Workshop on "Dynamic Aspects of Cerebral Edema" which was held in Montreal in May 1976 with participants from nine countries attending. The proceedings were published by Springer-Verlag, Heidelberg in December 1976 entitled, "Dynamics of Brain Edema", edited by H.M. Pappius and W. Feindel.

Dr. Pappius was a Member of a Study Group of the Joint Committee for Stroke Resources sponsored by the American Neurological Association which prepared a report on Brain Edema in Stroke. She also served as a Member of the Membership Committee of the American Society for Neurochemistry.

Electroencephalography and Clinical Neurophysiology

Consultant ..... Herbert Jasper, O.C., Ph.D., D. ès Sc., M.D., C.M., F.R.S.C. Hon. D.Sc. (Western Ontario)

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

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

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

Fellows: 6 mos. on this service

John Apantaku, M.D. (Ibadan, Nigeria)
Kenneth Laxer, M.D. (California)
Louise Hélène Lebrun, M.D. (Montréal)
Elizabeth Matthew, M.D. (Madras)*
Stanislav Prelevic, M.D. (Belgrade)*
Paulo Ragazzo, M.D. (Brazil)
Donald Schomer, M.D. (Michigan)
Daniel Stowens, M.D. (Columbia)
Emilian Wasserman, M.D. (Thomas Jefferson)
Jose Zuniga, M.D. (Lima)

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

*One year on this service

Clinical Service Functions:

1976 has been an unusually busy year in the EEG Laboratory. 4,126 examinations were carried out during that year. For the first time in our history the total number of examinations has exceeded 4,000; the increase over the figure for 1975 was 10%. Most of the examinations, 1,952, were carried out on patients hospitalized in the M.N.H., 581 patients were referred from other hospitals, the largest number from the Royal Victoria Hospital, 621 were referred from the out-patient services and 972 from private offices. The work in the operating room has also increased, the number of corticograms during 1976 amounting to 85, a substantial increase over the number of 56 taken the year before. In addition the EEG was recorded in the operating room during 13 endarterectomies.

As has been increasingly the case in recent years, many highly specialized procedures requiring much professional skill and time on the part of technicians and physicians were performed this year. These included chronic recordings with stereotaxically implanted electrodes, sphenoidal electrodes recordings, prolonged examinations for the recording of seizures, cable telemetry recording and some 4-channel cassette recordings. We are very happy that we have been able to acquire an audio-video recording system which can be synchronized with the EEG recorded through the computer-controlled 16-channel cable telemetry system. This new diagnostic tool has already proven its great value in clarifying the clinical

patterns of epileptic seizures and particularly their relationships with the EEG manifestations.

In last year's annual report the lack of availability of diagnostic evoked potential analyses of various sensory modalities was mentioned. This gap in our diagnostic armamentarium has persisted for the reasons stated then, namely the lack of an additional clinical neurophysiologist who would find the time to develop this diagnostically useful service.

Research activities:

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

The automatic epileptic spike and sharp wave recognition program developed by Dr. Gotman has been used in some patients for the evaluation of anticonvulsant drug effects. New methods of EEG analysis have been developed which are particularly suited for the detailed study of seizure records. We now have a large library of such ictal records which we have collected with the aid of the 16-channel cable telemetry system. Two main approaches have been used: (1) digital filtering in an attempt to remove or reduce some of the common artefacts obscuring the cerebral ictal discharge in scalp recordings and (2) coherence analysis of the ictal discharge. The aim of this method is to localize or lateralize the focus driving a seizure discharge that may have become generalized or appears generalized from the start. Both projects are still in their infancy, but preliminary results have been encouraging.

(2) *A reinvestigation of EEG patterns encountered in destructive lesions of the diencephalon, brainstem and posterior fossa* (Drs. N. Schaul and P. Gloor).

All the cases in this series have now been analysed and coded in computer accessible form. Preliminary statistical studies have been run, but the final analysis still remains to be done.

(3) *EEG investigations in various genetically determined diseases of the central nervous system* (Drs. E. and F. Andermann and collaborators).

These studies included Friedreich's ataxia, Batten's disease, Kufs' disease and tuberous sclerosis. Similar studies were carried out as part of a research project investigating the outcome of pregnancy in epileptic women.

(4) *Studies of neuroendocrine function of patients with various forms of epilepsy* (Drs. J.F. Woods and George Tolis with Drs. M. Jones and E. Matthews).

In the telemetry laboratory, studies on the neuroendocrine function of patients with epilepsy were continued. Over 20 recordings were made on patients with generalized and focal epilepsy. Two patients were studied before and after temporal lobectomy and two patients with prolactin-secreting adenomas. The type of epilepsy does not appear to influence the circadian pattern of hypothalamic function. One patient, however, with active epileptic abnormality during sleep did have marked suppression of sleep-related growth hormone and prolactin secretion. Anticon-

vulsant medication did not appear to interfere with normal hypothalamic-pituitary activity.

Postgraduate Degrees:

Dr. Jean Gotman received his Ph.D. degree from McGill University in the Fall of 1976 for his research on computer analysis of the clinical EEG.

Miscellaneous:

In 1976 Dr. Pierre Gloor served as President of the American Epilepsy Society. He was invited to organize a Special Interest Dinner on the use of computers in clinical electroencephalography at the Annual Meeting of the Society for Neuroscience held in November in Toronto. He was a member of the Faculty of two EEG Teaching Courses, the first organized by the American EEG Society at its Annual Meeting in Dearborn, Michigan in October, and the second by the American Academy of Neurology at its Annual Meeting in Atlanta, Georgia in April 1977. He was also invited to address the Western EEG Society at its Annual Meeting in February 1977 in San Diego on the subject of "Generalized Corticoreticular Epilepsy".

Dr. Frederick Andermann was elected Vice-President of the Canadian Neurological Society and served as Program Chairman of the American Epilepsy Society and of the joint Meeting of the British Association of Neurologists and the Canadian Neurological Society to be held in September 1977. Dr. Eva Andermann was elected Member of the Canadian College of Medical Geneticists. She was an invited participant in a Symposium on Genetic Aspects of the Epilepsies held at the Joint Meeting of the American EEG Society and the American Epilepsy Society held in Dearborn, Michigan in October 1976. Dr. John Woods was elected Vice-President of the Association of Neurologists of the Province of Québec.

Dr. Michel Aubé was appointed Professeur Adjoint in the Department of Medicine of l'Université de Montréal. He will hold this appointment in addition to his present one at McGill University. He was also elected Secretary of the Association des Neurologues de la Province de Québec.

Acknowledgements

We wish to thank all those who have contributed to make this year a productive one. Without the expert help we have received from the Neuroelectronic and Computer Laboratories under the imaginative direction of Mr. John Ives and Mr. Christopher Thompson, much of what has been new and original in our work could not have been done. We also wish to thank our EEG Technologists who under the guidance of Mrs. Katherine Crystal have assured a consistently high level of quality in our clinical diagnostic work.

Electromyography

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

Fellows ..... Robert Yufe, M.D. (McGill) July-Dec.
Robert Filiatrault, M.D. (Montréal) Jan.-June

Technician ..... Margo Henderson

968 examinations (500,020 professional units) were performed. The large (56%) increase in professional units reflects the increasing sophistication applied to the majority of individual studies.

Clinical Investigations

Together with Doctors Yufe, Trop and Campbell, the regional curare test was established. This technique has proven to be simple and safe. It has been shown to be of value in the diagnosis of myasthenia gravis (and ocular myasthenia) in patients in whom more routine electrophysiological testing gave negative results. It was also found, using the same technique, that about 50% of patients with multiple sclerosis demonstrate a latent defect in neuromuscular transmission despite the lack of any overt clinical features indicative of failure of transmission. On the basis of this work Dr. Eisen obtained a grant from the Multiple Sclerosis Society of Canada for research on the nature and mechanism of this transmission defect.

Animal Studies

Together with Doctors Karpati and Carpenter, further work has been carried out on ouabain paralysis in the rat. We have now ascertained that the reversible paralysis is due to specific inhibition of the muscle Na^+K^+ ATPase (sodium pump). This type of model will be used to compare muscle membrane function in normal and dystrophic hamsters. Eventually we hope to develop a regional ouabain test that can be applied to man. It has been shown that, in small doses, ouabain produces a positive inotropic effect in skeletal, as well as in cardiac muscle, and an alteration in the effect may prove to be a sensitive indication of human muscle dysfunction.

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.

Biochemical Engineer ..... John Ives, M.Sc.

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

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

Fellows:

George Kostopoulos, M.D. (Athens), Ph.D. (Saskatchewan)
John Musgrave, M.D. (Queens)
Andrea Pellegrini, M.D. (Padua), Ph.D. (McGill)
Luis Felipe Quesney, M.D. (Cath. University, Santiago) Ph.D. (McGill)
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 projects:

1. *Mechanisms of generalized penicillin epilepsy in the cat as a model of human generalized corticoreticular epilepsy* (Drs. L.F. Quesney, J. Musgrave, A. Pellegrini, G. Kostopoulos and P. Gloor).

The work summarized in last year's annual report which dealt mostly with the electrophysiological interactions of cortex and subcortical structures (particularly the thalamus) in the genesis of generalized penicillin epilepsy in the cat, has been written up by Dr. Quesney in his Ph.D. thesis. A series of papers dealing with these topics are now in press.

Dr. Pellegrini, in collaboration with Dr. Sherwin, has found that dipropyl acetate, a new anticonvulsant drug, is capable of reducing the number of discharges in this model. The effect seems to outlast considerably the time required for the complete elimination of the compound from the organism.

The effects on the epileptic discharges in feline generalized penicillin epilepsy exerted by a variety of agents capable of modifying the cortical excitability were investigated by Dr. Gloor and Dr. Pellegrini. Strychnine enhances the amplitude of the spike components. GABA increases the slow wave component and brings it out quite clearly in instances where it is small or even absent, thus sometimes turning an atypical spike and wave pattern into a classical one. Agents that depress cortical excitability, such as the topical application of KCl or cerebral hypoxia may lead to disappearance of the spike and wave discharges which seem to be replaced by spindles. This observation, again indicates the probable close relationship of the neurophysiological mechanisms underlying spindles and spike and wave activity in this model.

Studies performed in collaboration with Dr. Musgrave have demon-

strated the importance of the corpus callosum for the synchronization of the discharges of the two hemispheres in feline generalized penicillin epilepsy. Investigations, still progressing, have led to a more detailed understanding of the rôle of the corpus callosum in the bilateral synchronization of the discharge in generalized penicillin epilepsy and possibly in other cortical electrophysiological events.

Dr. Pellegrini has found that bilateral partial lesions in various areas of the thalamus were incapable of entirely eliminating the occurrence of the characteristic bilaterally synchronous spike and wave discharge in this model, with the exception of some lesions involving the lateralis posterior nucleus. Bilateral lesions of Forel's field were equally ineffective as well as lesions of the main rostral outflow from midline interlaminar system, the inferior thalamic peduncle. However, some of these lesions produced a moderate reduction in the amount of epileptiform activity. Massive unilateral destruction of one thalamus in animals with section of the corpus callosum seemed to be capable of eliminating the characteristic discharges of feline generalized penicillin epilepsy on the side of the thalamic lesion. These findings thus support previous evidence for the rôle exerted by the thalamus in the precipitation of these discharges, but indicate that the projection pathways from the thalamus to the cortex through which such influences are mediated are quite diffuse.

A microphysiological analysis of the epileptic discharges in generalized feline penicillin epilepsy has been initiated in collaboration with Doctors Pellegrini and Kostopoulos.

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

The neurophysiological analysis of the delta waves induced by systemically applied atropine was completed. The microphysiological aspects of this form of delta activity are very similar to those produced by a variety of brain lesions, thus supporting the cholinergic deafferentation hypothesis of polymorphic delta activity. More direct proof of this hypothesis was attempted by measuring the release of acetylcholine from cortex producing delta waves as compared to release from normal cortex. This work was carried out in cooperation with Dr. Wolfe using the mass spectrograph. Although some differences were found which seemed to support our hypothesis, other findings were less clear and further work needs to be done to confirm or disprove this hypothesis.

3. *Artificial intelligence:*

Mr. D. Skuce has finished his graduate work on LESK (for language for expressing scientific knowledge), a computer-based language which could be used to code scientific facts in a manner intelligible to non-computer experts. These studies formed the basis of his Ph.D. thesis submitted to the Department of Electrical Engineering at McGill University.

Post-graduate Degrees:

Dr. Felipe Quesney received his Ph.D. degree from McGill University for his experimental work of generalized penicillin epilepsy of the cat.

Acknowledgements:

Mr. Skuce has recently left the Institute after having worked here for many years during which we benefited from his knowledge and expertise in the computer field. Without his help and advice our computer facilities would have had a much later and slower start. For this we owe him a great debt of gratitude. Douglas Skuce's stimulating influence in our neurophysiological and electroencephalographic research will be missed and we wish him success in his future career.

The work done in our laboratories would not have been possible without the expert and generous help we received from many individuals. Mr. John Ives, our Biomedical Engineer, ably assisted by Mr. Eddy Puodziunas, Mr. Gordon Evans and Mr. David Fitzpatrick helped us with our equipment and electronic problems. Mr. Christopher Thompson and Dr. Jean Gotman, our Computer System Engineers, gave generously of their time to assist us in the use of the computer for data analysis. Mrs. Suzanne Schiller, our Laboratory Supervisor, Mrs. Carmela Corrado and Mrs. Janet Prevost assisted in ways too numerous to enumerate in our daily work. To all of them we extend our heartfelt thanks.

Neuropathology

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

G. Mathieson, M.B., Ch.B., M.Sc., F.R.C.S.P.

Fellows:

Paul Averback, M.D. (Manitoba)
Richard Branan, M.D. (Colorado)
Tyrone Hardy, M.D. (Howard)
Somchai Jiaravuthisan, M.D. (Mahidol)
Jorge Martinez-Leyva, M.D. (San Luis Potosi)

Kenneth Nudleman, M.D. (Queen's)
Henry Sadowski, M.D. (Toronto)
James St. John, M.D. (Wayne State)
Victor Smart-Abbey, M.D. (McGill)
John Stewart, B.Sc., M.B.B.S., M.R.C.P. (U.K.), (West Indies)

Chief Technicians:

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

John Gilbert, R.T.

