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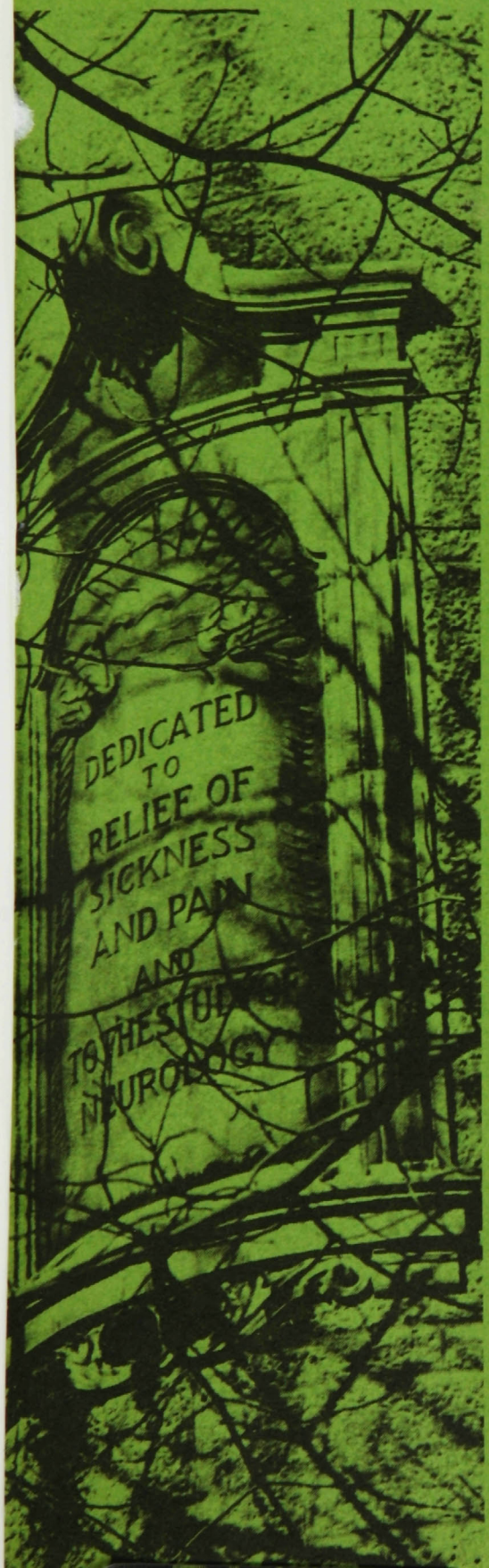
[TOM JEVAS]

h Annual Report

ONTREAL NEUROLOGICAL INSTITUTE
ONTREAL NEUROLOGICAL HOSPITAL



and the

DEPARTMENT

of

NEUROLOGY

and

NEUROSURGERY

of

McGill University

1973-74

39th Annual Report

MONTREAL NEUROLOGICAL INSTITUTE
MONTREAL NEUROLOGICAL HOSPITAL

and the

DEPARTMENT of NEUROLOGY

and NEUROSURGERY

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Contents

EDITORIAL NOTE

We are all indebted to those who have provided the excellent reviews of our past year's activities. I wish again to thank Mrs. Rose Slapack, our editorial secretary, as well as Mrs. Joy Shannon and Dr. K.A.C. Elliott who contributed much editorial help and advice.

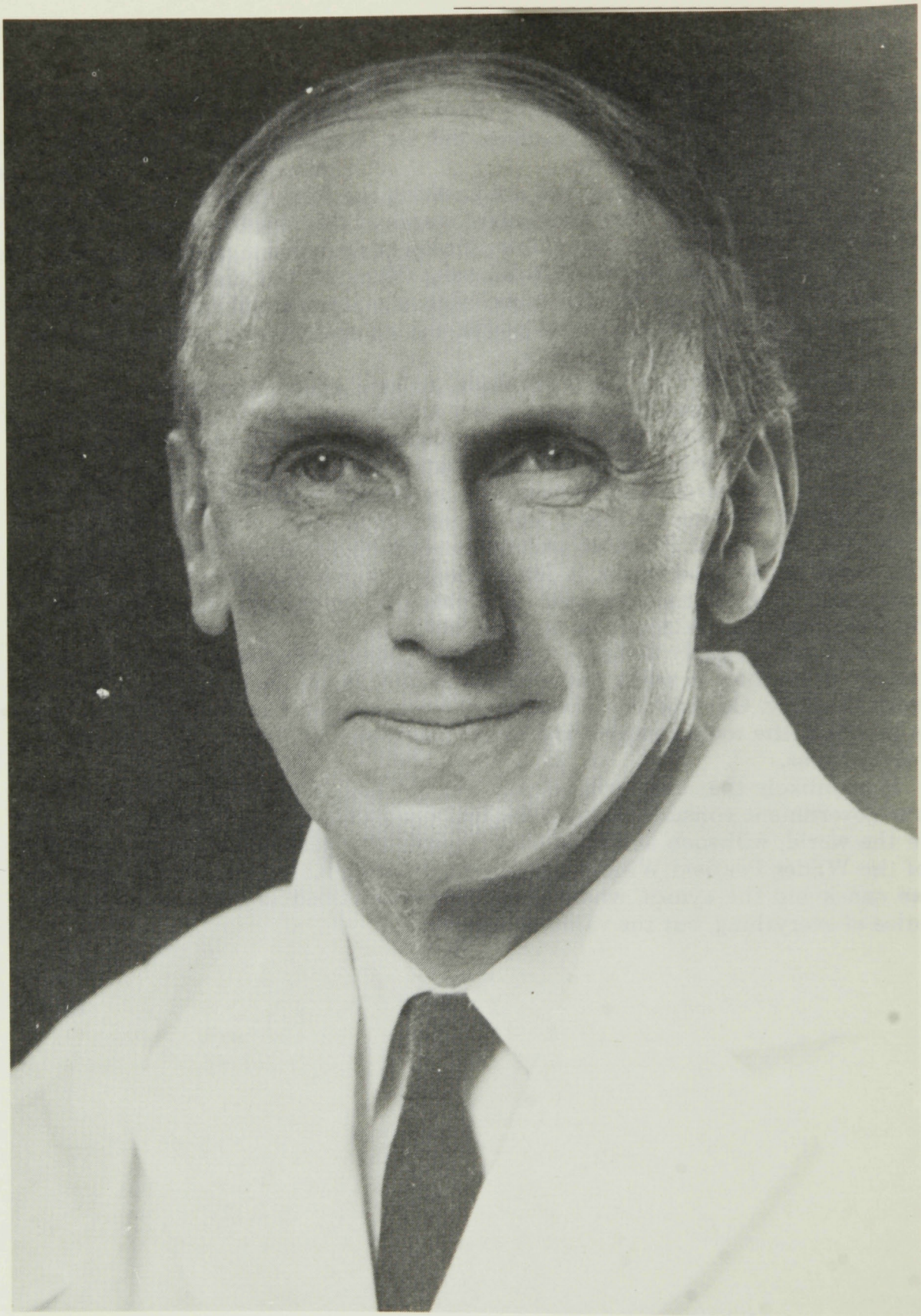
As this report goes to print, we are entering the fortieth year since the foundation of the Institute. The preliminary stages of this third phase of growth are underway on the east side. We did not intend our expansion program to coincide with the preparations for the 1976 Summer Olympics, but that in fact seems to be happening. The race against rising costs of materials and manpower that we are engaged in now will no doubt match any competition we may see here during those few frenetic weeks in 1976.

From the roof deck on the ninth floor, up here against the mountain, we can see out over this great city, many, many millions of dollars' worth of construction underway – novel sports palaces, towering market-places, multi-tiered apartments, magnificent money houses, stately and some rather unstately pleasure domes (Concordia and Discordia) – as though a modern Kublai Khan had gone berserk. Viewing all this, I feel almost embarrassed about our own modest claim for this small Hospital and brain research Institute, known throughout the world for its good works. A few millions now, carefully spent, can ensure its continuing contributions to human welfare and to the scientific reputation of McGill, Quebec and Canada in world neurology.

Our target is simply stated – we must use the best brains available to examine the brain, how it works and why sometimes, as disease affects it, it does not work properly. Our task, on the other hand, is immense, since the human brain is probably the most complex and surely the most important living structure in our universe.

It is unlikely that costs will get any less. We are, therefore, most hopeful that our government consultants, representing one of the most prosperous countries in the world, will soon accept our total project for renovation and the addition of the Wilder Penfield Wing, without emasculating it. We are hopeful, too, that we can avoid the cynics, whom Oscar Wilde described as those who know the price of everything, but the value of nothing.

W.F.
Editor



DR. FRANCIS L. McNAUGHTON
EMERITUS PROFESSOR OF NEUROLOGY,
McGILL UNIVERSITY

Report of the Director

DR. WILLIAM FEINDEL

This 39th Annual Report, contributed by members of our staff, reviews our work for the calendar year 1973 in regard to the Montreal Neurological Institute and the Montreal Neurological Hospital, and for the academic year 1973-74 in regard to the teaching Department of Neurology and Neurosurgery of the Faculty of Medicine of McGill University.

The Montreal Neurological Institute of McGill University was opened in 1934, as a hospital of 50 beds, combined with a brain research centre. From the beginning, by the terms of reference of the initial donations, the budgets for the clinical activities of the hospital and the research activities of the Institute were kept separate. This provided a secure base for our continuing program of research, despite at times desperate needs of the hospital. In 1953, with the addition of the McConnell Wing, the hospital expanded to 135 beds. In 1963, it was incorporated as a separate institution called the Montreal Neurological Hospital. Under Bill 65 and its subsequent regulations and directives, the Hospital is wholely financed through a global budget submitted to the Department of Social Affairs by the Board of Directors of the Hospital. The Hospital is one of the four McGill University teaching hospitals. It is unique in that the building in which the functions of the Hospital are carried out is owned by the University. The building is popularly referred to as the Montreal Neurological Institute or "the Neuro".

The budget of the Montreal Neurological Institute is maintained from endowments (two-thirds) and by outside research grants (one-third). It is submitted separately by the Director of the Institute to the Principal for approval by the Board of Governors of McGill University. The cost of operating most of the laboratories and support services is shared on a percentage basis between the Hospital and Institute with the agreement of the Department of Social Affairs. These ratios, established 10 years ago, were reviewed during the past twelve months. The revised figures were submitted to the Government for approval so that services provided by certain laboratories for the Hospital are more adequately reimbursed.

Now that the Montreal Neurological Hospital, under its own act of incorporation and under Bill 65, has become firmly identified as a separate institution, there is need for more formal recognition of the Montreal Neurological Institute. A start has already been made by inviting distinguished scientists from McGill and elsewhere to form a Neurosciences Advisory Council. Over the years, since the founding of the Institute, the Principal and certain members of the Board of Governors, have closely supported the affairs of the Institute. Our major endowment funds, listed in the financial statement of the Institute, originated from extraordinarily generous gifts. The Director of the Institute has the clear responsibility to the donors or their executors and heirs, to ensure that

these funds support research activities for which they were originally intended. They are not used to relieve the responsibility of the Government for the operation of the Neurological Hospital.

Nor, on the other hand, should the Institute's research funds be considered as a means of relieving the responsibility of the Faculty of Medicine in regard to teaching activities in the academic Department of Neurology and Neurosurgery. Originally this teaching department was a fiscal orphan. Teaching at the medical school in the basic neurosciences and in clinical neurology and neurosurgery, was carried out by the staff of the Neurological Institute in order to bring this important subject to medical students and to develop post-graduate residency training programs. In time, the other McGill teaching hospitals took on an increasing role in neurological teaching. For this, they fortunately have had some support from the budget of the Faculty of Medicine. But this has not been the case at the Neuro. We have recently estimated that one-quarter of a million dollars, almost half of the total annual income from the Institute's research endowment funds, is encumbered within our budget for teaching as contrasted to research. Twenty years ago, we had little choice but to take the responsibility for the teaching of neurology, neurosurgery and neurosciences in the McGill Medical School with expectation of little financial support. But in recent years, with increasing recognition by the Government of the operating costs of the Medical School, the budget of the Faculty of Medicine has grown to exceed seven million dollars. We appreciate the efforts already initiated by Dean Cronin and Vice-Principal Frost to ensure that the activities of our teaching Department of Neurology and Neurosurgery will be increasingly supported from the Faculty budget, rather than from Institute research funds.

In our three areas of responsibility – clinical, research and teaching – we have four serious financial problems.

1. We have suffered, as have all medical research centres in Canada, from the levelling off of the total budget of the Medical Research Council of Canada over the past few years. New grant applications have been refused, certain continuing research projects have been notified of termination and research that has received worldwide recognition for its excellence, has been cut back. Since one-third of the Institute's research budget derives from MRC funds, the overall effect on our research pattern is serious.

2. We have also been faced with the common problems of inflation, increases in research salaries and increases in the cost of materials and equipment.

3. With the persistent reduction in stockmarket values over the past two years, we have faced a decreasing annual income from our endowment funds.

4. In 1967, after serious deliberation the staff of the Institute and Hospital, with the approval of the University, made a decision to have the present building brought up-to-date and to add a new wing to provide for

a firm future development of our activities. Because of escalation of costs, the generous donations for the new building and renovations, made to supply matching funds for Government grants, are now under great strain. But, despite these difficulties, we believe that this project must go forward. The alternative would be to lose the scientific and clinical momentum which has been built up here over the past forty years and to become a second rate establishment.

The Wilder Penfield Wing

As a precursor to our major addition of a new nine storey wing, the frame structure of the field house has been demolished and construction of three levels at the rear of the present building has begun. The basement of the field house will be kept for workshops for our maintenance crew. The three new levels will provide for improved supply and storage, for a pleasant room to replace the nurses' lounge in the basement and to provide, for the first time, a properly designed radio-active isotope diagnostic laboratory.