For the first three months of 1976 there were 24 deaths in the hospital and the brains of 18 of these patients were studied postmortem. In the same period there were 146 surgical specimens, of which 54 were muscle biopsies, and 52 were tumours. There were also 17 spinal fluid sedimentation samples.

In the year April 1, 1976 to March 31, 1977 there were 113 deaths in the hospital. The brains of 60 of these were studied by us postmortem while 21 were coroner's cases; most of the latter were studied at the Institut de Médecine Légale. Forty-eight other brains were studied in this department. There were 552 surgical specimens, of which 145 were muscle biopsies, and 131 were tumours. There were 176 spinal fluid sedimentation specimens.

Members of this department participated in the undergraduate medical teaching. Dr. Mathieson took part in the Biology of Disease Course while Dr. Carpenter was responsible for a Basic Science Option in Neuropathology for fourth year students which was offered this year for the first time.

In research activities we have cooperated extensively with Doctors Karpati and Eisen. The accumulation of well studied muscle biopsies is bearing fruit in a series of articles on inflammatory myopathies. Our studies on Duchenne muscular dystrophy have turned up convincing evidence that the first morphologically detectable stage of necrosis of the muscle fibres is lysis of the plasma membrane. Work is in progress on the ultrastructure of muscle destruction in dystrophic hamsters, in cooperation with Doctors Karpati and Charron, to see if this may prove to be an adequate model for Duchenne dystrophy. We have reviewed our large series of biopsies from Batten-Kufs' disease. Diagnosis of the late infantile variety by skin biopsy shortly after birth appears to be possible. Some cautious exploration of the ultrastructure of pituitary tumours have been made with the encouragement of Doctors Bertrand and Tolis. We are discovering a surprising incidence of focal hypertrophic neuropathy in multiple sclerosis patients at autopsy. Further insights into the pathology of focal epilepsy are being sought.

We look forward to a year of further scientific advance, further refinement in diagnosis and more comprehensive teaching.

Neuro-Isotope Laboratories

BRAIN SCAN DEPARTMENT

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

Director ..... Y. Lucas Yamamoto, M.D., Ph.D, A.B.N.M., C.S.P.Q.

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

Brain Scan Technician ..... Miss Nicole Laflamme, R.T.N.M.

In the first three months of 1976, 814 patients and in the period of April 1, 1976 to March 31, 1977, 2,896 patients have received radionuclide investigations in the brain scan department.

Recently the committee for cerebrovascular study has drawn up the protocol for proper screening and evaluation procedures of cerebral hemodynamics in cerebrovascular disease, particularly in relation to transient ischemic attacks and carotid disease following medical or surgical treatment. The brain scan laboratory and the neuroradiology department were designed as the main laboratories for non-invasive and invasive investigation of cerebral hemodynamics. In addition to the standard procedures of dynamic gamma camera study of cerebral and carotid perfusion rate, CAT scans and cerebral and carotid angiographs, we are obtaining valuable

information by utilizing our recently developed dynamic positron emission tomography using the positron-emitting Krypton-77 inhalation technique. Research and development of the dynamic positron emission tomography device through the joint effort of our research group, Foster Radiation Lab, McGill University and Brookhaven National Laboratory, U.S.A. has resulted in pioneer application of this new method. Discussion of the advantages and quantitative superiority of this technique for investigation of cerebrovascular disease has recently been published in the Journal of Computer Assisted Tomography, January 1977.

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., C.S.P.Q.
Physicist	Ernst Meyer, M.Sc., Killam Scholar
Research Fellows	Toru Soejima, M.D. (Kyushu, Japan) Yoku Nakagawa, M.D. (Hokkaido, Japan) Christina Sahlin, M.D. (Lund, Sweden) Hector Ortegon, M.D. (Yucatan, Mexico) Richard Branan, M.D. (Colorado)
Research Assistant	Andrea Duszczyszyn, B.Sc.
Technicians	Janet Tekenos Janet Lynch, B.Sc. Patricia O'Reilly
Electronic Technician	George Lootus

Investigation of cerebral microcirculation and cerebral vasospasm in experimental animals in various pathological states has been continued using our techniques of cerebral fluorescein angiography and on-line computer analysis of regional cerebral blood flow with multichannel semiconductor detectors using beta emitting Krypton-85 for cortical flow and soft gamma emitting Xenon-133 for mini-regional cerebral blood flow.

Our research projects for 1976 were as follows:

1. *Early microcirculatory changes following focal cryogenic lesion in relation to the mechanism of cerebral edema.*

Our study using the above mentioned techniques and x-ray microangiography indicated progressive and marked microcirculatory disturbance in the cortical capillaries and veins, occurring within five minutes of the injury, with preservation of abnormal arterial circulation and arrest of the microcirculation in the late phase. This unique pattern of circulatory disturbance appears to be an important part of the mechanics of the driving force of "bulk flow" occurring in brain edema.

Effects of steroids on the above hemodynamic changes were investigated by Dr. Soejima. This study showed a significant improvement in the cortical blood flow with better preservation of the epicerebral micro-circula-

tion, as revealed by fluorescein angiography, and of penetrating cortical vessels by x-ray microangiography.

2. *Cerebral homodynamic changes following external and internal carotid anastomosis at the intracranial level in the chronic model of experimental cerebral ischemia.*

The benefit of microvascular anastomosis between extra and intra carotid arteries following occlusion of the middle cerebral artery in dogs has been further investigated by Dr. Ortegon in the chronic model, 24 hours after occlusion of the middle cerebral artery, rather than in the acute model which was previously studied by Dr. Murray.

Focal neurological impairment, various degrees of brain edema and marked impairment of rCBF were observed prior to anastomosis in this chronic model which is closely related to practical clinical conditions. We have observed a significant increase in rCBF with re-establishment of cortical flow in the territory of the occluded middle cerebral artery following anastomosis in the chronic model. Other beneficial factors such as hypercapnia and mild hypertension following anastomosis are now under investigation.

3. *Effect of CO_2 on the cortical blood flow measured by ^{85}Kr and global miniregional cerebral blood flow measured by ^{133}Xe in experimental focal cerebral ischemia.*

The dynamic aspect of cerebral vessel behaviour and the development of collateral flow at the microcirculatory level in experimental cerebral ischemia were further investigated by Dr. Nakagawa in relation to the various methods proposed for treatment of cerebral ischemia, particularly manipulation of the arterial CO_2 level. Our results indicate a significant increase in cortical blood flow, measured by the ^{85}Kr technique, up to 55mm torr of the arterial pCO_2, but there was progressive reduction of cortical blood flow above 60mm torr of the arterial pCO_2 in spite of a continuous increase of global miniregional cerebral blood flow measured by the ^{133}Xe technique. This contrariety between cortical blood flow and miniregional cerebral blood flow over 60mm torr of the arterial pCO_2 is under investigation. This investigation has now been extended to include a new model of enclosed cranium, with a transparent window, to simulate clinical conditions.

4. *Cerebral vasospasm in relation to vasoactive substances in the blood and the effects of prostaglandin-related compounds in vitro.*

A recent *in vitro* study by Dr. Sahlin indicates a biphasic response to cerebral vasospasm following application of uncoagulated blood, particularly 3-day old blood, to the dissected cat cerebral artery. The effects of antiserotonin agents, arachidonic acid, alpha and beta blocking agents as vasoactive substances in the blood are being investigated.

5. *Dynamic positron emission tomography for study of cerebral hemodynamics in the cross-section of the head.*

This project was accelerated by the excellent help of Professor Mark's

group in the Foster Radiation Laboratory, McGill University, in producing quantities of Krypton-77 gas from inexpensive natural Bromine-79.

We are also working with Professor Yaffe's group in the Radiochemistry Department, McGill University, in the production of positron-emitting Fluorine-18 labelled deoxyglucose for investigation of glucose metabolism in the subcompartment of the cross-section of the head.

6. *Cerebral microvessel response to trauna*

Dr. Carl Dila has continued work on the microvascular response of the brain to minimal trauma, using the techniques of fluorescein angiography and radio-isotope microregional cerebral blood flow (rCBF) studies. Early local hyperemia observed after minimal brain trauma is probably related to the release of histamine which produces pre-capillary vasodilatation and increase of blood flow. Subsequent studies suggest that under normal physiological conditions prostaglandins may affect an important baseline vasoconstrictor tone on the cerebral blood vessels.

Because of the need for a tool to study very rapid changes in cerebral circulation, Dr. Richard Branan has been developing a method for quantitative frame date base (FDB) analysis of the epicerebral circulation using fluorescein angiography. This project has been undertaken in association with the MacDonald-Stewart Image Processing Laboratory of the Institute of Pathology. The method defines dynamic changes in the epicerebral circulation such as flow patterns, transit times, velocity distributions and vessel reactions, all as a function of time. The advantages of FDB analysis over conventional methods of studying the cerebral circulation include better spatial and temporal resolutions.

Neurological Research

LABORATORY FOR NEUROPHARMACOLOGY

Head	Allan Sherwin, B.Sc., M.D., C.M., Ph.D., F.R.C.P. (C)
Technicians	Christine D. Harvey, M.Sc., (Pharmacology) Hélène Lacroix, R.T. Constance Mowat Joanne Popiel
Summer Medical Student	Rees Cosgrove

Studies were carried out to clarify the mechanisms of action of various anticonvulsants. A new model was developed which permitted rapid administration of drugs to rats via indwelling jugular cannulas. Phenytoin (Dilantin) and Phenobarbital were both shown to protect rats against electroshock seizures within three minutes. The delay to peak activity represented time to achieve an effective concentration in the brain. This concentration was similar for both drugs. Valproate (Depakine), a new

anticonvulsant, was also shown to have a rapid onset of action in this model. In collaboration with Doctors I. Koyama and N. van Gelder of l'Université de Montréal this was associated with a significant increase in brain GABA levels. As the brain/plasma ratios of Valproate were relatively low in comparison to other anticonvulsants, *in vitro* studies were performed to determine the binding affinities of various plasma and brain proteins for Valproate. In collaboration with Doctors Pellegrini and Gloor, Valproate was shown to protect cats against penicillin generalized epilepsy, a model of human myoclonic petit mal. A serendipitous finding was that the anticonvulsant effect of Valproate continued for some time after elimination of the drug from plasma.

The clinical efficacy of Valproate was evaluated in patients at the Montreal Neurological Hospital and at Foyer Savoy. Plasma drug levels were determined by a new gas chromatographic assay. Intravenous Clonazepam was also utilized in patients with status epilepticus and the plasma levels monitored by radioimmunoassay. Rees Cosgrove completed a detailed study which demonstrated the reliability of the immunoenzyme assay technique (EMIT) for determining plasma Ethosuximide (Zarontin) levels.

The service component of the laboratory was extremely busy as an ever-increasing number of requests for anticonvulsant drug levels were received from other hospitals. Mrs. Harvey and Dr. Sherwin were invited to write the chapters on Ethosuximide for a book sponsored by the National Institutes of Health on the analysis and interpretation of antiepileptic drug concentrations.

LABORATORY FOR NEUROMUSCULAR RESEARCH

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

Research Fellow of the Muscular Dystrophy Association of Canada ..... Louise Charron, M.D., F.R.C.P. (C)

Technicians ..... Carol Allen, B.Sc.
Steven Prescott

During the period of January 1st — March 31st, 1976, 55 muscle, 27 nerve, and 17 skin biopsies, and during the year April 1st, 1976 — March 31st, 1977, 145 muscle, 73 nerve, and 48 skin biopsies were received for histochemical processing and study from the MNH and other hospitals in the Montreal area, and Newfoundland.

We have studied unusual neuromuscular diseases including a familial myotubular myopathy and a unique myopathy with tubular spiral inclusions. A study of muscle biopsies from 26 patients with Duchenne muscular dystrophy allowed us to develop a concept regarding the pathophysiology of muscle cell necrosis in this disease. It appears that the initial alteration occurs in the muscle cell plasma membrane which then leads to either repair or to full blown necrosis. We have also observed an unusual vulnerability of skeletal muscle in Duchenne disease, to suxamethonium plus halothane administration.

Animal experiments included a comprehensive study of the pathophy-

siology of muscle destruction in the genetic muscular dystrophy of hamsters. This animal model shows several features of Duchenne muscular dystrophy. Therapeutic trials to arrest or reduce necrosis in the animal model are conducted and this may eventually lead to therapeutic trials in patients with Duchenne disease. Other animal experiments are directed towards the study of nerve-muscle interaction. We are testing a hypothesis that the essential condition of reinnervation is that "floating" acetylcholine receptors in the vicinity of motor end plates attract neural growth cones only if they are rich in acetylcholine. We have developed an animal model of *in vivo* inactivation of the skeletal muscle sodium pump by ouabain. This is a very useful model to study a specific membrane disturbance of skeletal muscle. A new histochemical technique for the demonstration of nicotinic acetylcholine receptors in skeletal muscle is being adopted.

Dr. Louise Charron has contributed to the research activities of the laboratory with great resourcefulness and diligence. We are delighted that she will join our staff as a senior neuromuscular investigator, to strengthen the team approach we have been following with Drs. Carpenter and Eisen. Unfortunately, in recent months, physiological correlations of our animal experiments have been severely compromised due to persistent unavailability of proper equipment and facilities for Dr. Eisen.

Dr. Karpati has been appointed to the Medical Advisory Board of the Muscular Dystrophy Association of Canada and to the Editorial Board of a new international journal for neuromuscular research (MUSCLE AND NERVE) and he was elected to active membership of the American Neurological Association.

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)

Consulting Psychiatrist ..... L. Gratton, M.D.