Our building project, after approval by McGill University, received recognition from the Provincial Government by Order-in-Council 69-4048 in December 1969. In April 1970, Mr. Claude Castonguay suspended all planning and construction of hospitals throughout the Province pending review of overall needs within the Department of Social Affairs. It was two and a half years later, November 1972, that we re-opened our planning with Monsieur Claude Forget and his team from the Section of Finance of the Ministry of Social Affairs. Last August a more fortunate number, 73-3031, gave us an Order-in-Council for 1.5 million dollars to effect the more urgent renovations now in progress. In the interval the original plans were completely revised and recosted. Despite the increase in estimates, we are still in a position to contribute substantially towards the cost of this project which has been listed for major support from the Federal Health Resources Fund and the Province of Quebec. Generous donations have come from friends in Montreal and from many parts of Canada, indicating what I believe is a general feeling, that the important work of this Institute and Hospital must be continued so that we can serve not only Montreal and Quebec, but provide a standard of excellence at an international level. The Board of Directors of the Hospital and the Board of Governors of McGill University have approved the recommendation that this new addition be named the Wilder Penfield Wing, as a fitting tribute to Dr. Penfield's world famous contributions to science, to medicine and to education.

Staff

Among the honours for the staff during the past year, and there have been a number, we compliment Dr. Brenda Milner for an award for distinguished scientific contributions from the American Psychological Association in recognition of her outstanding psychological studies of the human brain.

Dr. McNaughton received the distinction of Emeritus Professor of Neurology at the McGill University Convocation of the Health Sciences on May 29. Dr. McNaughton, perhaps best described as a neurologist's neurologist, is a modest man with nothing at all to be modest about. A devoted and beloved teacher, a splendid clinician, an excellent musician and a lover of painting, we all rejoice at his new honour and wish him well. I am particularly grateful to him for agreeing to be a special assistant in some of the many facets of the Director's work here at the Institute.

Dr. Penfield has just completed for publication a fascinating synthesis of his many contributions to our knowledge of the human brain which he has entitled "The Mystery of the mind" – an excellent record in itself of a human mind and brain in action.

Dr. Rasmussen, in addition to his busy neurosurgical activities, has been the main contributor of a number of chapters to a volume on "The Surgical Treatment of Epilepsy" sponsored by the National Institute of Neurological Diseases and Stroke at Bethesda. The majority of the authors in this extensive survey are graduates of the Institute and thus provide a remarkable record of the solid foundation which Dr. Penfield gave to this special field of neurosurgery.

Dr. Robb's forays into northern Canada to investigate the state of neurological disorders among the native population are of great importance. The spell of this astonishing country has been described to us by Dr. Robb.

Our distinguished Neuro-anaesthetist, Dr. Richard Gilbert, will step down as Head of the Department in the Hospital after long and devoted service. The Board of Directors has confirmed the appointement of Dr. Davy Trop to succeed Dr. Gilbert. Dr. Trop has shouldered, with Dr. Gilbert, much of the responsibility for this very busy department over the past four years, and at the same time has managed to keep up his active research work in respiratory physiology. We look forward to the continuing strength of this widely known department. At the same time we are sorry to lose Dr. Lisa Wilkinson who has been attracted to the sunshine of Phoenix, Arizona as Head of the Department of Neuro-anaesthesia at the Barrow Neurological Institute. She has agreed, on Dean Cronin's suggestion, to consider this a leave of absence.

Miss Joy Hackwell has announced her resignation as Director of Nursing in order to return to McGill University to take graduate studies. We see her go with mixed feelings – sadness that she is leaving the Hospital where, over the past four years, she has brought so much in the way of new ideas and approaches, but at the same time pleased that she will be strengthening her talents as an expert administrator. I have no hesitation in predicting that Miss Hackwell will go on to an outstanding career in her chosen field of administrative nursing.

Dr. K.A.C. Elliott, after his interesting duties in Nigeria, has returned to the McGill scene and will be giving us the advantage of his experience in research and writing on the new Editorial Committee of the Institute.

I should note that in February, I was invited to be a member of the Council for Science Policy which is advisory to the Cabinet of the Quebec Government. This Council represents academic, industrial and sociological research areas in the Province and has been given a mandate to define areas of strength and weaknesses in these important fields. I have also been elected President of the Medico-Chirurgical Society which dates back to 1847. There is no record of the President having previously been a neurologist or neurosurgeon, and it is perhaps time we were represented.

I am sorry to announce the death, in May of last year, shortly following our previous Annual Meeting, of Dr. Harold Elliott, the distinguished neurosurgeon. Dr. Elliott was a McGill graduate, who had outstanding service with Number One Canadian General Hospital from 1940-1946. He took a keen interest in the prevention of traffic accidents, research on Parkinson's disease and the rehabilitation of disabled veterans and patients with paraplegia. These efforts marked him as a neurosurgeon with an outstanding social conscience who helped many thousands of citizens.

It is with great regret, too, that we heard of the untimely death of Dr. Richard Lende, Professor of Neurosurgery at Albany, from an unexpected complication of a minor operation. Dick Lende was an excellent neurosurgeon, a strong investigator and his presence and contributions to neurosurgery will be greatly missed.

Computer Encephalography or EMI-scan

There must be very few of you now who do not know that we were the first centre in Canada to install the new device for brain diagnosis, known popularly as the EMI-scanner, after the company, Electrical and Musical Industries, who have produced it. This apparatus has proven its worth many times over. Obtained with an initial donation from the Webster Foundation and with the support of the Department of Social Affairs, we were able to avoid delay and put the device into operation in October of last year. The results have been remarkable. Over 1,000 examinations have now been completed and an exhibit prepared by Dr. Ethier and his staff, with the expert help of Mr. Charles Hodge and the photographic staff, has just been awarded first prize at the meeting of the Canadian Radiological Association. Many patients from Quebec and, indeed, from across Canada have already benefited from the detailed information which the scanner provides with safety and comfort for the patient. The First International Symposium on this topic was held at the Montreal Neurological Institute at the end of May.

Hospital

In Neuro-ophthalmology, Dr. Brian Younge has developed an active clinical teaching unit which fills an important gap in our Hospital function. This was developed in cooperation with the Neuro-ophthalmology Committee which included Dr. Sean Murphy of the Royal Victoria Hos-

pital, Dr. Sam Adams of the Montreal General Hospital, Dr. Bertram Cosgrove and myself from the Montreal Neurological Hospital. We congratulate Dr. Younge for the enthusiastic and impressive start which he has made in this new venture.

Mrs. Jean Wolfe and her students from the Urban Planning Department at McGill have initiated reviews of our hospital statistics in regard to patient referral. Some 60% of our patients come from the greater Montreal area, 20% from the rest of the Province of Quebec and 20% from outside the Province. These latter patients contributed more than a million dollars a year, or almost one-fifth of our total hospital budget. They provide in a sense an indication of the quality of work carried out at the Neuro and our special facilities for dealing with complex problems of the brain and nerves. Almost 50% of our patients are French-speaking.

As our Director of Finance noted, the grant to the Hospital by the City of Montreal, paid annually for the last 40 years, has now come to an end. This was intended to cover the costs of neurological care for Montreal patients before the advent of Hospital Insurance. We are grateful for this sustained support from the City.

The Institute

During 1973, the Institute received a bequest of the late George Maxwell Bell of Calgary. Some of this will be used towards the costs of the Penfield Wing and some will support a special brain research fund. Mr. Bell's death was a great loss to Canada and to McGill. He took a keen interest in the work of the Institute and developed warm friendships with many members of our Institute's staff.

The third Neurosciences Colloquium at Hovey Manor was held last fall on "Organization of the Hospital Services for Neurology and Neurosurgery in Relation to the University Department". The Colloquium was supported by a special grant to the Institute. We were pleased to have Dean Cronin and Dr. David Kinloch from the Department of Social Affairs to review problems of neurological and neurosurgical manpower with us.

The main lecture room was dedicated by Dr. Penfield as the Hughlings Jackson Amphitheatre during the year. Renovations were made possible by funds, requested by Dean Cronin from the University, in order to accommodate the increased number of medical students. Additional funds were provided from the Institute to improve the acoustics and air conditioning and to replace the hard seats, with the present comfortable seats.

Research

Most of you are aware of recent correspondence and discussions concerning the drastic cuts of Federal Government support for medical research. The problem of how much should be spent on medical research in Canada each year is obviously subject to the same difficult judgments which bear upon the question of how much is spent for military services, education or the arts. But one would hope that medical research can

claim certain humanitarian priorities, at least on a par with these and many other government responsibilities. In 1971, health care in Canada was estimated to cost just over five billion dollars. In the same period, sixty million dollars were spent on medical research, a proportion of 1.2%. The figures provided by industry, indicate that an actively growing business spends from 2 to 6% of its overall budget on research and development in order to survive. Surely the health industry would qualify as an area where the research and application of research has enormous potential. Examples are so obvious – insulin, penicillin, poliomyelitis vaccine and a host of other preparations, techniques and knowledge – without which the family doctor and the specialist alike would be helpless. At a 6% research and development contribution, the funding for medical research instead of being sixty million dollars, should be about three hundred million dollars per annum in Canada. We have seen no particular evidence in any of the arguments so far put forward by government surveys that this would be an unreasonable figure. Fiscal methods are now being brought to bear on our Hospital and University operations and it would seem sensible that we should have the same privilege of comparing our growth and development percentages with actively expanding business in terms of proper financial support. Most doctors welcome the government's insistence for support of preventive medicine. But one cannot talk of prevention of cancer until basic research establishes the cause. One cannot talk of prevention of epilepsy until we have further knowledge of the basic mechanism of the brain disturbance giving rise to epilepsy. These facts must be constantly emphasized to those who are in a position of responsibility for ensuring that resources are provided to make Canadian medical research second to none.

Acknowledgements

I wish to support the remarks of Mr. de Grandpré, the President of our Board of Directors of the Hospital, in thanking all the members of the Board, the first to be established under Bill 65, for their keen interest and help during the past year. In the midst of many changes, the Board provided an important factor of stability. I am particularly grateful to Mr. de Grandpré and to our Audit Committee, which included in addition, Mr. Colin Webster, Mr. Peter Leggat and Mrs. Shannon, for help in resolving some of our difficult financial problems. Mr. Thomas our Director Finance has met these with devotion and diligence.

I appreciate, too, the splendid cooperation that I have had as Chairman of the Department, from the staff here at the Montreal Neurological Hospital and those at the other McGill teaching hospitals. We are all pleased that Dr. Joseph Stratford is President, this year, of the Canadian Neurosurgical Society and of the Canadian Congress of Neurological Sciences which will be held at Saskatoon. Dr. Stratford and Dr. Baxter have recently moved into new teaching and consulting quarters and will have access also to the new facilities of the Montreal General Hospital Re-

search Institute. Dr. Donald Lawrence has been kept extremely busy during the past year in the clinical neurological service with the Montreal general group and organizing the coordinated course in Neurosciences twice during the same academic year to fit in with the new curriculum changes. Finally, it is a pleasure to report that we received this year a portrait of Mr. Jean de Grandpré, the third in the series of fine portraits painted by Mr. Lynn Buckham. We are grateful to Mr. Robert Scrivener, Chairman of the Board of Bell Canada, for arranging a generous grant which made it possible for the Institute and Hospital to acquire this portrait.

In the year ahead we will be celebrating our fortieth anniversary. It seems fitting that we rededicate our efforts to increase our financial support from endowments, by proper recognition of our role as a research centre, and by realistic budget allotment from the Faculty of Medicine to cover our teaching activities. With the strong support of the staff of the Hospital, the Institute and the teaching department which has been evident during this past year, I am assured that we will continue to make firm progress toward these goals.

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RICHARD G.B. GILBERT, M.B., B.S. (London), F.R.C.P. (C), F.F.A.R.C.S., F.A.C.A., C.S.P.Q.

Associate Anaesthetist
DAVY TROP, M.A., M.D. (Ghent), M.Sc., F.R.C.P. (C), C.S.P.Q.

Assistant Anaesthetists
JENNIFER A. BARNES, M.B., Ch.B. (St. Andrew's), C.S.P.Q.
LUIS F. CUADRADO, M.D. (Valladolid), D.A.B.A., C.S.P.Q.
ELIZABETH WILKINSON, M.B., B.S. (London), F.F.A.R.C.S.

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

Associate Neurochemist
HANNA PAPPIUS, M.Sc., Ph.D.

Neuropathologist
GORDON MATHIESON, M.B., Ch.B. (Aberdeen), M.Sc., F.R.C.P. (C)*

Associate Neuropathologist
STIRLING CARPENTER, A.B. (Princeton), M.D. (Temple)

Neuroanatomist
DONALD G. LAWRENCE, B.Sc. (Bishop's), M.D., C.M.

Neuro-ophthalmologist
BRIAN R. YOUNGE, M.D. (Alberta), F.R.C.S. (C)

Neuropsychologist and Medical Research Council Associate
BRENDA MILNER, Ph.D., Sc.D. (Cantab.)

Associate Neuropsychologist
LAUGHLIN TAYLOR, B.Ed. (Alberta), M.Sc.

Clinical Assistants, Neuropsychology
MARY KAY AJERSCH, M.A. (Western Ont.)
ENDA McGOVERN, B.A., Dip. Psych. (Univ. Coll., Dublin)

Clinical Psychologist
CLARA STRAUSS, M.A.

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

* on sabbatical leave

MONTREAL NEUROLOGICAL HOSPITAL

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

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

Consulting Neurologists..... André Barbeau, B.A., B.P.C.B., M.D. F.R.C.P.(C)
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Guy Courtois, B.A., M.D., M.Sc., F.R.C.P.(C)
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Charles Olanow, M.D., F.R.C.P.(C)

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William Tatlow, M.D., M.R.C.P., F.R.C.P.(C)
Danica Venecek, M.D.
Gordon Watters, B.A., M.D.

Honorary Consulting Neurosurgeon..... Jean Sirois, B.A., M.D.

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

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

ADMINISTRATIVE STAFF OF THE MONTREAL NEUROLOGICAL HOSPITAL

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

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Admitting	Mrs. M. Bernard
Dieticians	Miss S. McDonagh (resigned Mar. 1974)
	Mrs. Oresta Podgurny (Apr. 1974)
Employee Health Service	Mrs. J. Mallory, R.N.
Librarian	Mrs. M. Boski, B.A., B.L.S.