Technicians:
A. Sazant, B.Sc., B.Com.
S. Colby, M.Sc.
B. Ruminski, B.Sc.

Activity in the laboratory has continued at the level of previous years despite problems introduced by construction and increased costs. The major pre-occupation of the laboratory has been to conduct serial studies, comparing macrophage migration inhibition factor and leukocyte inhibition factory assays of young patients with multiple sclerosis, to assess evidence of immunological responses to myelin basic protein prior to and following clear-cut attacks of multiple sclerosis. Additional studies, comparing responses of stroke and multiple sclerosis patients to this antigen, but employing lymphoblastic transformation and macrophage migration inhibition factor assays, have been completed. The data again show evidence of different combinations of responses in multiple sclerosis and stroke patients, but immunological responses do occur in a proportion of stroke patients. Observations by Dr. Gratton of the psychiatric aberra-

tions which frequently occur in multiple sclerosis patients have been categorized and compared with those which occur with other neurological diseases. The data indicates the importance of recognizing that 'hysteria' is a frequent concomitant of demyelinating disease. Patients presenting with hysterical features cannot simply be dismissed as not having neurological disease.

Investigations on Bell's palsy patients have shown rather unique and intriguing results. These patients have sensitization to a basic protein peculiar to peripheral nerve, but after the first week of illness this suddenly disappears and sensitization to a myelin basic protein common to both the central and peripheral nervous system is present. This sensitization seems to persist for two or three weeks. These findings suggest that damage to peripheral or facial nerve is unlikely to be the primary event leading to release of antigens and that it is more likely that sensitization to a peptide sequence contained in viral envelope or possibly nuclear core is shared with a structural protein (myelin basic protein) in facial and peripheral nerve. The findings are undoubtedly of relevance to the acquisition of sensitization to other antigens and in other illnesses such as multiple sclerosis.

Studies of cerebral spinal fluid cell populations have continued on a smaller scale than anticipated because of budgetary problems, but data has continued to be accumulated.

The Multiple Sclerosis Society of Canada have funded a research secretary and a director of the MS clinic, making it possible to provide more adequate documentation of patients and better clinic service. This has also enabled participation in experimental transfer factor therapy with Dr. Gilles Lamoureux and Dr. Pierre Duquette at Notre Dame Hospital. The program presently planned will be conducted on a double blind basis. Patients will be assessed for immunological responses to a variety of antigens by Dr. Lamoureux and will also be assessed blindly by our group.

NEUROGENETICS

Neurogeneticist	Eva Andermann, M.D., C.M., M.Sc., Ph.D., F.C.C.M.G.
M.R.C. Research Fellow	Michel Vanasse, M.D.
Graduate Student	Linda Dansky, B.Sc.
Research Assistant	Lilly Blitzer, B.Sc.
Summer Students	Heather Rubenstein, B.Sc. Lily Siavala, B.Sc.

In addition to our consultation service, we have continued studies on neurogenetic conditions in Eastern Canada.

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

We have now ascertained 51 patients with all three clinical forms of CMD in 33 families: 30 late infantile, 17 juvenile and 4 adolescent or adult. 31 patients (61%) were Newfoundlanders of British descent and eight (16%) were Italian Canadians. We have estimated the incidence of CMD in Newfoundland as at least 1/8500 live births. In the past year, Dr. Wolfe's group has identified the lipid-free autofluorescent component of the stored material in late infantile CMD as complexes of retinoic acid and related compounds with peptides. This important breakthrough may lead to identification of the enzymatic defect, carrier detection, prenatal diagnosis and a therapeutic approach in this group of disorders.

An electroencephalographic study of these patients has been initiated with Dr. Michel Vanasse. Detailed studies were carried out with Drs. Gloor and Lal on Kufs' disease presenting as myoclonus epilepsy.

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

In the carrier detection program almost 800 individuals have been screened. Individuals found to be carriers are given genetic counselling.

A large screening clinic was organized at the Montreal Neurological Hospital for relatives of French-Canadian Tay-Sachs patients living in the Montreal area. Linkage studies employing a large number of markers have been initiated in conjunction with Dr. Robert Elston of the University of North Carolina at Chapel Hill, in an attempt to determine if the French-Canadian disease represents a new variant, or is identical to that in Ashkenazi Jews. Computer analysis of the data is continuing with the help of Dr. Jean Gotman, and the genealogies are being traced further by Mr. Jean Bergeron of l'Université de Montréal.

3. *Friedreich's ataxia* (Drs. E. Andermann, G. Remillard and F. Andermann, Miss C. Goyer and Miss L. Blitzer).

As part of the Quebec Cooperative Study of Friedreich's Ataxia, a detailed genetic analysis of 35 sibships with 58 affected individuals was carried out. In addition, the parents and siblings underwent various clinical and laboratory examinations, in an attempt at carrier detection and diagnosis of the pre-clinical state. The results of these preliminary studies, as well as the EEG findings in 50 patients and 32 relatives, were published in a special issue of the Canadian Journal of Neurological Sciences describing Phase I of the Cooperative Study. As part of Phase II, more detailed family studies have been initiated by our group, as follows: neuroendocrine studies with Drs. Joseph Martin and George Tolis and Dr. Robert Collu of Hôpital Ste. Justine; cardiological studies, including vector — and echocardiography, with Dr. André Pasternac of the Cardiology Institute; neuro-ophthalmological and neuro-otological studies with Drs. Trevor Kirkham and Athanasios Katsarkas; HL-A studies with Dr. Oh; and linkage studies in conjunction with Dr. Elston of the University of North Carolina. Miss Lilly Blitzer continues as coordinator of this study.

4. *Agenesis of the corpus callosum with sensorimotor neuronopathy* (Drs. I Andermann, D. Melançon, G. Karpati, S. Carpenter and F. Ande mann).

45 patients in 24 sibships have now been identified, all originating fro Charlevoix County, where the consanguinity rate is known to be markedl elevated. Recognition of the autosomal recessive nature of this hithert undescribed syndrome is important for genetic counselling and pre vention.

5. *Family studies in tuberous sclerosis* (Drs. E. Andermann, S. Charasirisc bhon, R. Wilkinson, S. Taylor and F. Andermann).

Tuberous sclerosis is a syndrome of mental retardation, seizures, specifi skin lesions and intracranial calcifications, inherited as an autosoma dominant trait. It is a relatively frequent cause of epilepsy in childhood A study to detect carriers of the tuberous sclerosis gene was done so fa in 15 families of affected patients for purposes of genetic counselling

Work on familial collagen vascular disease with spastic paraplegia on the outcome of pregnancy in epileptic women continues.

All these studies employ a team approach, involving close collaboratio among a large number of individuals and laboratories within the Hospita and Institute, as well as other McGill teaching hospitals and outside uni versities. Further progress has been made in the organization of a Cana dian registry for degenerative neurological disorders of childhood anc adolescence, sponsored by the Canadian Association for Child Neurology to be centered in this department.

Miscellaneous

Dr. Eva Andermann was made a Fellow of the Canadian College o Medical Geneticists, and was appointed to serve on the Royal Colleg Committee of the C.C.M.G. Dr. Andermann and Miss Linda Dansk presented four papers at the Fifth International Congress of Humar Genetics in Mexico City, and Dr. Andermann chaired a session on Clinica Genetics at this Congress. Dr. Andermann was also invited to participat in a Symposium on the Genetics of EEG and the Epilepsies at the Join Meeting of the American Epilepsy Society and American EEG Societ in Dearborn, Michigan.

Neuroanatomy

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

Teaching Associates ..... Charles Olanow, M.D., F.R.C.P. (C)
Wan Lim, B.A., M.Sc., Ph.D.

Technician ..... Giovanni Gaggi

After many years of participation in the organization and teaching o

the CNS Course, Dr. Allan Morton has decided to relinquish his responsibilities. His contributions to the course have been many but his experience was of particular help in the reorganization necessitated by the introduction of the new curriculum in 1973. I am especially grateful for his support but the whole department surely shares in gratitude for his contribution. Dr. Morton will continue his association with the department as a neurologist.

Dr. Wan Lim, a former postgraduate student in the department of Anatomy at McGill, has joined the teaching staff and runs the Thursday afternoon laboratory classes for half the first year medical class. She will be appointed lecturer in the department in July and will take part in neuroanatomical research in addition to her teaching commitments.

Dr. Lawrence was a speaker in a symposium organized by the International Society for Developmental Psychobiology in Toronto in November 1976 and organized the 1976-77 series of departmental Neuroscience seminars and participated in one on New Methods in Neuroanatomy. He also gave a number of seminars on aspects of the motor system in Montreal and at the University of Sherbrooke.

Neuro-Ophthalmology

Director ..... Trevor H. Kirkham, M.B., Ch.B, (Manchester) F.R.C.S.

Informal teaching to ophthalmology and neurology residents and participation in the medical, neurology, neurosurgery and ophthalmology rounds continues. Two elective R.V.H. medical residents spent one month with us.

A one-month pilot project course for medical student electives on neurophysiology, neuro-otology and neuro-ophthalmology was undertaken in collaboration with the other McGill departments concerned. The comments of the students so far received were favourable.

A paper on *Congenital abnormalities of the optic nerve* was read at the January meeting of the Royal College of Physicians and Surgeons of Canada.

Neuropsychology

Neuropsychologist and Medical Research Council Associate	Brenda Milner, Ph.D., Sc.D., F.R.S.C.
Associate Neuropsychologist	Laughlin B. Taylor, B.Ed., M.Sc.
Professional Assistants	Bryan Kolb, Ph.D. (Pennsylvania State) (6 months) Graham Ratcliff, D. Phil. (Oxon.)
Post-Doctoral Fellows	Marilyn Jones-Gotman, Ph.D. Philip Corsi, Ph.D. (4 months)
Graduate Students	Gina Jaccarino-Hiatt, M.A. Donald Read, B.A. (Simon Fraser)
Clinical Assistants	Mary Kay Ajersch, M.A. Gabriel Leonard, B.A., Dip. Psych. Dominique Cosandey, L.Ps., Dip. Psych., (Genève)
Clinical Trainee	Susan Bryson, B.A. (Guelph)

This year has seen a sharp increase in our clinical load, both in terms of the number of patients undergoing surgery for epilepsy and the number requiring preoperative screening with carotid-Amytal speech and memory tests. Of 86 epileptic patients for whom a cortical excision was planned, 42 (49 per cent) were subjected to Amytal tests, 25 for speech lateralization and 17 for the assessment of possible risk to memory in a temporal lobectomy. This work, which engages our entire department, is carried out jointly with Dr. Carl Dila and with the help of the department of radiology.

The Amytal procedure allows us also to compare the roles of the two hemispheres for functions other than speech. We have now strengthened our finding that gestures are usually programmed from the dominant hemisphere for speech, in both left-handers and right-handers. In addition, we have elicited a striking dissociation between the control of these expressive arm movements and the recall of a block-tapping sequence where the arm movements, though still sequential, are guided by a spatial array. The latter task, which merely requires a pointing response, is affected by lesions of the right hippocampus, but can be performed correctly by globally aphasic patients.

Dr. Bryan Kolb has continued to examine the emission and perception of facial expressions in patients with known focal brain lesions. He has demonstrated a poverty of emotional expression after frontal-lobe lesions, left or right, as well as an inability to copy arbitrary sequences of facial movements. In contrast, the copying of arm movements is disturbed primarily by left parietal-lobe lesions, a finding that complements our earlier results for the recall of gesture sequences after intracarotid Amytal injection. Dr. Kolb is now at the University of Lethbridge but his work is being continued by Dr. Milner and Mr. Taylor. His successor, Dr. Graham Ratcliff, is devising new tasks for the study of spatial memory and orientation in extrapersonal space.

Dr. Marilyn Jones-Gotman has now taken up a position on the hospital staff, replacing Dominique Cosandey who is at the Montreal Children's Hospital. This year Dr. Jones-Gotman's research has focused on the visual memory deficits seen after right temporal lobectomy where she is trying to elucidate the relative contributions of temporal neocortex and hippocampus to test performance. From a somewhat different standpoint, Gina Jaccarino-Hiatt has been exploring the verbal thought processes of patients with left temporal-lobe lesions to determine how far information-processing deficits may underlie their verbal memory defects.

In June, Dr. Milner organised a series of papers on nonverbal thought at the International Neuropsychology Symposium in Rocamadour, France, where Marilyn Gotman reported her evidence for nonverbal fluency deficits after right frontal-lobe lesions. During the year Dr. Milner was also the invited speaker at the annual meeting of the Society for Psychophysiological Research, at San Diego, as well as spending a week as visiting scientist in the neurobiology programme at the University of North Carolina and giving invited addresses at the meeting of the Society for Neuroscience in Toronto and at the Michigan regional neurosciences meeting.

This year the department suffered an irreparable loss in the sudden death of a distinguished colleague and friend, Professor Hans-Lukas Teuber of the Massachusetts Institute of Technology. Professor Teuber has been a frequent visitor to the MNI, providing helpful criticism and encouragement in our various research activities as well as collaborating with Dr. Milner in the follow-up study of amnesic patients. As a memorial to him, The H.-L. Teuber Neuropsychology Research Fund has now been established.

Psychiatry

Consultant in Neuropsychiatry ..... Louise A. Demers-Desrosiers, M.D., C.S.P.Q., F.R.C.P. (C)

Consultant in Child and Adolescent Psychiatry ..... M. Lalinec-Michaud, M.D., C.S.P.Q., F.R.C.P. (C)

Special Consultant, Pain Clinic ..... R. Alec Ramsey, M.D., C.S.P.Q., F.R.C.P. (C)

Residents: 6 mos. on service

Yves Dion, M.D., (Montréal)
Réjean Fontaine, M.D. (Montréal)
Robert Frank, M.D. (McGill)
J. Montplaisir, M.D. (Montréal)

During the three months ending March 31, 1976 there were 120 interviews with in-patients and 89 with out-patients. During the year ending March 31, 1977, there were 466 interviews with in-patients and 411 with out-patients.