Medical Records ..... Mrs. M. Duffie
Publications ..... Mrs. R. Slapack
Services (Oxygen & Inhalation) ..... Mr. Wilfred Garneau

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Director of Nursing ..... Miss C. Joy Hackwell, R.N., B.N.
Assistant Director of Nursing (days) ..... Miss Irene MacMillan, R.N., B.A., (M.Sc. App.)
Assistant Director of Nursing (nights) ... Miss Elizabeth Barrowman, R.N.
Nursing Supervisors (nights) ..... Miss Lillian McAuley, R.N.
Mrs. Margaret Smeaton, R.N.
Nursing Supervisors (evenings) ..... Mrs. Barbara Petrin, R.N.
Miss Cecilia Largo, R.N., B.Sc.
Nursing Supervisors (days) ..... Miss Annie Johnson, R.N.
Miss Anne Carney, R.N., B.N.
Assistant Director of Nursing Education ..... Miss Helena Kryk, R.N., B.N.
Coordinator of Inservice Education Department ..... Miss Geraldine Hart, R.N., B.N.
Clinical Instructor ..... Miss Elizabeth Roll, R.N., B.N.
Operating Room Supervisor ..... Miss Norma Isaacs, R.N., B.N.
V.O.N. ..... Mrs. Françoise Vanderland, R.N., B.N.

HEAD NURSES

Miss Mary Cavanaugh, R.N.
Miss Lucy Dalicandro, R.N.
Miss Marion Everett, R.N.
Miss Patricia Furlong, R.N.°
Mrs. Georgette Jotic, R.N.°
Miss Delta MacDonald, R.N.
Miss Noelene McGuire, R.N.
Miss Ursula Steiner, R.N.
Mrs. Winsome Wason, R.N.

THE WOMEN'S AUXILIARY OF THE ROYAL VICTORIA HOSPITAL

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Chairman, M.N.H. Coffee Shop Committee ..... Mrs. T.A. Somerville
Director of Volunteers ..... Mrs. Jean Little

CLERGY

Father Nicholas Andreou ..... *Greek Orthodox*
Rabbi Mordechai Glick ..... *Jewish*
Reverend Father F.X. Johnson, S.J. ..... *Roman Catholic*
Reverend Father E. Messier, S.J. ..... *Roman Catholic*
Reverend S.M. McDowell ..... *United*
Reverend Lionel Temple-Hill ..... *Anglican*

°Operating Room

RESIDENT STAFF – JULY 1973 THROUGH JUNE 1974

Senior Neurosurgical Resident..... Patrick Murray, M.D.
(Royal Coll. Surg., Dublin)

NEUROLOGICAL SERVICES

Residents : 6 mos. on this service

A. Bellavance, M.D. (Montréal) (1 yr.)
A. Gagnon, M.D. (Laval)
Y. Lapierre, M.D. (Montréal)
A. Larbrisseau, M.D. (Montréal)
J. Rubin, M.D. (McGill)
Y. Vaillancourt, M.D. (McGill)

Assistant Residents : 6 mos. on this service

J. Allen, M.D. (Harvard)
P. Clément, M.D. (Ottawa)
S. Johnson, M.D. (Michigan)
R. Jones, M.D. (Northwestern)
L.-H. Lebrun, M.D. (Montréal)
W. Neely, M.D. (Louiseville)
J. Rubin, M.D. (McGill)
C. Sacks, M.D. (Lausanne)

Royal Victoria Hospital Residents :

J. Brunton, M.D. (1 mo.)
R. Hyatt-Williams, M.D. (5 mos.)
R. Jones, M.D. (4 mos.)
Y. Lapierre, M.D. (1 mo.)
C. Sacks, M.D. (1 mo.)

RVH Rotators :

M. Booth, M.D.
J. Borak, M.D.
W. Ellis, M.D.
E. Espinosa, M.D.
K. Flegel, M.D.
R. Horwitz, M.D.
S. Lavoie, M.D.
L. Noel, M.D.
H. Pushie, M.D.
C. Reynolds, M.D.
D. Shannon, M.D.
M. Shapiro, M.D.
C. Tanser, M.D.

Montreal General Hospital Residents : 6 mos. on this service

M.L. D'Amour, M.D. (Montréal)
G. Moriarity, M.D. (Case Western Res.)
A. Perez de Leon, M.D. (Santiago de Compostela, Spain) (EMG.)
J. Romine, M.D. (Arkansas) (Lab.)
A. Rhi-Sausi, M.D. (Nuevo Leon, Mexico) (EMG.)

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

S. Johnson, M.D.
G. Moriarity, M.D.
L. Terry, M.D. (Marquette)

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

E. Bass, M.D. (McGill)
I. Leppik, M.D. (Pennsylvania)

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

J. Allen, M.D.
J. Dawlings, M.D. (British Columbia)
G. Fortin, M.D. (Montréal)
Y. Lapierre, M.D.
A. Rhi-Sausi, M.D.
A. Trottier, M.D. (Ottawa)
Y. Vaillancourt, M.D.

Jewish General Hospital Residents : 6 mos. on this service

E. Bass, M.D.
L.-H. Lebrun, M.D.

NEUROSURGICAL SERVICES

Residents : 6 mos. on this service

A. Drake, M.D. (Chicago)
E. Kuchner, M.D. (Chicago) (3 mos.)
J. Musgrave, M.D. (Queen's Belfast)
H. Ortegon, M.D. (Mexico) (3 mos.)
H. Tutt, M.D. (North Carolina)

Assistant Residents : 6 mos. on this service

N. Behar, M.D. (Med. School, Istanbul)
H. Blume, M.D. (Wayne State)
T. Hardy, M.D. (Howard)
W. Neely, M.D.
M. Pennink, M.D. (Amsterdam)
J. St. John, M.D. (Wayne State)
J.G. Villemure, M.D. (Laval)

RVH Rotators :

B. Backman, M.D.
L. Guam, M.D.
V. Smart-Abbey, M.D.

Montreal General Hospital Residents : 6 mos. on this service

J. Epps, M.D. (Howard)
A. Ginde, M.D. (Bombay)

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

J. Epps, M.D.
T. Hardy, M.D.
W. Neely, M.D.
H. Ortegon, M.D.
J. G. Villemure, M.D.

Montreal Children's Hospital Residents :

A. Ginde, M.D. (5 mos.)
E, Kuchner, M.D. (3 mos.)
J. Musgrave, M.D. (1 mo.)
H. Ortegon, M.D. (3 mos.)

Neurological Research :

C. Melmed, M.D. (Manitoba)
C. Sacks, M.D.

Cone Laboratory for Neurosurgical Research :

Leon Ravvin, M.D. (McGill)

University of Montreal Rotator in Neuropathology :

François Paquin, M.D. (4 mos.)

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

Class from September 3, 1973 to February 25, 1974

Bates, Miss Dianne
Dever, Miss Mary Paula
Fishbourne, Miss Candace
Grant, Miss Louise M.
Gray, Miss Wendy
Haines, Miss Judith A.
Krajewski, Miss Barbara
Lepage, Miss Raymonde
Murphy, Miss Kathleen
Nieuwendijk, Miss Petronelle
Powell, Miss Marilyn
Robinson, Miss Janice E.
Roddick, Miss Laura Elizabeth
Therien, Miss Ginette
Thorp, Miss Sandra L.

Class from March 4 to August 23, 1974

Clavette, Mr. Marc
Duff, Miss Anne C.
Fisher, Miss Emma M.
Hanlon, Miss Kathryn
Huybers, Miss Margaret
Smith, Miss Norma
Spence, Miss Inez
Wolfe, Miss Patricia
Wong, Miss Cindy

MONTREAL NEUROLOGICAL INSTITUTE AND McGILL UNIVERSITY TEACHING STAFF

Department of Neurology and Neurosurgery, Faculty of Medicine

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

Professor, Neurochemistry ..... Leonhard Wolfe
Associate Professor, Neurochemistry ..... Hanna Pappius
Associate Professor, Neuroradiology ..... Roméo Ethier
Assistant Professor, Neuroradiology ..... Denis Melançon
Lecturer, Neuroradiology ..... Garry Bélanger
Professor, Anaesthesia ..... Richard Gilbert
Associate Professor, Anaesthesia ..... Davy Trop
Assistant Professor, Anaesthesia ..... Elizabeth Wilkinson
Lecturer, Anaesthesia ..... Luis F. Cuadrado
Associate Professors, Neuropathology ..... Stirling Carpenter
Gordon Mathieson
Professor, Neuropsychology ..... Brenda Milner
Lecturer, Neuropsychology ..... Laughlin Taylor
Lecturer, Clinical Psychology ..... Clara Strauss
Associate Professor, Neuroanatomy ..... Donald G. Lawrence
Assistant Professor, Neuroanatomy ..... Allan Morton
Lecturer, Neuroanatomy ..... Charles Olanow
Lecturer, Neuro-ophthalmology ..... Brian R. Younge

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

Professor Pierre Gloor

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Gilles Bertrand, M.D.
Roméo Ethier, M.D.
Pierre Gloor, M.D.
Francis McNaughton, M.D.
Gordon Mathieson, M.D.
Preston Robb, M.D.
Leonhard Wolfe, M.D.
Mrs. Joy. M. Shannon, *Secretary*

EXECUTIVE STAFF OF THE MONTREAL NEUROLOGICAL INSTITUTE

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

Front Row : Drs. P. Robb, F. McNaughton, Miss J. Hackwell, Drs. W. Penfield, W. Nauta (Hughlings Jackson Lecturer), Mr. J. de Grandpré, Q.C., Drs. W. Feindel, R. Bell (Principal and Vice-Chancellor) Miss C. Griffin, Dr. P. Gloor, Mrs. J. Shannon, Drs. R. Ethier, T. Rasmussen, G. Bertrand.

Second Row : Drs. D. Melançon, I. Heller, F. Andermann, L. Wolfe, C. Dila, J. Cosgrove, B. Graham, R. Hansebout, H. Pappius, A. Eisen, G. Karpati, S. Carpenter, Mrs. C. Strauss, Dr. R. Jones.

Third Row : Drs. A. Bellavance, H. Blume, P. Bourgeau, Miss L. Dansky, Drs. C. Sacks, N. Schaul, Mr. L. Taylor, Drs. A. Olivier, I. Woods, S. Prelavić, A. Sherwin.

Fourth Row : Drs. P. Murray, J.-G. Villemure, M. Pennink, A. Larbrisseau, E. Andermann, I. Leppik, L. Quesney, Y. Vaillancourt, A. Wilkins, Mr. G. Ball, Dr. E. Kratzenburg, Mrs. M. Ajerseh.

Fifth Row : Drs. J. St. John, J. Musgrave, S. Taylor, Mrs. M. Boski, Mrs. M. Bernard, Mr. G. Thomas, Miss G. Jaccarino, Miss M. Jones, Mr. E. McGovern, Miss S. Colby.

Top Row : Drs. N. Behar, T. Hardy, W. Neely, D. Galloway, L. Ravvin, E. Kuchner, Messrs. J. Ives, C. Thompson, J. Gotman, J. Marion, Drs. Y. Ng, M. Moscovitch.

Front row : Miss D. MacDonald, Miss G. Hart, Miss J. Hackwell, Miss I. MacMillan, Miss A. Carney, Mrs. J. Mallory ;
Second row : Mrs. L. Gorman, Miss L. Carswell, Miss J. Blenkhorn, Miss J. Fryer, Miss S. Paterson, Miss S. Shepherd, Miss C. Kay.
Third row : Mrs. S. Rentschler, Miss R. Rodriguez, Mrs. S. Panicker, Mrs. M. Thomas, Miss L. Dalicandro, Miss M. Everett, Mrs. Y. Rupp, Mrs. H. Bakerman ;
Back row : Miss M. Wilkinson, Miss A. Higgins, Miss M. Songcharoen, Mrs. S. Lee, Miss N. Hendry, Miss H. Orr, Miss J. Ruse.

Neurology

PRESTON ROBB, M.D.

This is the report for 1973 on clinical neurology in the Montreal Neurological Hospital and on teaching and research activities on neurology in 1973-74 in the Montreal Neurological Institute. If one were to search the corridors of the building, one would have a hard time defining what is the hospital and what is the Institute. Similarly, it is difficult to divide the works of the neurology group, as they are inseparably integrated in the total program.

Clinical Services

We continue to operate three ward services, each with its special interest. Drs. Robb, Andermann, and Eisen man the "A" team, Drs. Cosgrove, Karpati, Graham, and Dr. McNaughton the "B" team, and Drs. Heller, Sherwin, and Woods the "C" team. We have had an excellent resident staff who have contributed much to maintaining a high standard of patient care. The major problems have not changed. The main one is the length of patient stay. The average stay for all patients in the hospital was 19.9 days. It is not known what the stay was for neurology patients alone. I cannot help but compliment the E.E.G. and X-Ray Departments for the speed with which they examine our patients. Nevertheless, it still takes too long to investigate a patient, and often much too long before a decision is made and a discharge plan devised. The placement of the chronically ill is an increasingly serious problem, and is reflected in the length of time that sick people have to await their turn to get into the hospital. It makes no sense that there are 30 or more long-stay patients all the time in an acute hospital such as this. One patient has been in the hospital since December 1971 and another since May 1972.

During 1973 there were 1130 admissions to the neurology services. Although we did not always succeed, we endeavoured to keep about the same number of patients on each service.

A variety of disorders continue to be investigated. New muscle diseases are being discovered. The treatment of epilepsy and serum levels of anticonvulsants continue to be of major interest. Telemetered E.E.G. recordings as a means of measuring effectiveness of anticonvulsants are being actively studied. New work is being done in the demyelinating and degenerative disorders. Headaches are being studied with renewed interest.

The immediate aim is better to understand nervous and muscular systems in health and disease, and how they respond to medication. The ultimate aim, of course, is to prevent, to cure or to alleviate.

The Royal Victoria Hospital has completely reorganized the outpatient department. The polyclinics have done away with the old neurology clinics and we now have clinics operating morning and afternoon

every day of the week. These are manned by a staff neurologist and a resident. The epilepsy clinic continues to operate as a separate group. Resident support for this clinic is from the laboratory services rather than the ward services. From our point of view it has worked well and we are grateful to Dr. Gloor and Dr. Carpenter for their forbearance. The polyclinics are a significant step forward in providing a more dignified type of patient care, but they are not without problems. The appointment system has not yet been satisfactorily organized ; many patients fail to appear, and neurologists are left waiting with little to do. Hopefully the staff will bear with the system until the problems can be ironed out. The emergency service in the neurology offices continues to operate ; the polyclinics, however, have reduced the demand.

The waiting time for patients to be seen in the offices is too long. If this is an indication of the demand for the services of a neurologist then clearly we need more neurologists. The waiting time for out-patient x-rays and E.E.G.'s also constitutes a serious problem. In order to circumvent this, patients may be admitted so that all of the tests may be done in a short time. There is obviously a need for a day diagnostic centre where patients can come during the day for investigation and return home. We await our new addition to the building when some of these problems can be solved and, I suppose, replaced by others ! We continue to provide a neurology consultation service for the emergency department and the wards of the R.V.H. A senior resident provides this coverage as well as participating in the teaching of medical students and residents.

Research

Dr. Gloor and Dr. Wolfe will report on the research activities of our team. As part of a university teaching and training program, it is essential that we have men skilled in the various subdisciplines that make up neurology. Last year I reviewed our various research programs. Now I would refer to a deficiency. For some time I have felt we should be doing more about cerebrovascular disease. We are all delighted with the appointment of Dr. Maurice McGregor as Physician-in-Chief to the Royal Victoria Hospital. It is my sincere hope, that with his help, a cooperative project between the R.V.H. and the M.N.H. can be launched. We are adding another neurologist to our staff whose main area of interest will be cerebrovascular disease. Dr. Feindel and Dr. Yamamoto have the facilities for basic circulatory studies, and the R.V.H. have a galaxy of physician scientists whose main interest is the circulatory system. We should be able to mount a productive program.

Teaching

There has been little change in the undergraduate teaching program during the past year. Dr. Donald Lawrence has gone far beyond the call of duty in setting up and coordinating the basic neurosciences course – not once, but twice. The change in the curriculum, moving the neuro-

sciences course to the first year, has required the repeat performance. We are not sure it is a good idea, but have done our best to cooperate. Dr. Sherwin has assumed control of the undergraduate teaching, and has worked particularly hard on the "Introduction to Clinical Science" course. We have had a fine group of elective students who have contributed to the program. Some of the papers they have prepared are excellent and augur well for their future.

I would be remiss if I did not point out that the teaching of clinical neurology at McGill is still not adequate. Hopefully, the new curriculum will improve the situation. The answer is not going to be in fancy new systems, but in getting students, patients, and teachers together for adequate periods.

The residents have worked well, and we are grateful for their help. Hopefully they have benefited as much as we have enjoyed having them. We are proud of the McGill Residency Training Program. It provides an opportunity for them to participate in different types of neurology as they rotate through the General, the Children's, the Jewish, and the Neurological Hospitals. The charting of their course through the system presents many problems. I am grateful for the understanding they have shown when they could not get exactly what they want.

We have just completed an experimental teaching project. Dr. Ralph Johnson, Senior Lecturer in the University of Glasgow and neurologist at the Institute of Neurological Sciences, has been with us for a month as visiting Professor. His special area of interest is the autonomic nervous system. He held teaching sessions at all the hospitals for residents, and gave the undergraduate teaching program at the R.V.H. Dr. Johnson is a gifted and enthusiastic teacher – and the whole project was a great success.

Mention should be made of special activities. In June, Dr. Cosgrove organized a very successful Research Seminar in Multiple Sclerosis which was held at the Institute. The many distinguished scientists who participated ensured its success.

Members of staff have continued to play a significant role in activities outside the Institute, such as the Canadian Neurological Society, the American Neurological Association, the Canadian Rehabilitation Society for the Disabled, the Muscular Dystrophy Association of Canada, and the National Institute for Neurological Diseases and Stroke.

An annual report is a time for reassessment. It should not be the work of one man, but of the whole team. The colloquium organized by Dr. Feindel and Mrs. Shannon has done much to meet this need. We should continue to look ahead and plan our research, teaching, and patient care programs.

To all of the team who have helped so much during the past year, I express my most sincere thanks.

Neurosurgery

DR. GILLES BERTRAND

During 1973, 955 patients were admitted directly to the neurosurgical services. This number does not include the patients transferred from neurology and does not reflect well the neurosurgeons work load. The number of operations is a better index. In 1973, there were 698. Of these, 251 were major craniotomies and 179 major laminectomies, essentially the same numbers as in the previous year.

There were only three operative infections, 0.4%, a remarkably low incidence which speaks well for the competence and vigilance of our operating room supervisor, Miss Norma Isaacs, and her excellent team of nurses, nursing aids and orderlies.

This low infection rate is certainly not attributable to a modern physical arrangement of our operating facilites. They are much more of a thoroughfare to the X-Ray Department than we would like to see and are in dire need of the serious upgrading for which we are at the moment making plans.

The secret for the extremely low incidence of infections probably lies in the painstaking, meticulous, often tedious attention to details at all stages of the process : before, during and after surgery and by all people involved in it : anaesthetists, residents, nursing staff as well as the surgeons themselves.

This explains why the surgeons are sometimes hesitant to abandon methods which have served their patients so well in favor of more streamlined techniques for fear they might cut across some important corner. We must, nevertheless, be ready to reappraise our methods constantly in the light of experience, changing circumstances and technical progress. As members of a teaching unit, we have a duty to our residents to provide them with an explanation and a good reason for everything we do and for the way we do it. This is sometimes more difficult than it seems. Our residents, headed by Dr. Pat Murray, Dr. Alan Drake and Dr. John Musgrave and their assistant-residents, to whom we are indebted so much for the tremendous share of the clinical work they accomplish daily, have been most helpful to the staff in this task of constant reappraisal of our clinical and teaching methods and we are most grateful to them for their comments, questions, suggestions, formal and informal, and for the stimulus they provide to better ourselves.

Neurosurgical staff activities :

Dr. Wilder Penfield was appointed Honorary Member of the Societas Neurologica et Psychiatrica Hungarica by Dr. Janos Tisovsky, Secretary of the Hungarian Embassy in Ottawa. He has also accepted Honorary Membership of the Dutch Society for Psychiatry.

Dr. Theodore Rasmussen was the invited speaker at the Hans Berger Centennial Symposium on Epilepsy in Edinburgh. He was also guest speaker at the Otfried Foerster Symposium on Cerebral Localization in Cologne. He continues as a member of the American Board of Neurological Surgeons and as consultant to the N.I.N.D.S. committee on Neural Sensory Prosthesis and on the Epilepsy advisory committee.

Dr. William Feindel was a guest lecturer to the Japanese Society of Neurosurgery in October and, early this year, to the Department of Neurosurgery of the University of Giessen. He was also appointed Anderson Goldwater visiting Professor at the Barrow Neurological Institute in Phoenix, Arizona. He is the vice-president of the Montreal Medico-Chirurgical Society.

Dr. Robert Hansebout was re-elected vice-president of the Association of Neurosurgeons of the Province of Quebec, he also continues as secretary-treasurer of the Montreal Neurological Society.

Drs. André Olivier and Carl Dila both received their diploma from the American Board of Neurological Surgery. We wish to congratulate them on this achievement together with Dr. Gonzalo Chong who joined the staff at the Jewish General Hospital and has been granted fellowship of the Royal College of Surgeons.

Dr. Gilles Bertrand was an invited speaker at the International Symposium on Stereotaxic Surgery in Tokyo and has been elected a member of the Council of the International Society for Stereotaxic and Functional Neurosurgery.

In 1957, Dr. Francis McNaughton, delivering the annual report of the neurologist-in-chief, commented that: "Arresting new developments in the clinical field do not come as often as we would like." This year, we have been more fortunate. The advent of computerized axial tomography, the EMI-SCAN, has indeed been an arresting new development which is already changing the pattern of investigation and treatment of neurosurgical patients. The complete safety and lack of unpleasant side-effects of this noninvasive technique of radiology has permitted the early diagnosis of many brain tumors. It is ideally suited to the investigation of the stroke patient, resolving the often puzzling differential diagnosis between brain hemorrhage and vascular occlusion. Hydrocephalus is also easily detected and its evolution followed during treatment without the necessity of repeated pneumoencephalograms or ventricular punctures.

These are only a few of the spectacular achievements of this remarkable instrument and we are grateful to Drs. Feindel and Ethier for their wisdom in foreseeing its tremendous potential and to the Webster family for the initial funds which allowed us to acquire it at an early date.

I would not want to end without saying something about a problem which, has become a cause of great concern to all the neurosurgeons in the Province.

The Ministry of Social Affairs has been making extensive studies of the delivery of health care in the hospitals with a view of reorganizing it in a planified more logical and, hopefully, more economical way.

Obstetrics and Gynaecology were in this way concentrated and, more recently, emergency services in the Montreal area have come under close scrutiny and will probably be reorganized in some way.

Last summer, a preliminary "working document" proposed a rather drastic reorganization of neurosurgical centers in Montreal. This document suggested reducing the number of centres from 13 or 14 to 6. Since then, a reappraisal of the situation has been made and The Association of Neurosurgeons hopes to have convinced the representatives of Government that there was no need for such sweeping changes. We have stressed the need for neurosurgery in centres where trauma and other emergency cases are handled, an aspect which had been somewhat neglected in this document. We have tried to define what constitutes quality of care, we have emphasized the fact that neurosurgery could not be planified alone, without neurology and without regard to the needs of the hospital centers already in existence at the moment, unevenly distributed as they may be.

Still, some rearrangement may occur : if this is done, it must provide for additional beds, equipment and facilities to meet the increased needs where patients and staff will be relocated and it must coincide with an overall reorganisation of the hospital facilities in the area and particularly of the emergency care centers. But, where quality of care is involved, there should be no compromise.

Graduate Studies and Research

DR. PIERRE GLOOR

Research at this Institute over the past year has continued to be vigorous and productive. Many advances have been made which will be reviewed in some detail in the individual reports of the various research laboratories. Although, from the point of view of continued productivity and creativity, the year has been a good one, we cannot but feel a sense of unease at the change in trend of governmental support of biomedical research. There seems to be less and less willingness on the part of the Government to adequately support medical research. We, at this Institute, have at this moment little cause to complain about this increasingly narrowing base of governmental support, since the cutbacks we have suffered in the recent past have been relatively modest, but should the present strictures remain unrelieved, research carried out at this Institute two or three years hence may be seriously jeopardized.

The difficulties medical research is facing today are caused by lack of understanding of its true rôle and importance in the frame of the overall health care delivery system which, of course, represents an increasingly

heavy load on the public purse. That governments wish to make economies in this area is understandable. I submit, however, that to make economies in the health field precisely in that segment for which the smallest amount of financial support has been allocated, namely medical research, makes little sense: the savings are trivial and the losses may be very great, because such a policy will destroy one of the pillars upon which good and economically sound health care rests: namely, quality. Medical research is important for understanding disease and its mechanism and from such understanding flows the potential for prevention, for rational and safe treatment,and for rehabilitation. An often unappreciated ancillary payoff of medical research derives from the fact that research is highly educational. It creates in its practitioners a discipline of the mind which makes them far better doctors than they otherwise would be and it is particularly important for those who instruct the future practitioners of medicine.

In terms of these principal functions of medical research, how well have we done during the past year ?

Much of our research has been concerned directly or indirectly with the search for better understanding of the causes and the mechanisms of disease processes. Let us just review a few of our contributions to this area : The causes and the mechanisms of epileptic seizures are still incompletely understood. Research in the neurophysiology and the neuropharmacology laboratories and in neurogenetics has contributed new significant knowledge to our understanding of the epilepsies. The work done in our psychology laboratories has clarified the impact of epileptic lesions on a variety of cognitive functions and memory. But much still needs to be done at the basic science level in neurophysiology, neuroanatomy, neurochemistry, in order to better understand the cause and the mechanism of the epilepsies. A number of laboratories in this Institute are actively involved in this search.

Neuromuscular disorders are crippling and often life-threatening conditions : team work embodying the convergence of various disciplines, histochemistry, electronmicroscopy, electromyography and neurochemistry has significantly advanced the knowledge and the prospects for effective treatment of some of these diseases.

The cause of multiple sclerosis, one of the most crippling of the neurological diseases, still remains an unsolved mystery. Much basic research in many disciplines is required to clarify the origin of this condition. Work in our neurological laboratories has focused on some of the immunological mechanisms which may be involved in the pathogenesis of this disorder.

Many neurological and neurosurgical conditions damage the brain through disturbances of the cerebral microcirculation or through the development of cerebral edema. To better understand these mechanisms and to recognize and measure their severity, a deeper knowledge of the physiology of cerebral circulation and of the neurochemistry of ischemic

brain disease and of cerebral edema is necessary. Work in the William Cone Laboratories for Neurosurgical Research and in neurochemistry has clarified some of these questions. Simultaneously, research in the neurophysiology laboratories has added new information regarding the disturbance of nerve cell function caused by cerebral edema. Increased knowledge in these areas is of fundamental importance for understanding the mechanism and evolution of many lesions affecting the brain and spinal cord. It is an essential prerequisite for devising better methods whereby the impact of lesions upon the functional integrity of the nervous system can be minimized.

Better knowledge of the causes and mechanisms of disease processes is the key to adequate prevention. The work in cerebral circulation and cerebral edema just referred to is, of course, very relevant in this context. In this area also, neurogenetic work carried out in conjunction with neurochemical and ultrastructural research has brought us a step closer to preventing many of the most depressing so-called degenerative diseases affecting infants and young children.

In the area of treatment, advances in the neuropharmacology of anticonvulsant drugs have provided us with powerful techniques whereby the treatment of epileptic seizures and the prevention of their occurrence can be put on a more rational and scientifically sound footing. Studies of the microcirculation of the brain have made it possible to devise better and safer surgical techniques for the treatment of large arteriovenous malformations of the brain. Methods of computer analysis of the EEG have been devised which hopefully will allow one to perform carotid endarterectomies in occlusive vascular disease of the neck with an increased margin of safety. The impressive work of our europsychologists has contributed to better patient selection and to a sharper definition of surgical risks in the operative treatment of focal epilepsies.