The main focus of our activities has revolved around two major areas: 1) clinical service as indicated by the above statistics and 2) clinical teaching

of neuropsychiatry to house staff, residents in psychiatry, and elective medical students.

We have made a special effort to coordinate and establish an effective liaison with the Allan Memorial Institute and other psychiatric treatment centres, as well as to increase our availability for service to out-patients of the Montreal Neurological Hospital staff.

For the future we can only hope that necessary funds will be made available to continue the development of a team to open new channels for a clinical research programme and participation in the proposed Day Care Centre.

Neurophotography

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

Assistants ..... Judy Little
Marcus Artz

Graphic Illustrator ..... Madeleine Hartell

The Department has had a successful year. The many research experiments carried out in the Institute were reflected in the increase of the workload in all areas of our department.

A new colour film on the market has enabled us to improve the quality of fluorescein angiography. During the year approximately 25,000 slides were produced for research projects using fluorescein angiography.

We have been involved in producing posters for meeting sessions. These posters have proved popular and after the meeting are used for display throughout the hospital.

Neil Robbins has left our department to take up a new post in charge of the Department of Photography at the Montreal Children's Hospital. We wish him well. Judy Little and Mr. Hodge attended the Annual Meeting of the Biological Photographic Association in Las Vegas, Nevada, where Mr. Hodge was awarded the Louis Schmitt Award, the highest honour bestowed by the Biological Photographic Association.

Tumour Registry

ARTHUR R. ELVIDGE, M.D.

For statistical purposes the 1976 — 1977 Annual Report of the Tumour Registry will be prepared in two parts.

During the first three months of 1976 a total of 73 patients with tumour or tumour suspect, directly and indirectly involving the nervous system were processed by the Tumour Registry. The figure includes 40 new

cases and 33 re-admissions. Twenty-seven new and 4 recurrences were verified pathologically. Twenty-five new cases and 16 re-admissions underwent surgery. The number treated by roentgenotherapy was 12 new cases and 4 re-admissions. There were 5 mortalities and autopsy was performed on 4. Clinic visits numbered 20.

For the 12 months ending March 31st, 1977, there were 301 cases of tumour and tumour suspect processed by the Tumour Registry. One hundred and fifty-three of these were new cases and 148 were re-admissions. Ninety-nine new cases and 8 re-admissions were verified pathologically. One hundred and thirty-five new cases and 22 re-admissions underwent surgery. The number treated by roentgenotherapy was 48 new cases and 11 re-admissions. There were 30 mortalities and autopsy was performed on 13. Clinic visits numbered 72.

Library

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

In spite of inflation we have been able to keep up our acquisitions and subscriptions. Our 1976-77 additions amounted to 225 volumes purchased and 27 volumes donated. In addition, the library staff ordered and processed about 100 volumes for various departments since the purchasing of books and periodicals has been concentrated in the hands of the librarian. This should help prevent duplication and delays and result in savings.

The library staff is currently engaged in updating our list of periodical holdings and reporting them to the National Library of Canada for inclusion in their Union List of Periodicals in Canadian Libraries.

Fellows' Society

President ..... Kenneth Laxer, M.D.
Vice-President ..... Jorge Martinez-Leyva, M.D.
Secretary-Treasurer ..... Robert Yufe, M.D.
Representative on the Board of Directors ..... Donald Schomer, M.D.
Union Representative ..... Bernard Rosenblatt, M.D.

Academically, this year has been very busy for the Fellows' Society. A basic science colloquium has been created utilizing McGill Faculty and distinguished guest lecturers. This course meets on alternate Wednesday evenings from 7:00 to 9:00 P.M. in the Hughlings Jackson Amphitheatre. The course has been designed to be a comprehensive survey of the basic neurosciences, i.e. neuroanatomy, neurophysiology, neuropharmacology

and neurochemistry, as an aid in preparation for the board examinations. The course is a perpetual, revolving programme repeating each topic every two years, thus ensuring that all residents will be exposed to the subject material.

This year the Annual Fellows' Day Lecture was held on June 3. Dr. Herbert Jasper, Consultant to the Montreal Neurological Institute in neurophysiology, was the guest speaker, and spoke on "Reflections on Forty Years of Epilepsy Research".

Socially the Fellows' programme has been a full one. Activities included a welcoming barbecue-pool party, a wine-cheese party and a 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. At the banquet this year the Fellows' Society gave awards to the neurologist and neurosurgeon who had demonstrated excellent teaching abilities and who had made an extra effort to teach the residents. It is hoped that these awards will be an annual event and they will serve as a stimulus to promote better teaching. This year's recipients were Dr. Israel Libman and Dr. Joseph Stratford. Dr. Kenneth Laxer and Dr. Jean-Guy Villemure received the Penfield Awards for excellence during their residency programs.

This year, with the appointment of Dr. J.B. Martin as Neurologist-in-Chief, a new spirit of fellowship has invaded the programme. In an effort to help unite the various programmes, the Fellows' Society, starting in the new year, will be known as the McGill Neuro Fellows' Society.

We would like to express again special thanks to the staff who contributed to the residents' seminars. We also thank former Fellows for their generous financial assistance, which enables the programmes of the Fellows' Society to continue.

Officers for 1977-78 are:

President	Richard Branan, M.D.
Vice-President	Daniel Stowens, M.D.
Secretary-Treasurer	Joy Arpin, M.D.
Residency Review Committee (Neurosurgery)	John Wells, M.D. José Montes, M.D.
Residency Review Committee (Neurology)	Werner Becker, M.D. Sirichai Chayasirisobhon, M.D.
Representative on the Board of Directors	Joseph Carlton, M.D.
Union Representative	Benjamin Zifkin, M.D.

The Montreal Neurological Society

President ..... Dr. Jules Hardy
Vice-President ..... Dr. Albert Aguayo
Secretary-Treasurer ..... Dr. Carl Dila

The officers for the 1977-78 year will be elected at the Annual Dinner which will be held in October, 1977.

This year, two meetings were held: One was held on September 22, 1976, and the other was held on April 6, 1977. The meetings were hosted by the Notre Dame Hospital and the Montreal General Hospital. Coffee was served at brief social periods before each meeting, provided by the host hospitals.

Papers read before the Society by distinguished visitors were as follows:
PROF. MAURICE MASSON, Professor of Neurology, Hôpital Beaujon, Paris, France: "Etude anatomo-clinique, deux observations de myelinolise centro-pontine".
DR. DONALD L. PRICE, Department of Neuropathology, Johns Hopkins Medical School, Baltimore, Maryland: "Tetanus".

The Montreal Neurological Women's Society

President ..... Betty Blume
Vice-President ..... Jeanne Branan
Secretary ..... Carol Laxer
Treasurer ..... Marja St. John
Welcoming Committee Chariwomen ..... Betty Blume
Nicole Olivier

The Women's Society of the Montreal Neurological Institute continues to adapt its program to fit the changing needs of that everchanging creature — the doctor's wife. More and more of our number are finding ways to exercise their person-ness rather than their wife-ness, and thus the role of our society is in a continuous flux.

This year's program centred on social occasions for couples and families. The annual pool party, held very early in July to avoid conflict with the Olympics, drew a good group and the evening was marred only by slow starting charcoal! In August a morning coffee get-together was held in honour of the newly arrived wives. A "Sunday in the Park" — an informal picnic and sports afternoon on Mount Royal — was scheduled but was rained out.

Fall began with the traditional opening meeting at the home of Mrs.

Feindel. Staff and resident wives mingled over sherry and compared notes on summer experiences and fall plans. The annual bake sale was held just prior to Thanksgiving in October. A substantial sum was raised for use in brightening up the graduate nurses' residence. Carol and Ken Laxer hosted a wine and cheese party for the society early in November. This was a new kind of event on our calendar and the response was most encouraging.

The children's party was held at the RVH nurses' residence in early December. A pantomime clown act was presented by Frank and Nancy Allison, drama professors with special training in mime. Their costumes and routines delighted all in attendance, regardless of age.

A perfect early spring day helped make the sugaring-off even more memorable this year! Eva and Fred Andermann again opened their country home to us and we filled it to bursting with staff and families eager to share a real Québecois tradition.

The closing meeting of the year was the pot-luck supper held on May 16 with Shira Karpati as hostess. The executive for the coming year is as follows:

President ..... Trish Stowens
Vice-President ..... Kathy Markley
Secretary-Treasurer ..... Dian Read
Welcoming Committee Chairwomen ..... Trish Stowens
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 and a year of clinical medicine OR an approved clinical clerkship during the final undergraduate year and one year of straight medical or pediatric interneship. The Professional Corporation of Physicians of Quebec requires, in addition, that all graduates of medical schools outside Canada and the U.S. who wish to train in the Province obtain the E.C.F.M.G. certificate, and a year of rotating interneship in an approved North American training centre. 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 in the Department of Neurology and Neurosurgery 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 Dr. Joseph B. Martin, Program Director for Neurology, Montreal Neurological Institute, 3801 University Street, Montreal, Quebec, Canada H3A 2B4.

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

An interneship and 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 and Montreal Children's 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, Quebec, Canada H3A 2B4.

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 7:00 p.m. twice a month during the academic year. Staff, Visiting Lecturers and Fellows.

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 provide in Course G531-602H. By special arrangement. Professor Wolfe and Pappius.

NEUROPATHOLOGY

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

G531-651H Conference in Neuropathology, alternate Thursdays, 4:3(— 5:30 p.m.

G531-652A Neurological Histopathology. Slide sessions, one hour twice weekly, Tuesday and Thursday mornings. Professor Stirling Carpenter.

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, Melançon, Bélanger and Taylor.

ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY

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

NEUROPSYCHOLOGY

G531-680H Clinical and research training for selected graduate students. Professor Milner and staff.

Publications — 1976-77

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

**Staff Members of the Montreal General Hospital*

*AGUAYO A.J., EPPS J., CHARRON L. and BRAY G.M.: Multipotentiality of Schwann cells in cross-anastomosed and grafted myelinated and unmyelinated nerves. Brain Res. 104:1-20, 1976.

*AGUAYO A.J., PEYRONNARD J.M., TERRY L.C., ROMINE J.S. and BRAY G.M.: Neonatal neuronal loss in rat superior cervical ganglia — retrograde effects on developing preganglionic axons and Schwann cells. J. Neurocytol 5:137-155, 1976.

*AGUAYO A.J., CHARRON L. and BRAY G.M.: Potential of Schwann cells from unmyelinated nerves to produce myelin. A quantitative ultrastructural and radioautographic study. J. Neurocytol 5:565-573, 1976.

*AGUAYO A.J., BRAY G.M., TERRY L.C. and SWEEZEY E.: Three dimensional analysis of unmyelinated fibers in normal and pathologic autonomic nerves. J. Neuropathol Exp. Neurol 35:136-151, 1976.

*AGUAYO A.J., ATTIWELL M., TRECARTEN J., PERKINS S. and BRAY G.M.: Schwann cell transplantation; evidence for a primary disorder of myelination in Trembler mouse nerves. Clin. Res. 24:688A, 1976 (Abstr.).

ALLEN J.C., SHEREMATA W., COSGROVE J.B.R., OSTERLAND K. and SHEA M.: Cerebrospinal fluid T and B lymphocyte kinetics related to exacerbations of multiple sclerosis. Neurology 26(6):579-583, 1976.

ANDERMANN E.: Genetic counselling in neurological disorders. Program of the Combined Centennial Meeting, Hospital for Sick Children Alumni, Canadian Pediatric Society, Ambulatory Pediatric Association and Society for Adolescent Medicine, Toronto, 279, 1975.

ANDERMANN E., ANDERMANN F., JOUBERT M., MELANÇON D., KARPATI G. and CARPENTER S.: Three familial midline malformation syndromes of the central nervous system: agenesis of the corpus callosum and anterior horn-cell disease: agenesis of the cerebellar vernis: and atrophy of the cerebellar vermis. In: *Malformation Syndromes*, D. Bergsma, ed. Birth Defects: Original Article Series XI(2). 1975. Amsterdam, Excerpta Medica International Congress Series 340, 1975, pp. 269-293.

ANDERMANN E., SCRIVER C.R., GOLD R., WOLFE L., PATRY G., LAFONTAINE R., GEOFFROY G. and ANDERMANN F.: Tay-Sachs screening in a French Canadian deme: suggestive evidence for polymorphism of the Tay-Sachs gene. Am J. Hum. Genet 27(6):12A, 1975 (Abstr.).

ANDERMANN E., REMILLARD G., GOYER C., BLITZER L., ANDERMANN F. and BARBEAU A.: Genetic and family studies in Friedreich's ataxia. Can J. Neurol Sci. 3(4):287-301, 1976.

ANDERMANN E., ANDERMANN F., CARPENTER S., KARPATI G., EISEN A., MELANÇON D. and BERGERON J.: Familial agenesis of the corpus callosum with sensorimotor neuronopathy: a new autosomal recessive syndrome originating in Charlevoix County. Can J. Neurol Sci. 3(2):155, 1976 (Abstr.).

ANDERMANN E., ANDERMANN F., CARPENTER S., KARPATI G., GRIMES D. and WOLFE L.S.: Late onset GM_2 gangliosidosis (juvenile Tay-Sachs disease) in two Lebanese families. Can J. Neurol Sci. 3(2):150, 1976 (Abstr.).

ANDERMANN E., ANDERMANN F., CARPENTER S., KARPATI G., EISEN A., MELANÇON D. and BERGERON J.: Familial agenesis of the corpus callosum with sensorimotor neuronopathy: a new autosomal recessive syndrome originating in Charlevoix County. Excerpta Medica International Congress Series 397:58, 1976 (Abstr.).

ANDERMANN F., ANDERMANN E., LEPPIK I., EISEN A.H., KARPATI G. and CARPENTER S.: A syndrome of collagen vascular disease spasticity and mental retardation in an inbred kindred. Am J. Hum Genet 27(6):12A, 1975 (Abstr.).