Good research is infectious : it should stimulate the interest of those with whom we work and whom we train, for it provides satisfaction, and carries with it the promise of improved patient care. I believe that our research has indeed been infectious : interest in graduate work has definitely been on the increase. We now have ten postgraduate students who are formally enrolled in the Faculty of Graduate Studies and Research and who work towards either an M.Sc. or Ph.D. degree in the Neurological Sciences. This has been the largest number in many years. These promising young people will in the future make significant contributions to the delivery of better health care in this or in other countries. The qualities nurtured by research have also proved infectious in our clinical work : the kind of understanding which we gain in the laboratory on the intricacies of the structure, the function, or the chemistry of the nervous system can be brought to the bedside and results in better clinical care.

Medical research, however, cannot be carried out without a certain critical mass of money and personnel resources. I would like to illustrate this with one example taken from our Institute activities. Four years ago, MRC awarded us a Major Equipment Grant for the purchase of a PDP-

12 computer. More importantly, MRC also provided some financial support for highly specialized manpower to run the computer laboratory. With the help of additional funds drawn from our own resources and from the Provincial Government, we were able to recruit a team of biomedical and computer engineers who have lent considerable muscle to our computer laboratory : we have achieved the critical mass for productive and successful research work. This alone made it possible to let our work in the computer laboratory branch out in many directions and to bring the computer not only to the laboratory bench, but to the bedside and into the operating room : stereotaxic surgery has become more precise and safer ; on-line measurement of cerebral blood flow in the laboratory and in the operating room is now possible with increased precision and efficiency ; the computer can be taught to recognize and store a record of seizure discharges obtained through a patient monitoring system which allows us to record the EEGs of some patients virtually uninterruptedly for several days, if need be, and to achieve better patient selection for surgical treatment ; the computer is capable of monitoring the functional integrity of the brain by means of an instant on-line EEG analysis in the operating room during carotid endarterectomies ; research into the clinical application of computer analysis of EEGs in order to improve accuracy and, hopefully, the efficiency of EEG reading has made great steps forward ; finally, the instrument has served one of its original purposes as a research tool in experimental neurophysiology. The computer is now so busy processing data every day of the week and often at nights and on weekends that new applications will have to fight for time allocation. Although this is a high priced operation, it is one that is paying off handsomely in increased knowledge and ultimately in better patient care and in decreased costs to the community. What is true for this particular example is true for all good medical research, including basic research, and we hope that this truth will become apparent to those in government who must decide on the priorities of where our health dollar goes.

Administration

MRS. J.M. SHANNON

To write an annual report, to review the activities of a year gone by, is a sobering exercise. Where did the time go ? What happened to those planned projects ? One does wish more could have been accomplished, but due to the efforts of all members of the hospital staff the credit side of the ledger is heartening.

I make no apologies for being proud of the building itself. The amphitheatre is considerably more cheerful and attractive than the one in which we met a year ago. The main corridor, stairwells, patient areas and many offices have had a "face-lift" thanks to our own carpenters and painters, who carry out my ideas and suggestions with great good humour and have contributed many of their own.

When I visit other hospitals I realize what a good job our housekeeping staff do, keeping this elderly building clean and tidy. Mr. Rochette, our Director of Auxiliary Services, has initiated training programmes in this area and we will continue to upgrade our services. It is impossible to overestimate the importance of this aspect of "patient care", both from the point of view of morale and as a contributing factor to our low infection rate. Our housekeeping staff are important members of our team and I appreciate their efforts.

The safety of our patients and staff is always uppermost in our minds and we have worked hard during the past year to establish the highest possible standards. Again, because of the age and design of the hospital, we can never relax our vigilance. I am indebted to Inspector Courcy of the City of Montreal Fire Department for his help in training our porters, orderlies and housekeeping staff and to Mr. Boisvert, the Safety Officer with the Montreal Joint Hospital Institute, for his advice and support. Mr. Heavysege, Director of Personnel, is our fire marshall, Mr. Rochette is his assistant and under their direction trained fire brigades will provide 24-hour a day, seven day a week protection. Any employee wearing insignia identifying him as a member of our fire brigade team is entitled to our respect and gratitude ; he has voluntarily agreed to spend time training and to put the welfare of our patients and his colleagues ahead of his own.

Bill 65 has occupied a considerable amount of time during the past year. Endless questionnaires must be filled in, statistics provided and documents read. On the other hand, it has been stimulating and rewarding to meet many members from the Department of Social Affairs who have visited the hospital, listened to our problems and have made an effort to learn about our unique role in the community as an ultra specialty hospital.

Last year I mentioned the Professionals' Advisory Council, a committee established by law. I said that I expected this group to make a

useful contribution ; I have not been disappointed. Under the capable, good-humoured leadership of Mr. Laughlin Taylor the Council has been active, imaginative and has submitted many constructive ideas. A seminar on the problems of communications within the hospital was enjoyable and provocative. It successfully pinpointed some problem areas and follow-up measures are underway. It has been a profitable experience to have Miss Joy Hackwell representing the Professionals' Advisory Council on our Board of Directors. Her concise, well thought out reports have ensured that our directors are knowledgeable regarding professional activities. Mr. Alfred Campbell has been a valuable liaison between the directors and the non-professional staff.

For 1973 occupancy was 86.0%, admissions 2,085, average length of stay 19.9 days, number of patient days 42,398. These figures are down very slightly from 1972. Statistics like financial statements are very impersonal. They in no way indicate the human effort necessary to produce them. The figures provided by Mr. Thomas do not tell the story of how hard he and his staff have worked to keep the hospital finances on an even keel. A cost of living bonus appearing in the budget does not show the many hours spent by Mr. Heavysege in order that our staff may receive it promptly. If you looked at the costs for items marked linen or housekeeping you would see that the line has been held or shows a decrease from last year. This is due to the efforts of Mr. Rochette. You would not know, however, of my many visits to his office when I have badgered him for more linen without spending more money ; when I have told him the floors must be washed more frequently, but he mustn't hire extra help. To his credit he always manages to look glad to see me ! Admission figures are impressive but they do not point out how Mrs. Bernard, our Admissions Officer, manages to juggle beds and to ensure an orderly flow of admissions and discharges. Occupancy and average length of stay in no way convey the devoted care involved by our nurses. Because I am concerned with all aspects of hospital activities, I am well aware of the achievements, the frustrations and the problems that take place " behind the scenes " and I am deeply grateful to everyone who makes these annual reports possible.

Financial Report

MR. GEOFFREY F. THOMAS

Last year, I enunciated the principles of global budgeting and invited all employees, as individuals, to examine the use being made of the available human and material resources with a view to reducing costs in each area. My role today is to provide an accounting of our collective stewardship.

In 1973, operating expenditures totalled $5,659,921, an increase of 15% over the preceding year. The shareable expenditure, subject to government review, amounted to $5,636,758. This is an increase of 4.5% over the approved budget of $5,391,499. Considering inflation, contractual salary increases and increased activities in certain areas, the increase over the budget appears justified. Offsetting income against expenditure, the shareable deficit amounted to $211,612, and this is being claimed from the Ministry of Social Affairs.

The major item of expense in hospitals is salaries and wages. Salaries and wages accounted for 73% of expenses compared with 69% in 1972; medical and surgical supplies accounted for 3% in 1973 and 2% in 1972; drugs remained at 2% while other supplies and expenses took 22% compared with 27% in 1972. Maybe the doctors should be complimented for exercising restraint in their drug orders and all employees for their assistance in reducing the requirements for other supplies and expenses.

Recently, the hospital received $301,957 in respect of the 1972 year-end-settlement and, providing the 1973 deficit is accepted by the Ministry, the accumulated deficit of the hospital will amount to $71,852.

The year 1973 was our second year's experience with global budgeting. The global budget, predicated on performance, attempts to measure the operating costs of each activity centre in relation to the volume of its work. The provision of statistical data by each department is essential because these statistics form the basis for decisions which management must make and provide data needed for the implementation and control of the budget process.

In 1973, the hospital admitted 2,085 patients who received 42,398 days of care, an occupancy rate of 86%, and discharged 2,072 patients whose average length of stay was 19.9 days.

The effect of length of stay on admission, patient days and costs, cannot be minimized and highlights the continuing need for alternate facilities to relieve this highly specialized institution of patients who do not require the particular care provided in this hospital.

I would like to express gratitude to the City of Montreal which has contributed an annual grant to the Hospital for the past 40 years. This grant has now been terminated and equivalent funds will be provided by the Ministry of Social Affairs. I also acknowledge my appreciation to members of the staff and the Board of Directors for their cooperation and support.

Nursing Department

MISS C. JOY HACKWELL

Several developments have taken place during the past year. I will, however, confine my remarks to a few of the highlights.

The Professionals' Advisory Council has been active during its first year, and I expect others will be making reference to it. I believe that the Nursing Department has made a significant contribution to the Council, and I would like to commend those who, in any way, have participated. Their responsible involvement has been most encouraging.

We are presently working with the Nursing Research Consultant of The Order of Nurses, on a project for the classification of patients in order to determine different care levels, for example, self-care, intermediate and high care. The next step is to determine the nursing staff required for the work load on each nursing unit. Our present method of determining staff based on patient days is of limited value since it does not indicate the amount of nursing care that each patient requires at any one time. The data collected will be helpful in preparing the annual budget requirements.

We are now initiating " the primary nurse concept " on 2 East for our staff nurses and are continuing to have our post-graduate students carry out this approach. This concept, I believe, facilitates the development of individual nurses to assume a professional level of responsibility in the nursing care of patients. A nurse takes total responsibility for planning and directing nursing care for a number of patients for the twenty-four hour period and ideally, where possible, from admission to discharge.

The post basic clinical program in neurological and neurosurgical nursing continues to attract nurses from all over the world. Despite additional subject matter and changes in methods of approach, the main objective of the clinical course is the improvement of patient care.

The abundance of learning facilities encourages students to assume responsibility for their own development. The exposure and involvement in various lectures, presentations and nursing projects enables them to select, combine and practice the newly acquired ideas and skills.

Our second year of recruiting C.E.G.E.P. and university graduate nurses has been most encouraging. We are expecting to employ twice the number of new graduates this year in comparison to 1973. Twenty-nine post-graduate students successfully completed our clinical course in 1973. Six of these remained as members of our nursing staff. Our nurses always enjoy working with young, enthusiastic graduates.

Two of our nurses, who have given many years of loyal and dedicated service to the hospital, retired this year. Miss Alice Cameron, who was Head Nurse on 4 South, retired at the end of the year following 27 years of service, and Mrs. Lilith Fletcher, Assistant Head Nurse, retired in

April having completed 20 years of service. We wish them both many years of health and happiness. They will be greatly missed.

The first recipient of the Eileen Flanagan Bursary is Miss Geraldine Fitzgerald, a staff nurse on 2 East. This has enabled Miss Fitzgerald to take a qualifying year to study towards the Bachelor of Nursing degree. We are looking forward to having her back with us on completion of her studies.

We greatly appreciate the generous donation to our Department from the Women's Auxiliary of the Royal Victoria Hospital. These funds have permitted us to purchase an audiovisual film strip series on fundamental concepts in nursing and nurse-patient interaction. We believe the series to be an excellent teaching tool and it will be well utilized by our Inservice Education Department.

On behalf of the entire nursing staff, I would like to thank all members of the hospital team for their support during the past year and express my warm appreciation to the nursing staff for their fine cooperation. I know that their objective is always to work towards excellence in the delivery of nursing care.

Social Service

Director..... Miss Cynthia Griffin, B.A., M.S.W., P.S.W.

Social Workers:

Miss Ann Chant, B.A., M.S.W., P.S.W.

Mrs. Saroj Gupta, B.A., M.S.W., P.S.W.

Mrs. Irena Liebich, B.A., M.S.W., P.S.W.

Miss Kathleen Macdonald, B.A., B.S.W., P.S.W.

Miss Noella Vaillancourt, B.A., M.S.S.

First, I want to express my appreciation to department staff (social workers and secretaries) for their help with this report and for their steadfastness in this anxiety-ridden period when communication has not kept pace with the rapid changes related to Chapter 48 of the Statutes of Quebec (Bill 65). The implications are clearer today than a year ago when all we knew was that hospital social services were to be integrated into a social service center.

This hospital has now expressed its intent to negotiate a contract for services with the Ville Marie Social Service Center formed last June predominantly of agencies servicing the non-Francophone population. It is of deep concern to hospital social workers that the Montreal region has three social service centers, not one, as in the other regions of the province. This is contrary to the philosophy of all of us in hospitals and to the spirit and the letter of the law which guarantees free choice for health services and social services with no distinction based on language, religion or ethnic origin.

One of the positive results of hospital social workers' apprehension, and even of our exclusion in the early days of planning for the centers has been the strengthening and recent incorporation of the provincial Association of Heads of Social Service in Hospitals. In Montreal, the regional association of social workers in health settings, representing over 40 hospitals, has worked as an increasingly cohesive unit. In our department, a seemingly exorbitant amount of time and effort has been spent on other than direct services to patients, at first by myself as head of the department but more recently involving all members through attending information meetings, exchanging viewpoints, serving on committees related to extended care, record keeping, statistics, and responding to numerous government and other surveys, all trying to determine both the needs of the patient group and the appropriate functions of social service in hospitals. If we do not want unwelcome policies and plans to be imposed upon us, it will be important to continue such participation in the interest of future services to patients and their families.

For each of the 13 statistics periods specified by the government, our department served an average of 230 patients (both inhospital and out), ranging from those seen by social workers only once to those with multiple personal and family problems related to illness with whom and for whom there were many contacts each month. Regardless of how statistics are kept, the ratio of Neurology to Neurosurgery, and in-patient to out, has varied only slightly, with the figure of Neurology out-patients four times that for in-patients on either Neurology or Neurosurgery. This reflects the continuing needs of large groups in Neurology such as multiple sclerosis and seizure patients and their frequently stress-ridden families. The fact that the Quebec Association for Epilepsy (Association du Québec pour l'Épilepsie) has no provision for English-speaking patients is one of the problems.

Our dilemma regarding problems of placement and home care continues. We know many patients remain far too long in this type of hospital, but we are also bombarded by frantic requests for help for out-patients and we, as social workers, can do so little at present. However, we shall continue to contribute to the government's awareness of the appalling gaps in resources and we look forward eagerly to implementation of their plan for eventual solutions.