ANDERMANN F., ANDERMANN E., JACOB J.C., CARPENTER S., KARPATI G. and WOLFE L.S.: Cerebromacular degeneration in Quebec and Newfoundland: genetic, neurochemical and demographic observations. Excerpta Medica International Congress Series 397:59, 1976 (Abstr.).

*BRAY G.M., PERKINS S., AGUAYO A.J. and PETERSON A.C.: Abnormal Schwann cell development in spinal root of newborn dystrophic mice. Neurology 26:349, 1976 (Abstr.).

*BRAY G.M. and AGUAYO A.J.: Sodium pump sites in nerve and muscle. Can. J. Neurol Sci. 3(2):142, 1976 (Abstr.).

BRAZEAU P. and MARTIN J.B.: Analogs of somatostatin. *In vivo* activities: prolongation of action with protamine zinc. International Symposium on Hypothalamus and Endocrine Functions Quebec 1975. In: *Hypothalamus and Endocrine Functions*, F Labrie, J. Meites and G. Pelletier, eds. New York, Plenum Press, 1976, pp. 378-386.

BRAZEAU P., EPELBAUM J., TSANG D., RENAUD L.P. and MARTIN J.B.: Brain regional and subcellular distribution of bioassayable growth hormone release inhibiting activity and RIA-SRIF activity. Proc Endocrine Soc., 58th Annual Meeting, 161, 1976 (Abstr.).

BROWNSTEIN S., KIRKHAM T.H. and KALOUSEK D.K.: Bilateral renal agenesis with multiple congenital ocular anomalies. Am J. Ophthalmol 82(5):770-774, 1976.

BUCKWOLD F.J., HAND R. and HANSEBOUT R.R.: Hospital-acquired bacterial meningitis in neurosurgical patients. J. Neurosurg 46(4):494-500, 1977

CARPENTER S. and KARPATI G.: Intra-axonal polyglucosan bodies: an unusual lesion of peripheral nerves. Neurology 26:369, 1976 (Abstr.).

CARPENTER S., KARPATI G., ROTHMAN S. and WATTERS G.: The childhood type of dermatomyositis, Neurology 26:952-962, 1976.

CARPENTER S., KARPATI G., ANDERMANN F., JACOB J.C. and ANDERMANN E.: The ultrastructural characteristics of the abnormal cytosomes in Batten-Kufs' disease. Brain 100:137-156, 1977.

*CHARRON L., AGUAYO A.J. and BRAY G.M.: Schwann cell kinetics in experimental nerve grafts. Can. J. Neurol Sci. 3:143, 1976 (Abstr.).

CLEMENT P., ANDERMANN F and DONGIER M.: Self-induced television epilepsy: a study of two patients. Can. Psychiatr. Assoc. J. 21:163-167, 1976.

COLBY S.P., SHEREMATA W., BAIN B. and EYLAR E.H.: Cellular hypersensitivity in attacks of multiple sclerosis. Neurology 27(2) 132-139, 1977.

DANON J., KARPATI G., CARPENTER S. and WOLFE L.S.: Experimental myotonic myopathy. Neurology 26:384, 1976 (Abstr.).

DANSKY L., ANDERMANN E., SHERWIN A. and ANDERMANN F.: The outcome of pregnancy in epileptic women. Epilepsia 16(1):199, 1975 (Abstr.).

DANSKY L., ANDERMANN E., ANDERMANN F. and SHERWIN A.: Major congenital malformations in the offspring of epileptic women. Am. J. Hum Genet 27(6):31A, 1975 (Abstr.).

DANSKY L., ANDERMANN E., ANDERMANN F., SHERWIN A. and LOUGHNAN P.M.: Congenital malformations in the offspring of epileptic women. Excerpta Medica International Congress Series 397:66-67, 1976 (Abstr.).

*DAS P.K., BRAY G.M., AGUAYO A.J. and RASMINSKY M.: Diminished ouabain-sensitive, sodium-potassium ATPase activity in sciatic nerves of rats with streptozotocin-induced diabetes. Exp. Neurol 53:285-288, 1976.

DILA C., BOUCHARD L., MEYER E., YAMAMOTO L. and FEINDEL W.: Microvascular response to minimal brain trauma. Proceedings of the 2nd Chicago Symposium. In: *Head Injuries*, R.L. McLaurin, ed. New York, Grune & Stratton Inc., 1976, pp. 213-215.

DURAND D, MARTIN J.B. and BRAZEAU P.: Evidence for a role of α-adrenergic mechanisms in regulation of episodic growth hormone secretion in the rat. Endocrinology 100(3):722-728, 1977.

EISEN A, SCHOMER D. and MELMED C.: An electrophysiological method for examining lumbosacral root compression. Le J. Can. des Sci. Neurol. 4(2); 117-123, 1977.

EPELBAUM J., BRAZEAU P., TSANG D., BRAWER J. and MARTIN J.B.: Subcellar distribution of radioimmunoassayble somatostatin in rat brain. Brain Res. 126:309-323, 1977.

FEINDEL W.: Obituary on Dr. Wilder Graves Penfield (1891-1976). Can. Med. Assoc. J. 3:1158-9, 1976.

FEINDEL W.: Tribute to Dr. Wilder Penfield. Can. J. Neurol. Sci. 3(2): pp. v. vi, 1976.

FEINDEL W.: Introduction to *Dynamics of Brain Edema*, H. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag, 1976, pp. 1-4.

FEINDEL W.: Application of new technology for control of neurological disorders in developing countries. Menarini International Foundation, Florence, Italy. Conference on the Responsability of Science in Modern Society, October 1976. (Abstr.).

FEINDEL, William et al: Wilder Penfield: his legacy to neurology. CMAJ 116(12):1365-1377, 1977.

FOX S., KRNJEVIĆ K. and MORRIS M.E.: Lioresal depresses synaptic transmission in the cuneate nucleus. Neuroscience II:1003, 1976 (Abstr.).

GLOOR P.: Intracarotid amobarbital and pentylenetetrazol activation. In: *Handbook of Electroencephalography and Clinical Neurophysiology*, A. Rémond, Editor-in-Chief. Amsterdam, Elsevier Publishing Company 3(D), R. Naquet, ed., 1976, pp. 121-151.

GLOOR P.: Generalized and widespread bilateral paroxysmal activities. In: *Handbook of Electroencephalography and Clinical Neurophysiology*, A. Rémond, Editor-in-Chief. Amsterdam, Elsevier Publishing Company 11(B), W.A. Cobb, ed., 1976, pp. 52-87

GLOOR P., RASMUSSEN T., ALTUZARRA A. and GARRETSON H.: Rôle of the intracarotid amobarbital-pentylenetetrazol EEG test in the diagnosis and surgical treatment of patients with complex seizure problems. Epilepsia 17:15-31, 1976.

GLOOR P., BALL G. and SCHAUL N.: Brain lesions that produce delta waves in the EEG. Neurology 27(4):326-333, 1977

GOTMAN J. and GLOOR P.: Automatic recognition and quantification of interictal epileptic activity in the human scalp EEG. Electroencephalogr. Clin. Neurophysiol. 41:513-529, 1976.

GUNN T., BORTOLUSSI R., LITTLE J.M., ANDERMANN F., FRASER F.C. and BELMONTE M.M.: Juvenile diabetes mellitus, optic atrophy, sensory nerve deafness and diabetes insipidus — a syndrome. J. Pediat. 89(4):565-570, 1976.

HANSEBOUT R.R., KUCHNER E.F. and ROMERO-SIERRA C.: Effects of local hypothermia and of steroids on recovery from experimental spinal cord compression injury. Yearbook Neurol. and Neurosurg. 1977, pp. 352-353.

HANSEBOUT R.R., KUCHNER E.F., MERCER D.I. and PAPPIUS H.M.: Chemical changes in injured spinal cord: effects of steroids and local cooling. Can. J. Neurol. Sci. 3:147, 1976 (Abstr.).

HARVEY C.D., SHERWIN A.L. and VAN DER KLEIJN E.: Distribution of anticonvulsant drugs in gray and white matter of human brain. Le J. Can. des Sci. Neurologiques 4(2):89-92, 1977.

IMMER H., ABRAHAM N.A., NELSON V., SESTANJ K., GOTZ M., BRAZEAU P. and MARTIN J.B.: Analogs of somatostatin: chemistry and *in vitro* results. International Symposium on Hypothalamus and Endocrine Functions Quebec 75. In: *Hypothalamus and Endocrine Functions*, F. Labrie, J. Meites and G. Pelletier, eds. New York, Plenum Press 1976, pp. 373-378.

IVES J.R.: EEG monitoring of ambulatory epileptic patients: Post-graduate Med. J. 52(7):86-91, 1976.

IVES J.R.: New sphenoidal electrode assembly to permit long-term monitoring of the patient's ictal or interictal EEG. Electroencephalogr. Clin. Neurophysiol. Article #EEG TC1296A, 1976.

IVES J.R. and WOODS J.F.: Ambulatory monitoring of epileptic patients: clinical and research applications. Electroencephalogr. Clin. Neurophysiol. 41:544-545, 1976 (Abstr.).

IVES J.R., THOMPSON C.J. and GLOOR P.: Seizure monitoring: a new tool in electroencephalography. Electroencephalogr. Clin. Neurophysiol. 41:422-427, 1976.

IVES J.R., THOMPSON C.J. and GLOOR P.: An automatic multichannel seizure monitoring and recording system for epileptic patients. Electroencephalogr. Clin. Neurophysiol. 40:326-327, 1976 (Abstr.).

IVES J.R., WILKINS A., JONES M., ANDERMANN F. and WOODS J.: Twenty-seven days in the life of an epileptic patient. Biotelemetry III: 177-180, 1976.

JONES-GOTMAN M. and MILNER B.: Design fluency: the invention of nonsense drawings after focal cerebral lesions. Neuropsychologia 15:77, 1976.

JONES M.W., ANDERMANN F., WILKINS A.: Pattern sensitive epilepsy: the clinical spectrum postulated mechanisms and considerations on treatment. Can. J. Neurol. Sci. 3:145, 1976 (Abstr.).

KARPATI G. and CARPENTER S.: Maturational arrest (of muscle in infantile myotonic dystrophy). Arch. Neurol. 33:847, 1976. (letter to the ed.).

KARPATI G.: Subtypes of histochemical Type I muscle fibers. Neurology 26:296, 1976 (letter to the ed.).

KARPATI G., CARPENTER S., EISEN A.A., AUBE M. and DiMAURO S.: The adult form of acid maltase deficiency. Ann. Neurol. 1:276-280, 1977.

KARPATI G.: Trophic regulation of the structure and function of skeletal muscles. In: *Microsurgery*, A.I. Daniller and B. Strauch, eds. St. Louis, Mosby Company, Chap. 12, 1976, pp. 108-111.

KARPATI G., CARPENTER S., WOLFE L.S. and ANDERMANN F.: Juvenile dystonic lipidosis: an unusual form of neurovisceral storage disease. Neurology 27(1): 32-42, 1977.

KIRKHAM T.H. and LANNING B.K.: Monocular elevator paresis, Argyll Robertson pupils and sarcoidosis. Can. J. Ophthalmol. 11(4):330-335, 1976.

KIRKHAM T.H.: Sixth nerve palsies in children. In: *Orthoptics — Past Present Future*, S. Moore, J. Mein and L. Stockbridge, eds. Miami, Symposia Specialists, 1976, pp. 359-366.

KIRKHAM T.H., PREUS M. and KAPLAN P.: Renal anomalies and oligohydrammos in the cerebro-oculo-facio-skeletal syndrome. Am. J. Dis. Child 131:62-64, 1977.

KIRKHAM T.H.: Temporary tarsorrhaphy. Am. J. Ophthalmol. 83:137, 1977.

*KIRSH J., ROSENTHALL L., FINLAYSON M.H. and WEE R.: Progressive multifocal leukoencephalopathy. Radiology 119:399-400, 1976.

KRNJEVIĆ K. and MORRIS M.E.: Input-output relation of transmission through cuneate nucleus. J. Physiol. (London) 257:791-815, 1976.

KRNJEVIĆ K. and MORRIS M.E.: Some effects of picrotoxin on afferent terminals in the cuneate nucleus of the cat. In: *Drugs and Central Synaptic Transmission*, P.B. Bradley and B.N. Dhawan, eds. London, MacMillan Press 25, 1976, pp. 273-283.

KUCHNER E.F. and HANSEBOUT R.R.: Combined steroid and hypothermia treatment of experimental spinal cord injury. Surg. Neurol. 6(6):371-376, 1976.

KUCHNER E.F., MERCER I.D., PAPPIUS H.M. and HANSEBOUT R.R.: Experimental spinal cord injury: effects of steroids and/or cooling on edema, electrolytes and motor recovery. In: *Dynamics of Cerebral Edema*, H.M. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag IV(8), 1976 pp. 315-322.

LAWRENCE D.G. and HOPKINS D.A.: The development of motor control in the rhesus monkey: evidence concerning the rôle of corticomotoneuronal connections. Brain 99(2):235-254, 1976.

LEPPIK I.E., ANDERMANN E., ANDERMANN F., CARPENTER S., EISEN A.H. and KARPATI G.: Familial collagen vascular disease with neurological involvement. Can. J. Neurol. Sci. 2(3):329, 1975, (Abstr.).

LEPPIK I.E., ANDERMANN E., ANDERMANN F., EISEN A.H., KARPATI G., CARPENTER S. and ELSTON R.C.: A syndrome of collagen vascular disease, spasticity and mental retardation in an inbred kindred. Clin. Res. 23:624a, 1975 (Abstr.).

LEPPIK I.E., ANDERMANN E., ANDERMANN F., EISEN A.H., KARPATI G., CARPENTER S. and ELSTON R.C.: A syndrome of collagen vascular disease, spasticity and mental retardation in an inbred kindred. Excerpta Medica International Congress Series 397:85-86, 1976 (Abstr.).

LEPPIK I.E., THOMPSON C.J., ETHIER R. and SHERWIN A.L.: Diatrizoate in computed cranial tomography: a quantitative study. Investigative Radiology 12(1): 21-26, 1977.

LEPPIK I.E. and SHERWIN A.L.: Anticonvulsant activity of phenobarbital and phenytoin in combination. J. Pharmacol. Exper. Therapeut. 200(3):570-575, 1977

LITTLE J.R., KERR F.W.L. and SUNDT, Jr. T.M.: Microcirculatory obstruction in focal cerebral ischemia — relationship to neuronal alterations. Stroke 7:102, 1976 (Abstr.).

LITTLE J.R. and MacCARTY C.S.: Tension pneumocephalus after insertion of ventriculoperitoneal shunt for aqueductal stenosis. J. Neurosurg. 44:383-385, 1976.

LITTLE J.R., KERR F.W.L. and SUNDT, Jr. T.M.: Microcirculatory obstruction in focal cerebral ischemia: an electron microscopic investigation in monkeys. Stroke 7:25-30, 1976.

LITTLE J.R.: Microvascular alterations and edema in focal cerebral ischemia. In: *Dynamics of Cerebral Edema*. H.M. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag, III(9), 1976, pp 236-243.

LITTLE J.R.: Implanted device for middle cerebral artery occlusion in conscious cats. Stroke 8(2):258-260, 1977.

LITTLE J.R., KERR F.W.L. and SUNDT, Jr. T.M.: Microvascular alterations and edema in focal cerebral ischemia. Can. J. Neurol. Sci. 3:152, 1976 (Abstr.).

MARTIN J.B.: Brain regulation of GH secretion. In: *Frontiers in Neuroendocrinology*, L. Martini and W.F. Ganong, eds. New York, Raven Press 4(5), 1976, pp. 129-168.

MARTIN J.B.: Immunoassays in clinical medicine. In: *Clinical Immunology*, S. Freedman and P. Gold, eds. 2nd ed, New York, Harper and Row, 1976, pp. 590-599.

MARTIN J.B.: Hypothalamus and releasing hormones. In: *Harrison's Principles of Internal Medicine*, G.W. Thorn, R.D. Adams, E. Braunwald, K.J. Isselbacher and R. G. Petersdorf, eds. 8th ed, New York McGraw-Hill, Part 4, Sec. 2, Chap. 89, 1977, pp. 471-478.

McAULIFFE J.J., SHERWIN A.L., LEPPIK I.E. FAYLE S.A. and PIPPENGER C.E.: Salivary levels of anticonvulsants: a practical approach to drug monitoring. Neurology 27:409-413, 1977.

MELMED C., EISEN A. and SCHOMER D.: Human sensory nerve refractor period: a simple technique for its determinations. Can. J. Neurol. Sci. 3:142, 1976 (Abstr.).

MORRIS M.E. and KRNJEVIĆ K.: Extracellular K^+ accumulation and modulation of sensory transmission. In: *Advances in Pain Research and Therapy*, J.J. Bonica and D. Albe-Fessard, New York, Raven Press 1(15), 1976, pp. 117-122.

MORRIS M.E.: Effects of anaesthesia on synaptic transmission in the cuneate nucleus. Neuroscience II: 1008, 1976 (Abstr.).

MURRAY P., FEINDEL W. and YAMAMOTO L.: Comparison of pattern and rate of cerebral blood flow before and after anastomosis of the superficial temporal artery to middle artery. Can. J. Neurol. Sci. 3:145, 1976 (Abstr.).

NEMEROFF C.B., KONKOL R.J., MARTIN J.B., BISSETTE G., BRAZEAU P., BREESE G.R., GRANT L.D., PRANGE, Jr. A.J. and KIZER J.S.: Microchemical analysis of the hypothalamic lesion induced by monosodium L-Glutamate (MSG) in the neonatal rat: evidence for a dopaminergic rôle in neuroendocrine regulation. Sixth Annual Meeting of the Society for Neuroscience, p. 654, 1976.

O'GORMAN A.M. and KIRKHAM T.H.: Aneurysmal bone cyst of the orbit with unusual angiographic features. Am. J. Roentgenol. Radium Ther. Nucl. Med. 126(4): 896-899, 1976.

PAPPIUS H.M.: Pathophysiology of cerebral edema. The search for the ideal therapeutic agent. In: *Current Controversies in Neurosurgery*, T.P. Morley, ed. Philadelphia, W.B. Saunders, 1976, pp. 587-594.

PAPPIUS H.M. and WOLFE L.S.: Some further studies on vasogenic edema. In: *Dynamics of Brain Edema*, H.M. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag, II(13), 1976, pp. 138-143.

PAPPIUS H.M. and FEINDEL W.: Editors. *Dynamics of Brain Edema*, Heidelberg, Springer-Verlag, 1976, 404 pages.

PAPPIUS H.M.: Inorganic constituents. Metabolic and deficiency diseases of the nervous system. In: *Handbook of Clinical Neurology*, H. Klawans, ed. Amsterdam, North-Holland Publishing Co 29(1), 1976.

*PERKINS S., AGUAYO A.J. and BRAY G.M.: Quantitative ultrastructural findings in Trembler mouse neuropathy. Clin. Res. 24:688a, 1976.

*PITTMAN Q.J., BLUME H.W., MacKENZIE B.W. and RENAUD L.P.: GABA, glycine and synaptic inhibition in the hypothalamic ventromedial nucleus of the rat. Canada Physiology 8:56, 1976.

POLOMENO R.C. and KIRKHAM T.H.: Acute convergent strabismus in children 3:154, 1976 (Abstr.).

QUESNEY L.F., GLOOR P., WOLFE L.S. and JOZSEF S.: Effect of PGF_2 and 15(S)-15-Methyl PGE_2 methyl ester on feline generalized penicillin epilepsy. In: *Advances in Prostaglandin and Thromboxane Research*, B. Samuelsson and R. Paoletti, eds. New York, Raven Press 1, 1976, pp. 387-390.

QUESNEY L.F., GLOOR P., KRATZENBERG E. and ZUMSTEIN H.: Pathophysiology of generalized penicillin epilepsy in the cat: the role of cortical and subcortical structures. Systemic application of penicillin. Electroencephalogr. Clin. Neurophysiol. 42:640-655, 1977.

*RASMINSKY M.: Nervous impulses arising in mid-root of spinal root axons of dystrophic mice. Neuroscience 2:417, 1976 (Abstr.).

*RASMINSKY M. and KEARNEY R.E.: Continuous conduction in large diameter bare axons in spinal roots of dystrophic mice. Neurology 26:367, 1976 (Abstr.).

RASMUSSEN T.: The place of surgery in the treatment of epilepsy. In: *Current Controversies in Neurosurgery*. T.P. Morley, ed. Philadelphia, W.B. Saunders Co. 1(19), 1976, pp. 465-477.

RASMUSSEN T.: Wilder Penfield 1891-1976. J. Neurosurg. 45(3):248-250, 1976.

RASMUSSEN T.: Panel discussion on current modes of therapy. In: *Dynamics of Brain Edema*, H.M. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag IV, 1976, pp. 359-361.

*REMILLARD G., ANDERMANN F., BLITZER L. and ANDERMANN E.: Electroencephalographic findings in Friedreich's ataxia. Can. J. Neurol. Sci. 3(4):309-312, 1976.

REMILLARD G.M., ANDERMANN F., RHI-SAUSI A. and ROBBINS N.M.: Facial asymmetry in patients with temporal lobe epilepsy: a clinical sign useful in the lateralization of temporal epileptogenic foci. Neurology 27(2):109-114, 1977.

RENAUD L.P., MARTIN J.B. and BRAZEAU P.: Hypothalamic releasing factor: physiological evidence for a regulatory action on central neurons and pathways for their distribution in brain. Pharmacol. Biochem. Behav. 5(1):171-178, 1976.

*RENAUD L.P.: Histamine microiontophoresis on identified hypothalamic neurons: three patterns of response in the ventromedial nucleus of the rat.. Brain Res. 105:339-344, 1976.

*RENAUD L.P.: An electrophysiological study of amygdalo-hypothalamic projections to the ventromedial nucleus of the rat. Brain Res. 105:45-58, 1976.

*RENAUD L.P.: Tuberoinfundibular neurons in the basomedial hypothalamus of the rat: electrophysiological evidence for axon collaterals to hypothalamic and extrahypothalamic areas. Brain Res. 105:59-72, 1976.

*RENAUD L.P.: Influence of amygdala stimulation on the activity of identified tuberoinfundibular neurones in the rat hypothalamus. J. Physiol. 260:237-252, 1976.

*RENAUD L.P.: Tuberoinfundibular neurons: electrophysiological studies on afferent and efferent connections. The Physiologist 19:338, 1976.

*RENAUD L.P.: Reciprocal connections between hypothalamic ventromedial nucleus (HVM) and amygdala. Proc. Can. Fed. Biol. Soc. 19:575, 1976 (Abstr.).

*RENAUD L.P.: Electrophysiological evidence for axon collaterals in the tuberoinfundibular system of the rat. J. Physiol. 254:20-21P, 1976.

*ROMINE J.S., BRAY G.M. and AGUAYO A.J.: Multiplication of unmyelinated Schwann cells after crush injury. Arch. Neurol. 33:49-54, 1976.

*ROMINE J.S., AGUAYO A.J. and BRAY G.M.: Lack of Schwann cell migration after crush of unmyelinated nerves. J. Neuropath. Exp. Neurol. 35:118, 1976 (Abstr.).

ROTHMAN S.J. and OLANOW C.W.: A new spinocerebellar syndrome with early mental retardation and seizures 3:150, 1976 (Abstr.).

SCHAUL N., BALL G., GLOOR P and PAPPIUS H.: The EEG in cerebral edema. In: *Dynamics of Brain Edema*, H. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag II(14), 1976, pp 144-149.

SCHOMER D., EISEN A. and MELMED C.: The "F" Wave: its physiology and its use in determining proximal motor conduction times. Can. J. Neurol. Sci. 3:149, 1976 (Abstr.).

SCOTTI G., ETHIER R., MELANÇON D., TERBRUGGE K. and TCHANG S. Computed tomography in the evaluation of intracranial aneurysms and subarachnoid hemorrhage. Radiology 122(1):85-90, 1977.

SHEREMATA W., ALLEN J., SAZANT A., COSGROVE J.B. and OSTERLAND K.: Cerebrospinal fluid. In: *Transactions of the American Neurological Assoc.,* 1976, p. 101.

SHEREMATA W., ELDEFRAWI M., TRILLER H. and HELLER I.: Myasthenia gravis, multiple sclerosis and cellular sensitization to acetylecholine receptor. Can. J. Neurol. Sci. 3:148, 1976 (Abstr.).

SHEREMATA W.A., ELDEFRAWI M. and MOSCARELLO M.: Experimental allergic myasthenia and cellular sensitization to AChRP. Can. J. Neurol. Sci. 3:148, 1976 (Abstr.).

SHEREMATA W.A., EYLAR E.H. and COSGROVE J.B.R.: Multiple sclerosis: sensitization to myelin basic protein fragment (Peptide T) encephalitogenic to primates preliminary report. J. Neurol. Sci. 27:413-425, 1976.

SHEREMATA W., WOODS D.D. and MOSCARELLO M.A.: Antimyelin basic protein antibodies and cellular hypersensitivity in multiple sclerosis. In: *Transactions of the American Neurological Assoc.,* 1976, p. 101.

SHEREMATA W., TRILLER H., COSGROVE J.B.R. and EYLAR E.H.: Direct leukocyte migration inhibition by myelin basic protein in exacerbations of multiple sclerosis. CMAJ 116:985-988, 1977.

SHERWIN A.L., HARVEY C.D., LEPPIK I.E. and GONDA A.: Correlation between red cell and free plasma phenytoin levels in renal disease. Neurology 26:874-878, 1976.

SHERWIN A.L., HARVEY C.D. and LEPPIK I.E.: Quantitation of antiepileptic drugs in human brain. In: *Quantitative Analytic Studies in Epilepsy,* P. Kellaway and I. Petersén, eds. New York, Raven Press, 1976, pp. 171-182.

*STRATFORD J.: Myelopathy due to cervical spinal stenosis. Can. J. Neurol. Sci. 3:157, 1976 (Abstr.).

TANNENBAUM G.S., MARTIN J.B. and COLLE E.: Ultradian growth hormone rhythm in the rat: effects of feeding hyperglycemia and insulin induced hypoglycemia. Endocrinology 99:720-727, 1976.

TERBRUGGE K., SCOTTI G., ETHIER R., MELANCON D., TCHANG S. and MILNER C.: Computed tomography in intracranial arteriovenous malformations. Radiology 122(3):703-705, 1977.

TERRY L.C., WILLOUGHBY J.O., BRAZEAU P., MARTIN J.B. and PATEL, Y.: Antiserum to somatostatin prevents stress-induced inhibition of growth hormone secretion in the rat. Science 192:565-567, 1976.

TERRY L.C., AUDET J., BRAZEAU P. and MARTIN J.B.: Neuroendocrine concomitants of intracranial self-stimulation: effects on growth hormone (GH), prolactin (PRL) and corticosterone (CS). Sixth Annual Meeting of the Society for Neuroscience, 1976, p. 660.

THOMPSON C.J., YAMAMOTO Y.L. and MEYER E.: A positron imaging system for the measurement of regional cerebral blood flow. SPIE Optical Instrumentation in Medicine 96:263-268, 1976.

THOMPSON C.J., HARDY T. and BERTRAND G.: A system for anatomical and functional mapping of the human thalamus. Computers & Biomedical Res. 10:9-24, 1977.

TSANG D. and MARTIN J.B.: Effect of hypothalamic hormones on the concentration of adenosine 3', 5'-monophosphate in incubated rat pineal glands. Life Sciences 19:911-918, 1976.

VANASSE M., BEDARD P. and ANDERMANN F.: Shuddering attacks in children: an early clinical manifestation of essential tremor. Neurology 26(11):1027-1030, 1976.