After a lapse of several years, we enjoyed having McGill School of Social Work students again, but with a difference, in that for the first time they were following a Bachelor's rather than a Master's level course.

Two vital adjuncts to our department are the long hours of work by the unfailing R.V.H. volunteers and the funds for special health-related needs of marginal income patients provided through the devoted efforts of members of organizations such as the R.V.H. Women's Auxiliary, M.S. Associations, and In His Name Society, and this past year from an increasing number of individual donors. Changes due to government provisions will not eliminate the need for such help. Contributions of time and funds will be needed more than ever.

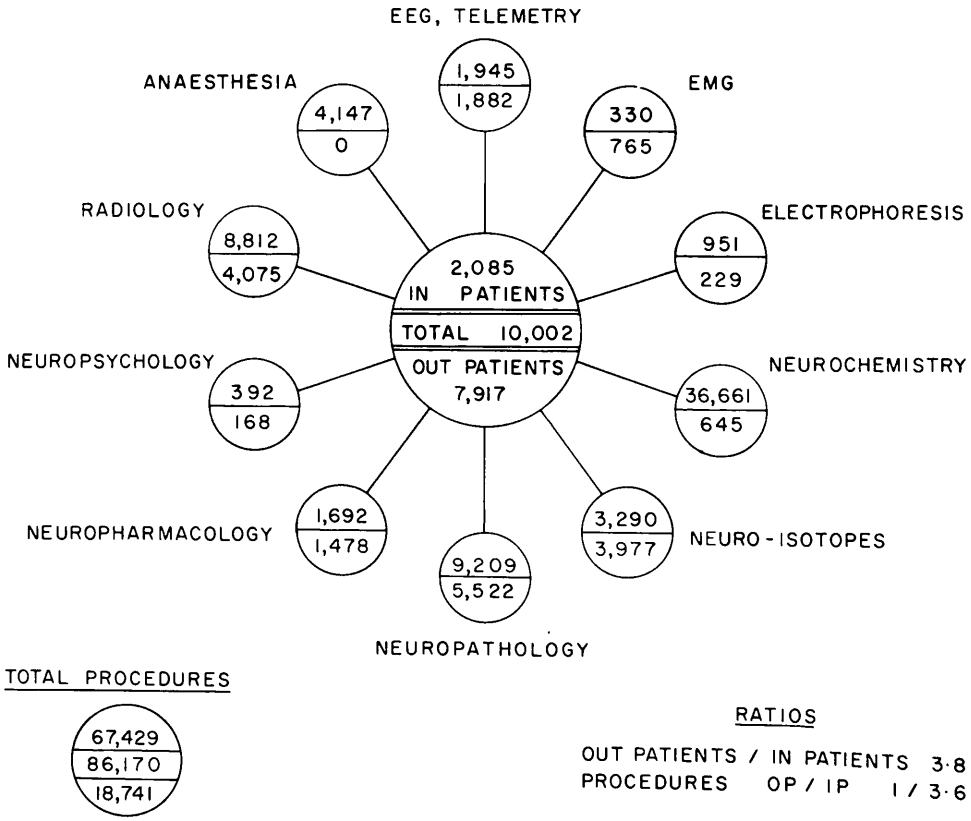
The recent past has been fraught with problems and disruptions, which will not cease overnight. However, it is now clear that social workers will remain within the hospital. Continuing association with social workers of other hospitals and affiliation with the Ville Marie Social Service Center, where we are already well represented in planning for programme development should, in fact, enhance our effectiveness in this hospital where we look forward to ever-closer collaboration with the other members of the multidiscipline hospital team.

Clinical Laboratories & Departments

DR. LEONHARD S. WOLFE

There are ten departments involved in laboratory and diagnostic services. The following two diagrams give a statistical summary of their activities in the past year. Figure 1 shows the total number of laboratory procedures carried out by each department. The upper figures represent procedures on in-patients, the lower on out-patients, RVH referrals included. The central circle shows the number of patients on whom these tests were performed. One notes that there are 3.8 out-patients to every

LABORATORY PROCEDURES 1973

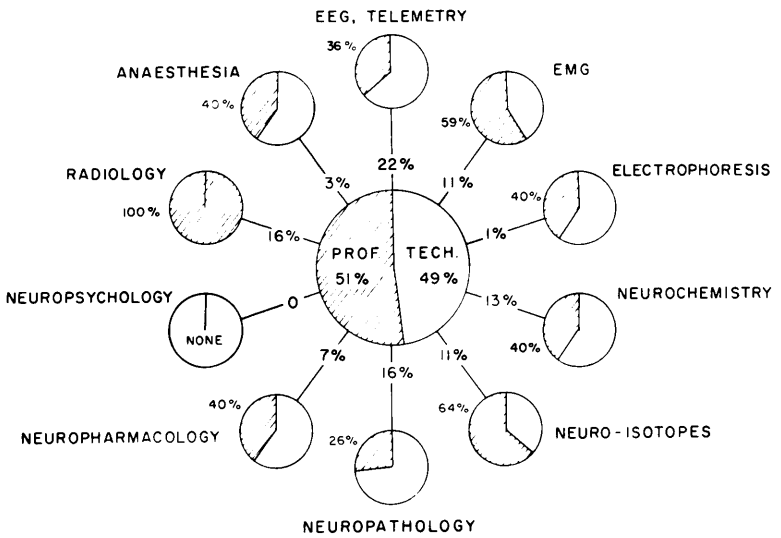


in-patient but the average number of procedures carried out on an in-patient is 32 whereas on an out-patient it is 2.4. Of course this diagram represents a crude summary since some procedures are simple routine tests, for instance, blood and urine analyses, whilst others are considerably more complex and time-consuming. The EMI-scans are included in the radiology figures and were 297 for only the latter part of the year. This number will be much larger for 1974 and will warrant separate presentation next year.

There were only small increases in the numbers of procedures with the exception of neuropharmacology and the neuro-isotope laboratory in which the numbers increased by 98% and 58% respectively. The expansion of the excellent service for anti-convulsant drug level measurements in blood on in-patients as well as out-patients accounts for the large increase in neuropharmacology as did the expansion of procedures in the neuro-isotope laboratory. The number of in-patients undergoing procedures decreased slightly but out-patients increased by 15%.

Figure 2 illustrates the proportion of professional and technical units accounted for by each department. The total units in each category were almost equal but the distribution varied greatly for individual departments.

PROPORTION OF PROFESSIONAL AND TECHNICAL UNITS
1973



Many of you may feel that statistics are a bore. It has been said that " there are lies, there are damn lies and there are statistics ". However, if we want to know what we do, where we have been and venture some remarks about where we are going, statistics can offer some measure of our progress. Their use as hard data in government negotiations, in comparative analyses of other hospitals and as a personal guage of output cannot be underestimated. I therefore urge the laboratory departments to try to systematize and unify the keeping of records in order that evaluation of our activities, whether externally or internally, can be made on some basis of rationality.

New techniques in patient monitoring have been developed which have greatly improved patient care. This has involved much work in the biomedical engineering field. So far this has been financed on a shoestring and the work load imposed on the engineering and technical staff has been so great that one cannot realistically hope that the extra work load will be sustained at the same level without the hiring of further personnel. Similarly, the computer is used in a number of clinical analyses but doesn't seem to have found a way of calculating itself into the budget for clinical procedures. This difficulty of quantitatively evaluating frontier clinical procedures as well as standard accepted procedures occurs in many departments. In terms of the advancement of diagnosis and treatment this is a most exciting area but in terms of financing it is a thorny thicket and we must develop a clearer policy for new and evolving clinical procedures.

Neuro - Anaesthesia

Anaesthetist	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.
Associate Anaesthetist	Davy Trop, M.A., M.D., M.Sc., F.R.C.P.(C) C.S.P.Q.
Assistant Anaesthetists	Jennifer A. Barnes, M.B., Ch.B., C.S.P.Q.
	Gilles Cossette, M.D., F.R.C.P.(C) C.S.P.Q.*
	Luis F. Cuadrado, M.D., D.A.B.A., C.S.P.Q.
	Elizabeth Wilkinson, M.B., B.S., F.F.A.R.C.S.

Fellows : 6 mos. on this service

M.-D. Besse, M.D. (Strasbourg)	R.C. Khairy, M.D. (Cairo)
C. Eyraud, M.D. (Montpellier)	Paule Lavigne, M.D. (Laval)
Josseline Faizende, M.D. (Marseille)	J.-E. Mazères, M.D. (Montpellier)
Agatha Forson, M.D. (Univ. Coll. Dublin)	T. Patel, M.D. (Gunerat, India)
Louis Freeman, M.D. (Jefferson Med. Coll.)	Anh Vu, M.D. (Saigon)
	Jean-Marie Wasmer, M.D. (Strasbourg)

The department has had an excellent clinical year but we are aware that our research programme is not very active. Projects led by Doctor Davy Trop are continuing but the clinical workload is so unpredictable that it is difficult to plan ahead.

A major interest of the department is the study and treatment of pain. Doctor Davy Trop organizes this service and has the valuable assistance of Professor R. Melzack of the Psychology Department of McGill University. A considerable amount of material has already been accumulated. Work is also progressing with Doctor Robert Hansebout in relation to implantation of dorsal column stimulating electrodes.

Doctor Elizabeth Wilkinson has continued and enlarged her interests in the field of medical education. In addition, she has advised concerning a number of audiovisual aids for various disciplines in the medical faculty.

* Resigned

Clinical work :

Few major changes have taken place though techniques become more sophisticated. We are indebted to our nurse, Miss Claudette Cardinal, and her assistants. Mr. Alfred Campbell and Mr. Austin Henry, who maintain a high order of sterility and service with our equipment.

The steroid drug, Althesin, has now been allotted to us for clinical trial. This should prove of value in certain fields of neurosurgery and neuroradiology.

During the year, a total of 1353 clinical procedures were carried out, 760 in connection with various radiological examinations and 593 with surgical procedures. In addition, there were 150 pain consultations and treatments.

The department continues to be extremely interested in the Intensive Care unit. Lectures, demonstrations and monthly meetings have taken place. The work of this unit occupies the full time of one anaesthetist.

During the year, we were fortunate to have a cardiac monitoring unit donated to this area by the Women's Auxiliary.

In the anaesthesia laboratory, a total of 4,147 procedures were carried out.

The department, indeed the hospital, is fortunate to have the services of Mr. Wilfrid Garneau whose helpfulness and meticulous attention to maintenance of equipment and safety features is a source of strength, reliability and economy.

He has been joined by Miss Thérèse Hahneman whose professional work and industry is of the highest order.

We still lack enough volume controlled respirators. At least two more should be obtained.

Neuroradiology

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

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

Assistant Radiologist..... Garry Bélanger, B.A., M.D.

Fellows : One year on this service

John Chiu, M.D. (Hong Kong)
Saul Taylor, M.D. (Toronto)
Dan Galloway, M.D. (Oklahoma)

Neurosurgery Residents :

Alan Drake, M.D. (2 mos.)
Warren Neely, M.D. (3 mos.)
Eugene Kuchner, M.D. (3 mos.)
Hector Ortegon, M.D. (4 mos.)

RVH Rotators :

Mitchell Goldman, M.D.
Georges Surette, M.D.
Anis Khalil, M.D.

Chief Technician : Joan Broadley, D.S.R., R.T.R.

The major renovations which had been undertaken have now been completed except for minor additions. For the first time in many years all the x-ray rooms are in operation, which is a relief both to the technicians and radiologists. Two major x-ray rooms have been completed during the past year, i.e. the pneumoencephalography room and the EMI Scanner room.

The EMI Scanner has had a tremendous impact. Because of the value of the results obtained, it has become our busiest single piece of equipment. We can hardly cope with the demand, even though a careful selection of cases is made. We are now operating the unit 12 hours a day. During the first few months of operation of the EMI Scanner we had an increase in the number of special procedures, like cerebral angiograms and pneumoencephalograms, but we can now see a definite decrease in the number of those studies as experience with computerized axial tomography increases. I think we can expect an approximate drop of 30% and maybe more in the number of our special procedures in the future.

A total of 12887 examinations of all kinds were carried out, which represents only a very slight increase over last year. I believe, however, judging from the present pace of the department, that next year will be another record year.

Despite the heavy clinical load, teaching was carried out as usual with the outstanding help from Drs. Melançon and Bélanger. As we had slightly fewer residents rotating in the department last year, teaching could be organized in a more integrated fashion. It was very rewarding to train and work with our three clinical fellows. We have enjoyed also teaching three residents from the radiology program, four residents from the neurosurgery program and also one elective.

It has been an exciting and productive year and I would like to take this opportunity to thank everybody who contributed to it in any way, and, especially of course, the people on the fifth floor.

Neurochemistry

Honorary Consultant	K.A.C. Elliott, M.Sc., Ph.D., Sc.D., F.R.S.C.
Neurochemist and Medical Research Council Associate	Leonhard S. Wolfe, M.Sc., Ph.D., M.D., F.R.C.P.(C)
Associate Neurochemist	Hanna M. Pappius, M.Sc., Ph.D.
Assistant Neurochemist, Clinical	Irving H. Heller, M.D., C.M., M.Sc., Ph.D., F.R.C.P.(C)

Fellows :
N.M.K. Ng Ying Kin, B.Sc., Ph.D., (Wales), Research Fellow
Jean Marion, B.Sc. (McGill), Medical Research Council Studentship

Head Technician : Mrs. M. Rostworowski

Technicians, Research
Mrs. R. Lau
Mr. Michael McHugh
Mrs. P. Skelton
Mrs. H. Szylinger

Clinical
Mrs. M. Liénard-Boisjoly
Mrs. E. Rossin-Arthiat
Mrs. H. Seni

The work load in our laboratories has remained at a fairly constant level for sometime now.

In the last year 14,932 tests have been done on blood, spinal fluid and urine in the 7th floor Neurochemistry Laboratory and 237 liters of nupercaine solution were prepared for use on the wards.

In the 3rd floor laboratory, 9113 separate hematological determinations were carried out, 3665 urines were analyzed and 304 miscellaneous tests were done. In addition 3897 blood specimens were drawn for analysis in our 7th floor laboratory, 4206 for analysis to be done at the R.V.H. and 952 for the Provincial Laboratories.