WILBER J.F., MONTOYA E., GENDRICH R., PLOTNIKOFF N.P., WHITE W.F., RENAUD L. and MARTIN J.B.: Gonadotropin-releasing hormone and thyrotropin-releasing hormone: distribution and effects in the central nervous system. *Recent Progress in Hormone Research*, RO Greep, ed. New York, Academic Press 42(4), 1976, pp. 117-159.

WILLOUGHBY J.O., MARTIN J.B., BRAZEAU P.B. and RENAUD L.P.: Pulsatile growth hormone: failure to demonstrate a correlation to sleep phases in the rat. Endocrinology 98:593-598, 1976.

WILLOUGHBY J.O. and MARTIN J.B.: Episodic GH secretion: evidence for a hypothalamic dopaminergic mechanism. International Symposium on Hypothalamus and Endocrine Functions Quebec 75. In: *Hypothalamus and Endocrine Functions*, F. Labrie, J. Meites and G. Pelletier, eds. New York, Plenum Press, 1976, pp. 303-320.

WILLOUGHBY J.O., TERRY L.C., BRAZEAU P and MARTIN J.B.: Hypothalamic deafferentation: effects on pulsatile anterior pituitary (AP) hormone secretion. Sixth Annual Meeting of the Society for Neuroscience, 1976, p. 686.

WOLFE L.S., ROSTWOROWSKI K. and PAPPIUS H.M.: The endogenous biosynthesis of prostaglandins by brain tissue *in vitro*. Can. J. Biochem. 54:629-640, 1976.

WOLFE L.S., PAPPIUS H.M. and MARION J.: The biosynthesis of prostaglandins by brain tissue *in vitro*, B. Samuelsson and R. Paoletti, eds. New York, Raven Press 1, 1976, pp. 345-355.

WOLFE L.S.: Prostaglandins and synaptic transmission. In: *Basic Neurochemistry*. G.J. Siegel, R.W. Albers, R. Katzman and B.W Agranoff, eds. Boston, Little, Brown 13, 1976, pp. 263-275.

WOLFE L.S. and NG YING KIN N.M.K.: Storage and excretion of oligosaccharides and glycopeptides in the gangliosidoses. In: *Current Trends in Sphingolipidoses and Allied Disorders*, B.W. Volk and L. Schneck, eds. New York, Plenum Press, 1976, pp. 15-29.

WOLFE L.S., ROSTWOROWSKI K. and MARION J.: Endogenous formation of the prostaglandin endoperoxide metabolite, thromboxane B_2 by brain tissue. Biochem. Biophys. Res. Commun. 70:907-913, 1976.

WOLFE L.S., NG YING KIN N.M.K., BAKER R.R., CARPENTER S. and ANDERMANN F.: Identification of retinoyl complexes as the autofluorescent component of the neuronal storage material in Batten's disease. Science 195:1360-1362, 1977.

WOLFE L.S.: Prostaglandins and the nervous system. In: *Prostaglandins and Therapeutics* (Guidelines to Medical Sciences Series), D.K. Silver, ed. Kalamazoo, The Upjohn Co. 3(1), 1977 p. 2.

YAMAMOTO Y.L., THOMPSON C.J., MEYER E. and FEINDEL W.: Dynamic positron emission tomography for study of cerebral hemodynamics in a cross-section of the head using positron emitting Gallium-68-EDTA and Krypton-77 J. of Computer Assisted Tomography 1:43-56, 1977.

YAMAMOTO Y.L., SOEJIMA T., MEYER E. and FEINDEL W.: Early hemodynamic changes at the microcirculatory level following focal cryogenic injury over the cortex. In: *Dynamics of Brain Edema*, H. Pappius and W. Feindel, eds. Heidelberg, Springer-Verlag, II(1), 1976, pp 59-62.

YAMAMOTO Y.L., THOMPSON C.J. and MEYER E.: Evaluation of positron emission tomography for study of cerebral hemodynamics in a cross-section of the head using positron emitting Gallium-68-EDTA and Krypton-77. J. Nucl. Med. 17:546, 1976 (Abstr.).

YAMAMOTO Y.L., THOMPSON C.J., MEYER E. and FEINDEL W.: Dynamic positron emission tomography for study of cross-section cerebral hemodynamics in humans. Can. J. Neurol. Sci. 3:144, 1976 (Abstr.).

YOUNG S.N., LAL S., FELDMULLER F., SOURKES T.L., FORD R.M., KIELLY M. and MARTIN J.B.: Parallel variation of ventricular CSF tryptophan and free serum tryptophan in man. J. Neurol. Neurosurg. Psychiatr. 39:61-65, 1976.

YUFE R., KARPATI G. and CARPENTER S.: Cardiac myxoma: a diagnostic challenge for the neurologist. Neurology 26:1060-1065, 1976.

MONTREAL NEUROLOGICAL HOSPITAL

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

BALANCE SHEET AS AT MARCH 31, 1977

GENERAL FUND

	March 31 1977	December 31 1975
ASSETS		
Cash	$ 21,329	$ —
Accounts receivable — less provision for doubtful accounts	578,462	540,768
Due from The Quebec Department of Social Affairs Operating grants	1,519,146	714,246
Inventory of supplies at cost	136,929	160,546
	$2,255,866	$1,415,560
LIABILITIES		
Bank indebtedness	$ —	$ 36,865
Bank loan	384,777	513,397
Accounts payable and accrued liabilities	211,670	79,099
Due to plant fund	6,611	—
Due to Royal Institution for the Advancement of Learning		
— Current account	1,720,569	636,088
— Advances to cover prior years' deficit	11,797	11,906
Capital (deficit) — Note 1	(79,558)	138,205
	$2,255,866	$1,415,560

PLANT FUND

ASSETS			
Cash		$ 19,745	$ 18,433
Short term investments		615,000	—
Due from The Quebec Department of Social Affairs		—	93,536
Due from general fund		6,611	—
Advance to Royal Institution for the Advancement of Learning — construction project		1,509,240	484,204
Fixed assets, at cost			
Equipment	$2,063,474		
Less: Accumulated depreciation	884,904	1,178,570	1,271,974
		$3,329,166	$1,868,147
LIABILITIES			
Bank loan		$ —	$ 60,502
Unexpended balance of special equipment grant for construction project		382,267	—
Due to Royal Institution for the Advancement of Learning		5,863	111,969
Restricted funds — construction project		1,744,200	423,702
Capital		1,196,836	1,271,974
		$3,329,166	$1,868,147

STATEMENT OF OPERATIONS
FOR THE FIFTEEN MONTH PERIOD ENDED MARCH 31, 1977

	Fifteen months ended March 31 1977	Twelve months ended December 31 1975
INCOME		
Quebec Department of Social Affairs (Note 1)	$ 8,652,400	$5,360,411
Revenue from patients	2,501,336	1,721,858
Other income	21,901	26,916
	11,175,637	7,109,185
EXPENSES		
Salaries and wages	8,307,275	5,036,720
Fringe benefits	571,630	302,313
Drugs, medical and surgical supplies	426,821	358,909
Services and supplies	2,087,783	1,468,897
	11,393,509	7,166,839
Deficit for the period	$ 217,872	$ 57,654

STATEMENT OF GENERAL FUND CAPITAL
FOR THE FIFTEEN MONTH PERIOD ENDED MARCH 31, 1977

	Fifteen months ended March 31 1977	Twelve months ended December 31 1975
Capital at beginning of the period	$ 138,205	$ 141,518
Add		
Settlement from the Quebec Department of Social Affairs on account of prior periods	—	52,566
Payment from the Quebec Department of Social Affairs on account of retroactive salary adjustments	861,487	1,615
Adjustment of prior periods' deficit	109	160
	999,801	195,859
Deduct		
Salary adjustments retroactive to prior periods	861,487	—
Deficit for the period	217,872	57,654
Capital (deficit) at end of the period (Note 1)	$(79,558)	$ 138,205

STATEMENT OF PLANT FUND CAPITAL
FOR THE FIFTEEN MONTH PERIOD ENDED MARCH 31, 1977

	Fifteen months ended March 31 1977	Twelve months ended December 31 1975
Capital at beginning of the period	$ 1,271,974	$1,281,631
Increase in plant capital	85,470	124,018
	1,357,444	1,405,649
Less: Depreciation on equipment	160,608	133,675
Capital at end of the period	$ 1,196,836	$1,271,974

NOTES TO FINANCIAL STATEMENTS
MARCH 31, 1977

1. *Quebec Department of Social Affairs*
   Income includes payments from the Government of Quebec to the extent of the amounts approved to May 6, 1977 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 $497,676 at March 31, 1977. These sickness benefits are payable when an employee terminates his services and are expensed at that time.

   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.

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

3. *Change of year end*
   In accordance with the directives of the Quebec Department of Social Affairs the Hospital changed its year end from December 31 to March 31.

AUDITORS' REPORT

To the Board of Directors,
Montreal Neurological Hospital.

We have examined the balance sheet of the Montreal Neurological Hospital as at March 31, 1977 and the statements of operations, general fund capital and plant fund capital for the fifteen month period then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Hospital as at March 31, 1977 and the results of its operations for the fifteen month period then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Montreal, Quebec,
June 10, 1977.

TOUCHE ROSS & CO.
Chartered Accountants.

MONTREAL NEUROLOGICAL INSTITUTE
RESEARCH AND TEACHING EXPENDITURE SUMMARY
FOR THE FIFTEEN MONTH PERIOD ENDED MARCH 31st, 1977

1. Budgeted Expenditures from MNI Endowment Funds (includes contribution of MNI Funds for Departmental Teaching of $472,285)	$ 867,681	
2. Expenditures from Donations and Special Funds of MNI	1,051,421	
3. External Grants for Research and Fellowship	429,531	2,348,633
4. Salaries paid to the Department of Neurology and Neurosurgery from General University Funds for Teaching Services:		
4.1 Geographic Full Time Staff (formerly QHIS Hospital Component)	175,523	
4.2 Teaching provided to other departments (radiology, pathology, biochemistry and anatomy)	46,520	222,043
		$2,570,676

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. Sheramata
— Dr. A. Sherwin
— Dr. L. Wolfe
— Dr. L. Yamamoto

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

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

Multiple Sclerosis Society of Canada
— Dr. J.B.R. Cosgrove — Dr. W Sheramata

DONATIONS TO SPECIALS FUNDS — 1976-77

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

Mr. Jacques Boulais	100.00
Estate of the late Mr. Frederick Dalton Drake	3,000.00
Dr. William H. Feindel	200.00
Miss Mildred Flynn	100.00
Reverend Charles H. Foote	200.00
Mrs. Opal Holst	100.00
Jenkes Charitable Memorial Fund	903.65
Mr. John Langdon	500.00
Miss Margaret F.M. Morris	2,000.00
Mr. Hugh G. Seybold	100.00
Mrs. Mary Smith	2,765.15
In Memory of the late Mrs. Jean Abrahams	15.00
In Memory of the late Dr. Albert Bertrand (balance from 1975-76)	45.00
In Memory of the late Miss Gail Budd	20.00
In Memory of the late Miss Estelle Marchand	25.00
In Memory of the late Mrs. Eileen Williams	40.00

COSGROVE RESEARCH FUND

Mrs. Joan E. Bourne	10,000.00
Miss Colette Brossard	10.00
Mr. Stephen D. Cantlie	1,000.00
Champoux et Associés Inc.	100.00
Mr. René Champoux	100.00
Mrs. Joan Harrington	50.00
Mr. J.A. de Lalanne	400.00
Mr. Alain Sansregret	1,000.00
Mr. Ernest John Saykaly	2,500.00
Mr. Richard Shatilla	4,000.00
Mr. and Mrs. George Troutman	50.00
In Memory of the late Mr. Joseph Holzel	10.00

ENDOCRINE RESEARCH FUND	
ST. Nicholas Men's Club	$2,500.00
In Memory of the late Mrs. Saidie Bornstein	15.00
In Memory of the late Mr. Joe Canner	15.00
In Memory of the late Mr. Joe Nadler	866.47
In Memory of the late Mr. Hy Shell	15.00
GORDON LIBRARY FUND	
HARVEY CUSHING CLINICAL RELIEF FUND	
Anonymous	5.00
Mrs. J. Binnie	25.00
Mr. Leo Hearty	25.00
In His Name Society	25.00
Mrs. Lillian Sandler	60.00
Auxiliary of the Royal Victoria Hospital	1,000.00
HOSPITAL EQUIPMENT FUND	
Canadian Pacific (Public Relations and Advertising)	105.00
Mr. and Mrs. William Stall	10.00
Auxiliary of the Royal Victoria Hospital	332.00
MARY MASSABKY FOUNDATION RESEARCH FUND	2,000.00
MARY MASSABKY SCHOLARSHIP FUND	
A.G.M. Limited	5,000.00
M.N.I. BUILDING FUND	
In Memory of the late Mrs. Elizabeth Papineau	65.00
In Memory of the late Mr. Ross Ogilvie	25.00
M.N.I. NEUROSURGICAL RESEARCH FUND	
Mr. and Mrs. Alan H. Parkin	100.00
M.N.I. PARKINSON'S DISEASE FUND	
In Memory of the late Mrs. Lucienne Charlebois	14.00
M.N.I. STAFF LOAN FUND	
MULTIPLE SCLEROSIS CLINICAL RELIEF FUND	
Employees of the Montreal Neurological Hospital	$ 369,20
Mrs. Edith Green	700.00
Montreal Association for Multiple Sclerosis	1,000.00
MULTIPLE SCLEROSIS RESEARCH FUND	
Mr. Monroe Abbey	18.00
Champlain Ambulance Services Registered	200.00
Mrs. Goldie Gurlevitch	25.00
Miss Hilda Holzel	50.00
Mr. Roland Leveille	100.00
Montreal Association for Multiple Sclerosis	5,000.00
Mrs. Phyllis Roseman	650.00
In Memory of the late Mr. Robert Béloir	60.00
McNAUGHTON NEUROANATOMY RESEARCH FUND	
Anonymous	60.00