DONNER LABORATORY OF EXPERIMENTAL NEUROCHEMISTRY

A. Neurological diseases (Dr. L.S. Wolfe and associates) :

1) *Sphingolipidoses*

In the previous Annual Report the isolation and complete structural determination of oligosaccharides and glycopeptides which accumulate in the liver of G_{M1}-gangliosidosis was described. Further studies have shown that the principal component is a decasaccharide which probably derives from erythrocyte stromal glycoprotein and which cannot be broken down in the patient's tissues due to the absence of the enzyme β-galactosidase. Similar oligosaccharides have been isolated from the kidney and urine of the patients. In Sandhoff's disease (G_{M2}-gangliosidosis Type II) in which activity of both the A and B components of β-N-acetylhexosaminidase are absent, oligosaccharides and glycopeptides also accumulate in the viscera (principally the liver and spleen) as well as G_{M2}-ganglioside and globoside. The structure of the principal oligosaccharide has been determined. It contains seven sugar units groups with N-acetylglucosamine at the non-reducing termini and it also is derived from the major erythrocyte stromal glycoprotein. These compounds do not accumulate in Tay-Sachs disease.

2) *Non-gangliosidotic cerebromacular degenerations (Batten's disease)*

Considerable time has been spent on the analysis of leukocyte peroxidase activity in normal subjects and patients, using guiacol and p-

phenylenediamine as hydrogen donors in the assay. After very many determinations we have failed to confirm the indications in the literature that there is a deficiency of peroxidase in this group of diseases. Further studies are in progress to determine more specific peroxidase activities on unsaturated lipid hydroperoxides.

3) *Carnitine Deficiency*

In collaboration with Dr. Karpati and Dr. Mamer of the Royal Victoria Hospital Mass Spectrometry Unit, detailed chemical studies are in progress on a boy with a muscle disorder which is due to complete inability to synthesize carnitine. A large increase in dicarboxylic fatty acids has been found in the urine. This is due to increased ω-oxidation of fatty acids concomitant with deficiency in β-oxidation of fatty acids. Carnitine is required for transport of fatty acids into mitochondria. An abnormal betaine has been found in the urine which is being characterized. This should give a clue to the enzymatic step which is deficient in the synthesis of carnitine from lysine. The disease appears not to be due to a deficiency of γ-butyrobetaine β-hydroxylase and the defect must be at a step earlier in the biosynthesis of carnitine. Remarkable clinical improvement has been found by Dr. Karpati on dietary carnitine supplementation.

B. Prostaglandins (Dr. Wolfe and associates) :

1) *Cerebrospinal Fluid*

A large number of samples have now been analyzed using gas chromatography mass fragmentography. We greatly appreciate the cooperation of Dr. Orval Mamer of the RVH Mass Spectrometry Unit in these studies. Normally, prostaglandin $F_{2\alpha}$ is present in very low amounts (50-80 pg/ml). Significant increases are found in epileptic patients before operation. Prostaglandins are increased in the CSF postoperatively, but this is due to the surgery rather than to the primary disease. Striking increases were found in all cases with viral or bacterial meningitis and encephalitis. Inflammation of the brain leads to a marked increase in prostaglandin synthesis and release into the CSF and is one of the important factors causing the pyrexia through direct action on the anterior hypothalamus.

2) *Biosynthesis of prostaglandins in brain (with Dr. Pappius and Mr. Marion).*

Brain tissues have considerable capacity to synthesize prostaglandins from endogenous precursors. Little catabolism could be found. The amounts of prostaglandins E_2 and $F_{2\alpha}$ synthesized vary in various brain regions (cerebral cortex, cerebellum, caudate nucleus, hypothalamus). Separate enzymes control the synthesis of these two types of prostaglandins. The precursor, arachidonic acid, appears to be compartmentalized and does not equilibrate with exogenously added arachidonic acid. The membrane lipids from which the precursor fatty acids are liberated are being studied. The release of the substrate fatty acids from complex lipids appears to be the controlling step in prostaglandin biosynthesis.

3) *Cerebral vasospasm and the release of prostaglandins in cerebral injury*

Studies are continuing in collaboration with Drs. Feindel, Yamamoto, Pappius and Mr. Hodge on the vasoconstriction of small epicerebral blood vessels produced by prostaglandins. Recent work by others has shown that platelets release a very powerful platelet-aggregating principle that also is a potent vasoconstricting agent. The substance is known to be a prostaglandin endoperoxide which is an intermediate in the biosynthesis of the natural prostaglandins. The formation of this substance which is extremely labile but has long lasting effects could be a key factor in the production of vasospasm following cerebral thrombosis or brain injury. Studies are in progress using the standard freezing lesion technique developed by Dr. Pappius to determine the effect of drugs, which inhibit prostaglandin synthesis *in vivo,* on cerebral blood flow, vasospasm and cerebral edema.

C. *Fluid and Electrolyte Distribution in Nervous Tissue (Dr. Pappius and associates):*

The study of the kinetics of exchange of ^{24}Na between blood and brain is near completion. The results do not appear to support the hypothesis that sodium transport is the main mechanism by which edema is resolved. This hypothesis is based mainly on the findings that furosemide and acetazolamide, two drugs known to inhibit sodium transport, decrease significantly the edema which results from a standard freezing lesion. Alternative explanations for these findings are now being considered.

The collaborative studies with Dr. Hansebout on edematous changes in spinal cord injury and with Dr. Eisen on such changes in crushed nerve are continuing. In gerbil brains with unilateral carotid occlusion, early changes in water and electrolyte content were demonstrated (with Dr. Klatzo and associates at NINDS). It is still unclear whether they precede the breakdown of the blood-brain barrier to proteins.

The study with Dr. A. Yates of the Banting and Best Institute, Toronto, showed that cerebral edema measured chemically does not correlate well with edema as assessed by histological means. Up to 18 hours after death the water content of white matter does not change significantly, so sampling of such post-mortem material is possible to establish the presence of edema *in vivo.* In cerebral cortex dry weight sodium and potassium change progressively after death so that post-mortem sampling is of little value.

Dr. Wolfe has become Deputy Chief Editor of the Journal of Neurochemistry and a member of the Medical Advisory Board of the National Tay Sachs and Allied Diseases Association, Inc. Membership is continued on the Medical Research Council Priorities Selection and Review Committee and the Grants Committee for Neurological Sciences.

Electroencephalography and Clinical Neurophysiology

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

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

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

Assistant Electroencephalographers..... Eva Andermann, M.D., C.M., M.Sc., Ph.D.
Andrew Eisen, M.D., M.R.C.S., L.R.C.P., F.R.C.P.(C)
Ivan Woods, M.B., B.Ch., B.A.O., M.Sc.

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

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

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

Fellows : 6 mos. on this service

Michel Aubé, M.D. (Montréal)
Pierre Bourgeau, M.D. (Montréal)
André Gagnon, M.D. (Montréal)
Robert Hyatt-Williams, M.D. (London) (1 year).
Albert Larbrisseau, M.D. (Montréal)
Ilo Leppik, M.D. (Pennsylvania)
Menno Pennink, M.D. (Amsterdam)
Louis Roy, M.D. (Montréal)
Neil Schaul, M.D. (State Med. Univ., N.Y.) (1 year)
Maurilio Villato, M.D. (Madrid)

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

Clinical Service Functions

In the year 1973 a total of 3,827 examinations were carried out in the laboratory, an increase of almost 400 over the figure for the previous year. Of these examinations, 1,945 were performed on in-patients and 1,882 on out-patients or patients referred from other hospitals. In the operating room, 58 electrocorticograms were recorded during neurosurgical operations for the relief of intractable epileptic seizures.

The trend, noted in the previous year, to an increase in the number of long, time-consuming procedures has continued, partly due to the fact that exploration with chronically implanted stereotaxic depth electrodes in complex seizure problems has become an accepted diagnostic method for a small number of highly selected patients. The interference of these long term recordings with the daily routine of the laboratory has to some extent been mitigated by the development of sophisticated patient monitoring and seizure detection techniques which include a 16-channel multiplexer used in conjunction with the PDP-12 computer. With this method the patient's EEG can be recorded virtually without interruption over several days and nights, without undue interference with his freedom of movement, in an attempt to capture the often elusive ictal discharges concomitant with a spontaneous clinical seizure.

Among the special procedures carried out in the laboratory, those involved in stereotaxically implanted chronic depth electrodes have been most rewarding. They have allowed us to offer surgical treatment for the relief of seizures in patients for whom previously such treatment could not be contemplated. The success of these studies could not have been possible without the concerted effort of a large team including electroencephalographers, neurosurgeons, radiologists, biomedical and computer engineers, EEG technicians, electronic technicians, nurses and the patients themselves.

We were fortunate in being able to appoint Dr. Eva Andermann as Assistant Electroencephalographer. Her special expertise in neurogenetics will add a new and valuable dimension to our EEG work. She has also assumed some of the responsibility for the recording and interpretation of electrocorticograms in the operating room, thus fulfilling a long felt need for assistance in this important area.

Research Activities

(A) *Computer analysis of clinical electroencephalograms*

(J. Gotman, P. Gloor, C. Thompson, J. Ives, D. Skuce, W. Ray and G. Remillard).

The general aim of this long term project is to delineate areas in which the computer could effectively assist in the interpretation of EEG data and in their final presentation to the recipient of an EEG report. An initial step in this direction was taken by the program described in last year's annual report : based on the spectral analysis of 16-channels of EEG and the computation of frequency ratios for each channel, a visual display, a so-called "canonogram" is generated by the computer. The results of this analysis have been evaluated and compared with the results of the traditional reading of the EEG. The canonograms which are quick and easy to read, were found to be about equally, if not slightly more accurate than the traditional EEG reading in pinpointing the localization of a supratentorial destructive brain lesion.

A further study which grew out of this investigation was an attempt to minimize errors introduced into the analysis of the activity derived from the frontal channels by slow eye movement artefacts. Computational methods have been devised to reduce these errors to acceptable levels.

Another promising application of computer analysis of the EEG has been the on-line display of compressed spectral arrays and of instantaneous frequency ratios in the operating room during carotid endarterectomies. A measure of the patient's instantaneous blood pressure will be added to this display. The system is designed to detect potentially damaging ischemia of the brain as early as possible during the surgical procedure.

(B) *Automatic Patient Monitoring Systems*
(J. Ives, C. Thompson, I.F. Woods and P. Gloor)

The 8-channel telemetry system developed in our neuroelectronics laboratories by Mr. John Ives has continued to be very useful in many clinical situations, especially in the study of absence attacks. It had, however, some limitations which have been overcome by the development of two additional systems devised by Mr. J. Ives. The first is a 16-channel system which allows one to multiplex the activity from 16 EEG channels to one carrier. The multiplexing unit is small and lightweight and is worn by the patient on his head. It presently connects either to the computer or to a 16-channel Mingograf EEG machine by means of a long thin lightweight flexible cable which allows the patient full range of his movements within the confines and immediate vicinity of his room. The computer is programmed either to recognize by a number of logical steps the occurrence of a seizure discharge and to record this event, or the nurse or the patient himself can push a button when a seizure occurs, which will then save this part of the recording for further analysis. The system operates with a sufficiently large time delay (up to 4 minutes) which makes it possible to record the full length of the seizure including its onset and several minutes of recording prior to it. This system provides relatively artefact-free records of ictal events which may occur at any time of the day or night. By connecting the patient to the system it is now almost always possible to obtain a seizure record from a patient in whom such seizures occur at least once every two or three days. The system has been used to great advantage in the analysis of patients with stereotaxically implanted electrodes, but it has also been applied successfully in many cases in which the EEG is recorded from the scalp.

A second system developed by Mr. John Ives is a 4-channel portable 24 hours cassette recorder, which is sufficiently small and light that the patient can carry it on him without discomfort and without this being evident to people with whom he comes in contact during his daily activities. Electrodes applied to the scalp and connecting wires are hidden in the hair and under clothing. With the help of this system it has been possible to record the EEG virtually continuously over several days and nights in patients outside the hospital when they are engaged in their usual professional, educational or social activities. It has been most helpful in the clarification of suspected, relatively infrequent seizures, syncopal episodes and in a number of ictal discharges occurring in patients with absence epilepsy.

(C) *Influence of Ethosuximide on Absence Attacks and Psychological Performance in Children*
(I.F. Woods)

Research has continued in this area with the use of an 8-channel radiotelemetry system. The research activities have however been made difficult by the increasing number of demands for diagnostic service made on the telemetry laboratory.

(D) *Interaction of Genetic and Environmental Factors in Patients Operated for Focal Epilepsy.*
(E. Andermann, L. Dansky and J.D. Metrakos)

This study carried out in conjunction with the Department of Genetics of McGill University was based on seizure histories and EEG recordings of more than 300 near relatives of patients operated in our hospital for focal epilepsies. A significant contribution of genetic factors to the seizure disorders in these patients was demonstrated in this study.

(E) *Miscellaneous Clinical-EEG Correlation Studies :*

Studies on the following conditions have been undertaken mostly under the direction and/or on the initiative of Dr. Frederick Andermann.

(a) Temporal lobe epilepsy and perinatal occlusion of the posterior carotid artery, a syndrome analagous to infantile hemiplegia (G. Rémillard, R. Ethier and F. Andermann).

(b) Pattern-sensitive photogenic epilepsy (Dr. A. Wilkins and Dr. F. Andermann). It was possible to define some of the physical parameters important for the elicitation of the abnormal discharges.

(c) Self-induced television epilepsy with special consideration to psychiatric aspects of the problem (Drs. F. Andermann, P. Clément and M. Dongier).

(d) Characteristic EEG patterns in infants with maple syrup urine disease. (In conjunction with the EEG laboratories at the Montreal Children's and the Ste. Justine Hospitals by Drs. A. Trottier, K. Metrakos, G. Geoffroy and F. Andermann).

(e) Facial asymmetry occurring in patients with temporal lobe epilepsy, a frequently encountered but clinically neglected sign. The correlation between the clinical and EEG findings has been investigated by Dr. Rémillard and Dr. F. Andermann with the assistance of Mr. Charles Hodge in the photography department.