Mr. William Lynn	100.00
Mr. Edouard Norsworthy	300.00
Miss Barbara Duncan	20.00
Mr. Robert Wiele	25.00
Mr. J. Wilcox	100.00
In Memory of the late Dr. W. Penfield	15.00
In Memory of the late Mr. Sidney M. Ross	25.00
In Memory of the late Mr. Paul Vauthier	65.00

NEUROGENETICS RESEARCH FUND

Association Canadienne de l'Ataxie	11,500.00

NEUROLOGICAL RESEARCH FUND

J.W. McConnell Foundation Inc.	5,000.00
Steyning Foundation	3,000.00
Mrs. Hazel Sutherland	10.00
Employees of the Teleglobe Canada Power Station	22.00
In Honour of the 60th Wedding Anniversary of Mr. and Mrs. Ben Greenblatt	65.00
In Memory of the late Mr. Alan Campbell	517.65
In Memory of the late Mr. Alexander Campbell	25.00
In Memory of the late Mrs. Emile Charlebois	10.00
In Memory of the late Miss Louise Cohen	25.00
In Memory of the late Mr. J.H. Dionne	25.00
In Memory of the late Mr. Arthur Evans	35.00
In Memory of the late Mr. Albert Franklin	67.00
In Memory of the late Mr. Louis-Philippe Gagnon	257.00
In Memory of the late Mr. Pierre Godbout	29.00
In Memory of the late Mr. Edouard Grenier	25.00
In Memory of the late Mr. D.T. Jefferson	10.00
In Memory of the late Mrs. Oscar Knebel	245.00
In Memory of the late Mrs. Viola Matthews	20.00
In Memory of the late Mrs. Beatrice Nettleship	22.00
In Memory of the late Mr. Jules Noiseux	20.00
In Memory of the late Mr. Ross Graham Ogilvie	641.00
In Memory of the late Mrs. Elizabeth Papineau	295.00
In Memory of the late Miss Diane Pietroniro	450.00
In Memory of the late Mr. Fabien Racine	25.00
In Memory of the late Mr. E.H. Smith	5.00
In Memory of the late Mr. Frederick L. Tadgell	294.00
In Memory of the late Mr. A. Terni	10.00
In Memory of the late Mrs. A.E.D. Treman	25.00
In Memory of the late Mr. Paul Vauthier	260.00
In Memory of the late Mr. Clifford Ward	57.00
In Memory of the late Mrs. Eileen Williams	65.00
In Memory of the late Mrs. Stella Zdaniak	230.00

NEUROPHYSIOLOGY RESEARCH FUND

NEURORADIOLOGY RESEARCH AND TEACHING FUND

NURSING FUNDS

EILEEN C. FLANAGAN NURSING BURSARY FUND

M.N.I. NURSING EDUCATION FUND	
Auxiliary, R.V.H.	1,223.00
PENFIELD EQUIPMENT FUND	
M.N.I. Nurses	710.50
OAKLAWN FOUNDATION FELLOWSHIP FUND	
PENFIELD AWARD FUND	
WILDER PENFIELD MEMORIAL RESEARCH FUND	
In Memory of the late Dr. Wilder Graves Penfield	3,806.50
ZELDA AND LEO POSMAN RESEARCH FUND	
Mrs. Ettie Astroff	9.00
Mr. Maurice Gillick	100.00
Mr. Sam Guttman	75.00
Kristee Construction Corporation	50.00
Libby and Joe Kronick	36.00
National Furs Limited	100.00
Dr. W.P Schach	100.00
Mr. Bernard Shapiro	1,000.00
Mr. and Mrs. David Usheroff	50.00
Mrs. Joan Usheroff	25.00
In Memory of the late Mrs. Annie Posman	300.00
In Memory of the late Mrs. Bosca Tecla	25.00
REITMAN RESEARCH FUND	
Mr. Cyril Reitman and Family	5,000.00
REUBEN RABINOVITCH MEMORIAL FUND	
REUBEN RAVINOVITCH MEMORIAL LIBRARY FUND	
Dr. Donald L. Lloyd-Smith	293.11
LEWIS REFORD FELLOWS' FUND	
SHERWIN RESEARCH FUND	
Mr. Henry Garber	100.00
Mrs. Fay Fraid Rosenfeld	1,000.00
Mr. Joe Rubin	1,000.00
Mr. Didier Terkel	200.00
In Memory of his late wife, Mrs. Lillian Sheila Presner	200.00
SPECIAL PROJECT FUNDS:	
EPILEPSY FOLLOW-UP AND RESEARCH PROJECT	
Savoy Foundation	40,000.00
STROKE RESEARCH	
Anonymous	80,000.00
SPINAL CORD RESEARCH FUND	
Anonymous	5,000.00
In Memory of the late Mrs. Fred W. Scotcher	250.00

THOMAS WILLIS FUND

H.L. TEUBER NEUROPSYCHOLOGY RESEARCH FUND	
Dr. Marilyn Gotman	$ 60.00
Dr. Brenda Milner	250.00
Mr. Laughlin B. Taylor	300.00
AUXILIARY, R.V.H. Total of items listed above	2,555.00

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 Montreal 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.

CLASSIFICATION OF OPERATIONS
FOR FIFTEEN MONTH PERIOD ENDED MARCH 31, 1977

Craniotomy and Craniectomy		
and biopsy	6	
and decompression	11	
and drainage of abscess	1	
and excision of abscess	1	
and drainage of subdural haematoma	21	
and drainage of intracerebral haematoma	9	
and drainage of extradural haematoma	4	
and elevation depressed skull fracture	4	
and excision of epileptogenic focus (lobectomy)	97	
and excision of epileptogenic focus (hemispherectomy)	2	
and excision, clipping or wrapping of aneurysm	36	
and exploration	2	
and hypophysectomy for pituitary or intrasellar tumour	2	
and hypophysectomy (transphenoidal) for pituitary or intrasellar tumour	28	
and plastic repair of dura (CSF, rhinorrhea or fistula)	4	
and plastic repair of skull defect (plate, bone or plastic)	7	
and removal of arteriovenous malformation	11	
and cerebral vascular bypass and anastomosis	5	
and removal of posterior fossa tumour	19	
and removal of cerebral tumour	69	
and correction Chiari malformation (plugging of central canal)	1	
and orbital roof decompression of optic nerve	1	
and trigeminal rhizotomy — temporal	1	
and trigeminal rhizotomy — suboccipital	1	343
Trepanation		
and biopsy	4	
and drainage of epidural, subdural, intracerebral space	19	
and drainage of abscess	1	
and placement of electrodes	2	
and insertion ventricular catheter or drain	4	30
Shunt Procedure		
and lumbar subarachnoid peritoneal	4	
and ventricular caval	46	
and ventricular peritoneal	3	
and ventriculocisternostomy (Torkildsen's)	1	
and replacement or revision of shunt	4	58
Stereotaxic Procedures		
and placement of electrodes	5	
and ventriculography, PEG, angiography (localization)	8	
and second stage	8	
and biopsy or drainage of cyst	1	22
Laminectomy and Hemilaminectomy		
and anterolateral cordotomy — thoracic	3	
and anterolateral cordotomy — lumbar	1	
decompression or exploration of spinal cord for spondylosis (dentate ligament section)	26	
decompression or exploration of spinal cord (trauma)	4	
decompression or exploration of spinal cord tumour or vascular malformation	4	
discoidectomy — lumbosacral	73	

discoidectomy — thoracic	2	
discoidectomy — cervical	4	
incision and drainage of abscess	1	
incision and drainage of intramedullary cyst (syringomyelia)	7	
repair of meningocele, CSF leak, dural graft	1	
removal of tumour — intramedullary	3	
removal of tumour — extramedullary, intradural	8	
removal of extradural tumour — metastatic, bone, etc.	13	
rhizotomy	6	
spinal fusion with bone graft — autogenous or bone bank	21	
spinal fusion with Harrington rods and autogenous or other graft	1	
spinal fusion with wire or plate or surgical simplex	8	
spinal fusion — cervical — occipital	2	
spinal fusion, anterior approach, spinal trauma	2	
discoidectomy — anterior approach — cervical, Cloward procedure	28	
discoidectomy — anterior approach — cervical	3	
discoidectomy — anterior approach — cervical without arthrodesis	4	225
Nerve Explorations		
avulsion or section	11	
excision of neuroma	1	
neurolysis, transplantation or decompression or exploration	66	
anastomosis or suture	1	
excision of nerve tumour	1	80
Artery Exploration		
endarterectomy (Patch graft)	15	
ligation	1	
progressive occlusion (Selverstone clamp)	3	
thermocoagulation of gasserian ganglion	36	
ligation or biopsy superficial temporal artery	1	56
Wound Re-opening		
evacuation of haematoma	7	
further removal of tumour	1	
resuturing	1	9
Miscellaneous		
miscellaneous	26	
nerve blocks	196*	
suture of laceration or wound	1	
tracheostomy	23	
radio frequency trigeminal rhizotomy	4	
muscle biopsy	129	183
TOTAL number of theatre cases		1006
Radiological Procedures		
Cerebral angiography — percutaneous, carotid, vertebral or subclavian	103	
catheterization (brachial, femoral or carotid)	496	
pneumograms under anaesthesia	217	
selective arterial embolization	1	817

*Not included in final count

CLASSIFICATION OF DISEASES

(1) Period — January 1 to March 31, 1976
(2) Year — April 1 to March 31, 1977

	(1)		(2)	
NERVOUS SYSTEM GENERALLY				
Multiple sclerosis	18		67	
Motor neurone disease	—		29	
Friedreich's ataxia	2		1	
Tuberous sclerosis	—		7	
Miscellaneous	2	22	7	111
Meninges				
Meningocele and myelomeningocele	—		1	
Acute purulent meningitis	3		13	
Subdural haematoma	7		27	
Subarachnoid haemorrhage	17		35	
Adhesive arachnoiditis	—		3	
Spinal arachnoiditis	1		1	
CSF rhinorrhea	2		2	
Miscellaneous	12	42	135	217
Brain				
Congenital anomalies	2		3	
Hydrocephalus	6		0	
Abscess	—		5	
Head injury (contusion, laceration, traumatic encephalopathy, concussion, skull fracture)	35		204	
Epilepsy	74		288	
Arnold-Chiari deformity	—		7	
Parkinsonism	8		16	
Intracerebral haemorrhage	6		31	
Intracerebral haematoma	3		12	
Alzheimer's disease	2		10	
Thrombosis, encephalopathy due to arteriosclerosis	23		103	
Cysts	1		10	
Aneurysm	5		12	
Encephalitis	—		8	
Sturge-Weber syndrome	—		2	
Arteriovenous malformation	8		10	
Miscellaneous	19	192	103	854
Tumours				
Astrocytoma	13		14	
Craniopharyngioma	2		3	
Schwannoma	1		3	
Neuroma	—		3	
Chromophobe adenoma of pituitary	8		22	
Gliomas	7		22	
Sarcoma	1		1	
Metastatic carcinoma	1		54	
Hodgkin's disease	—		1	
Brain tumour suspected	6		13	
Hemangioblastoma	—		1	
Angioma	—		2	
Medulloblastoma	1		3	
Glioblastoma multiforme	9		32	
Oligodendroglioma	—		5	

Lipoma	—		2	
Meningioma	12		28	
Chordoma	—		1	
Miscellaneous	3	64	23	233
Spinal Cord				
Contusion of spinal cord	—		1	
Compression of spinal cord	—		2	
Guillain-Barré syndrome	3		8	
Myelopathy	2		34	
Syringomyelia	2		7	
Hydromyelia	—		2	
Diastematomyelia	—		1	
Spinocerebellar degeneration suspected	1		1	
Spinal stenosis	—		12	
Spastic paraplegia	1		1	
Miscellaneous	11	20	70	139
Cranial and Peripheral Nerves				
Cubital tunnel syndrome	10		—	
Trigeminal neuralgia	17		30	
Optic neuritis	1		—	
Ulnar neuropathy	2		23	
Other neuralgias	1		8	
Carpal tunnel syndrome	—		37	
Peripheral neuropathy	2		9	
Neuritis	—		1	
Occipital neuralgia	1		4	
Hemifacial spasm	2		5	
6th nerve palsy	—		2	
Oculomotor paresis	—		2	
Meralgia paresthetica	1		1	
Miscellaneous	13	50	36	158
Muscles				
Myasthenia gravis	4		13	
Muscular dystrophy	2		8	
Myopathy	2		3	
Spasmodic torticollis	—		7	
Muscular atrophy	2		6	
Huntington's chorea	—		1	
Myalgia of undetermined origin	—		5	
Charcot-Marie tooth disease	—		5	
Miscellaneous	3	13	16	64
Mental Disease				
Mental retardation	—		6	
Depression	2		7	
Anxiety state	—		6	
Conversion hysteria	3		8	
Schizophrenia	1		1	
Behaviour disorder	2		2	
Learning disorder	1		—	
Chronic alcoholism	—		7	
Miscellaneous	1	10	1	38
Other Systems				
Protrusion disc — lumbar	21		63	
Protrusion disc — cervical	10		23	
Fracture and/or dislocation vertebral column	8		34	

Back pain	9		31	
Pain miscellaneous	1		29	
Gunshot wounds	2		2	
Rheumatoid arthritis	—		1	
Coronary insufficiency	—		6	
Hypoglycemia	—		1	
Diabetes mellitus	—		3	
Hypertension	3		1	
CNS disease	1		1	
Osteoarthritis	—		1	
Hypothyroidism	—		1	
Miscellaneous	15	70	52	249

CAUSES OF DEATH

Head injury (concussion, contusion, haematoma	1		14	
Intracranial aneurysm (haemorrhage, haematoma due to aneurysm)	6		34	
Cerebrovascular disease (thrombosis, infarction, haemorrhage)	1		10	
Intracranial tumour, primary	1		16	
Intracranial tumour, metastatic	—		5	
Cardiac arrest	7		14	
Other systems	8	24	20	113