(f) Hypersomnia in obese individuals (Pickwickian syndrome) (Dr. F. Quesney, Dr. P. Gloor and Dr. M. Kryger in collaboration with the Meakins-Christie Laboratories of the Royal Victoria Hospital.) The polygraphic studies clarified some of the complex inter-relationships between respiratory mechanisms, sleep and arousal mechanisms, and cardiac function.

Meetings and Related Events :

A number of papers dealing with recent research in our laboratory have been presented at national and international meetings by various members of the staff.

Dr. P. Gloor was invited to present the Berger Oration in honor of the 100th anniversary of Hans Berger's birth at the Hans Berger Centennial Symposium on the Management of Epilepsy, held in Edinburgh in July 1973. He was also invited by the International League against Epilepsy to speak on the mechanism of generalized epilepsies at the Symposium

held in Barcelona in conjunction with the International Congress of Neurology.

Dr. Frederick Andermann has been elected President-elect of the Eastern Association of Electroencephalographers.

Acknowledgments :

We wish to express our gratitude to all those who have made our work exciting, rewarding and successful. These include our technicians under Mrs. Kay Crystal's direction, Mr. Christopher Thompson, Mr. Douglas Skuce and Mr. Jean Gotman of the Computer Laboratory, and Mr. John Ives, Mr. Edward Puodzuinas and Mr. Gordon Evans of the Neuroelectronics Laboratory. Without their dedicated assistance, our work both in the clinical service and in the research field could not have been carried out with the same measure of success and excellence.

Electromyography Laboratory

Head..... Andrew A. Eisen, M.D., M.R.C.S., L.R.C.P., F.R.C.P.(C)
Fellow..... Morris Jak Danon, M.D. (Istanbul)
Technician..... Margo Henderson

Clinical Aspects :

During the year 1973-74 several projects have been completed and published. Two studies on the cubital tunnel syndrome were undertaken. Electrodiagnostic criteria for the mild syndrome (patients without clinical signs but with suggestive symptomatology) were established. Subsequently the natural history of the disease was investigated and indications for surgical decompression outlined. Although the majority of patients recover spontaneously, early surgery in those showing sequential electrophysiological deterioration results in quicker and more complete recovery. With Doctors Woods and Sherwin the neuropathy of long term dilantin administration was investigated. Overt neuropathy was found to be rare, but electrophysiological abnormalities common. The latter could be directly correlated with plasma dilantin levels and the total dosage of the drug administered. B_{12} therapy may prevent dilantin neuropathy. Sequential clinical and electrophysiological studies were carried out in 25 cases of the Guillain-Barré syndrome. This work was published with Dr. Peter Humphreys, and it was shown that patients who attain their peak neurological deficit in under four weeks, and who show no electrophysiological abnormality, recover quickly and completely. Those showing evidence of denervation recover slowly if at all. This work was presented to the 8th International Congress of Electroencephalography and Clinical Neurophysiology, Marseille Sept. 1-7, 1973.

Together with Dr. Jak Danon the orbicularis oculi (blink) reflex was studied in 11 cases of operatively proven acoustic neuroma. Abnormalities of the reflex were found in every case, and it is recommended that

this simple repeatable diagnostic aid be used routinely in the investigation of angle tumours. The results were presented to the 43rd Annual Meeting of the Royal College of Physicians and Surgeons of Canada, Montreal, January 1974.

Electromyography Laboratory

The laboratory carried out 1095 patient examinations, an increase of 12% compared to the previous year. We continue to achieve a very short waiting period for examinations – about one week for outpatients, and usually the same day for inpatients. However this rapid service may have to be curtailed due to a large number of commitments.

Basic Research Aspects

The limitations of differentiating neurogenic from myopathic disease using conventional electromyographic techniques are well known. Together with Doctors Karpati and Carpenter a recently described quantal technique for measuring the number of functioning motor units in a muscle was applied to neurogenic and myopathic models in the rat. This additional electrodiagnostic method is now being used clinically. Our most recent endeavours are concerned with the pharmacological conversion of the physiological and histochemical properties of muscle, through alteration of suprasegmental influences using Reserpine. This work is also being done in collaboration with Doctors Karpati and Carpenter, to whom, as always, I extend my thanks for their continuing encouragement and help.

Experimental Neurophysiology

Consultant	Herbert Jasper, O.C., M.D., C.M., Ph.D., D. ès Sci., F.R.S.C.
Neurophysiologist	Pierre Gloor, M.D., Ph.D.
Assistant Neurophysiologist, Killam Scholar	Stanislav Prelevic, M.D. (Belgrade)
Biomedical Engineer	John Ives, M.Sc.
Computer Systems Engineer	Christopher Thompson, M.S.
Assistant Computer Systems Engineer	Jean Gotman, E.S.E., M.E.

Fellows :

Graham Ball, M.Sc. (Manitoba)
McIntyre Burnham, B.A. (Cornell) Ph.D. (McGill)
Ernest Kratzenberg, M.D. (Nancy)
Luis Felipe Quesney, M.D. (Cath. Univ. of Chile)
Douglas Skuce, M.Sc. (McGill) Killam Scholar

Laboratory Supervisors

Mary Roach, A.R.R.C., R.N. (until Aug. 31, 1973)
Suzanne Schiller, R.N. (from Sept. 1, 1973)

Chief Electronics Technician	Edward Puodziunas
Assistant Electronics Technician	Gordon Evans

Research Projects

Studies on an animal model of generalized corticoreticular epilepsy (Drs. A. Guberman, L.F. Quesney, E. Kratzenberg and P. Gloor)

The studies of the effects of cholinergic and anticholinergic drugs on the epileptiform discharges in the model of generalized corticoreticular epilepsy produced in the cat by large intramuscular doses of penicillin were completed. They supported evidence obtained in previous studies that a reduction of the cholinergic drive exerted by the brainstem reticular formation is a factor in promoting generalized epileptiform discharges in this preparation.

The investigation of effects of two common anticonvulsant drugs, ethosuximide (Zarontin) and diphenylhydantoin (Dilantin), carried out in collaboration with Dr. Sherwin's laboratory, was also completed. The results showed that the discharges of feline generalized penicillin epilepsy are quite sensitive to ethosuximide and much less so to diphenylhydantoin.

Preliminary results of a new study on the role of thalamocortical mechanisms in this form of epilepsy seem to indicate that volleys originating from the intralaminar and midline nuclei of the thalamus, which are capable of triggering barbiturate spindles and/or initiating recruiting responses, may also be instrumental in triggering the paroxysmal bursts of spike and wave activity in this animal model. We suspect that in this condition normal thalamocortical volleys generated by this system elicit an abnormal epileptiform cortical response.

An as yet incomplete study on the effects of taurine on generalized penicillin epilepsy in the cat suggests that this amino-acid has no effect upon this form of epileptic discharge.

Neurophysiological mechanisms of pathological delta waves (Mr. Graham Ball and Dr. P. Gloor)

Our work has demonstrated that localized pathological delta waves result from white matter lesions. The slow waves are most likely generated by neurons, since they show a statistical relationship with single unit discharge and a laminar profile in the cortex which suggest the presence of a cortical neuronal type of generator. The white matter lesion probably induces some kind of cortical deafferentation. We were able to demonstrate further that reversible white matter pathology such as represented by cerebral edema is also capable of producing the presumed partially deafferented state of cortex, resulting in the production of delta waves. Preliminary results of evoked potential studies suggest that transcallosal and specific thalamocortical volleys are not crucially involved in this deafferentation process. It seems more likely that deafferentation from connections arising from the ascending reticular system is a necessary prerequisite for the generation of cortical delta activity.

Electrophysiological study of amygdaloid afferents in the cat (Drs. S. Prelević and M. Burnham)

The projections from temporal neocortex to amygdala were analyzed

using a raster display method. The results confirmed previously acquired data demonstrating that one of the principal sources of amygdaloid inputs is the temporal neocortex. Excitation-inhibition sequences are the principal mode of response of amygdaloid neurons to these cortical inputs.

Artificial intelligence
(D.R. Skuce)

Mr. Skuce's work in artificial intelligence now has a name : NSL, for Natural Scientific Language. NSL is a formalism for expressing scientific knowledge precisely, in order to communicate it to a computer. Some elementary facts of neurology are being encoded, and will be " taught " to the machine shortly.

Meetings

Dr. Gloor was invited to participate in an NINDS Workshop on the anatomy and physiology of the limbic system, which was part of a larger project designed to prepare a report on the research aspects of the neurological basis of aggressive (violent) behaviour. He was also invited to present a lecture in the Research Seminar Series of the Missouri Institute of Psychiatry in St. Louis on the functional interrelations between temporal cortex and amygdala in the light of anatomical, physiological and behavioural data.

Dr. Prelević was invited to attend as a discussant the Golgi Centennial on Chemical versus Electrical Transmission in Pavia and Milan in September 1973.

After many years of devoted service, Miss Mary Roach retired at the end of August 1973 as supervisor of our laboratories. During these years, she made many friends who will always remember her with fondness. We were fortunate in having been able to replace Miss Roach by Mrs. Suzanne Schiller.

Neuropathology

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

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

Fellows : 6 mos. on this service

Michel Aubé, M.D. (Montréal)

Hsi-Sheng Chuang, M.D. (Taiwan)

Monique Lefebvre-D'Amour, M.D. (Montréal)

Ted Davies, M.D. (Kentucky)
John Dawlings, M.D. (British Columbia)
Robert Hyatt-Williams, M.D. (London)
John Musgrave, M.D. (Queen's, Belfast)
Adolfo J. Perez de Leon, M.D. (Santiago)
Yvon Robitaille, M.D. (Montréal)

University of Montreal Rotator
François Paquin, M.D. (4 mos.)

Chief Technicians :
Barbara Nuttall, B.A., A.R.T.
John Gilbert, R.T.

During the past year autopsy study of the nervous system was made on 48 patients dying in the M.N.H., and on the brains of 46 patients dying in the Royal Victoria Hospital or elsewhere. Four hundred and sixty-three surgical specimens were processed in paraffin sections and examined in this department. Frozen sections for rapid diagnosis were performed on 82. One hundred and eleven specimens of spinal fluid were examined cytologically. One hundred and forty-eight specimens of human tissues, chiefly muscle and nerve biopsies, were embedded in Epoxy resin and examined in semithin sections. From 36 of these, ultrathin sections were made for electron microscopy. In slightly less than half of these the electron microscopic examination made a substantial contribution to the diagnosis, and in the other cases, we hope that we will eventually learn from it important things about pathogenesis.

We are grateful to the Medical Research Council of Canada and Muscular Dystrophy Association of Canada, for supporting our research in electron microscopy. The experimental work of the past year has been done in collaboration with Drs. Karpati and Eisen. An extensive study of experimental ischemic myopathy in the rat soleus muscle will soon be published. This model has been proposed by others as reproducing the lesions of Duchenne muscular dystrophy. As a sequel we will study the ultrastructure of biopsies from patients with Duchenne muscular dystrophy, in order to make as strict a comparison as possible with ischemic lesions. Other projects under way include study of the effects of intra-arterial injection of mitochondrial uncoupling agents on the ultrastructure of rat muscle and a detailed examination of biopsies from 16 patients with polymyositis with the hope of classifying cases according to pathogenetic mechanisms. We have been able to diagnose further cases of Batten's disease by electron microscopy on skin and muscle specimens sent from Newfoundland by Dr. J.C. Jacob. An investigation of the ultrastructure of fibroblasts grown in tissue cultures from patients with Batten's disease has begun with the help of Dr. H. Goldman, from the Department of Biochemical Genetics of Montreal Children's Hospital.

Dr. Mathieson is spending a sabbatical year in the Department of Pathology of the University of Aberdeen, Scotland where he has been reviewing sections of cortical excisions for epilepsy, performed at the

M.N.H., and writing a chapter on the pathological aspects of epilepsy, with special reference to the surgical pathology of focal cerebral seizures, for a book on the neurosurgical management of the epilepsies.

Neuro - Isotope Laboratories

Director	William H. Feindel, B.A., M.Sc., M.D., C.M., D.Phil., D.Sc., F.R.C.S.(C), F.A.C.S., F.R.S.C
Assistant Director	Y. Lucas Yamamoto, M.D., Ph.D., (Hokkaido)
Medical Research Council Trainee	Leon J. Ravvin, M.D.
Physicist	Ernst Meyer, M.Sc., (Zurich)
Research Assistant	Andrea Duszczyszyn, B.Sc., (Loyola)
Senior Brain Scan Technician	Gloria Abrahamson, R.T.N.M, M.S.R., F.S.R.
Assistant Brain Scan Technician	John Fodor
Electronic Technician	George Lootus

In the Brain Scan Laboratory, the total number of examinations for 1973 was 7,265, an increase compared to 1972 when there were 4,264. The assessment of the Med II Gamma Camera digital computer system has continued and it has proved satisfactory. We have noted a great increase in diagnostic work for patients with strokes. Dr. Yamamoto and the staff were most active in planning the new area which will be available for the first time to provide adequate facilities for safe handling of radio-active materials and better conditions for patient control. The transfer will take place during the summer months.

THE WILLIAM CONE LABORATORY FOR NEUROSURGICAL RESEARCH

Studies on important aspects of the cerebral circulation were continued and extended during the past year with the support of the Medical Research Council of Canada, the Cone Memorial Fund and the Pillow-Vaughan endowment. The application of the two new techniques which we have developed in our laboratories over the past decade, fluorescein angiography and measurement of local cerebral blood flow by miniature detectors, has continued to be extremely productive in a number of new areas.

(a) *Analysis of Experimental Strokes :*

Dr. Leon Ravvin has continued the project of analyzing the early changes occurring in focal cerebral blood flow after selective closure of

small arterial vessels on the surface of the brain. Dr. Ravvin held a M.R.C. trainee grant and will be presenting his results in the form of a M.Sc. thesis during the coming year.

(b) *Prostaglandins and Cerebral Blood Vessels*

Dr. Terence Myles completed a study of the vasoconstrictive effects c prostaglandins on the small cerebral arteries and arterioles and he exam ined several agents including ethanol which tend to counteract this va sospasm of the vessels. Dr. Myles received his M.Sc. degree for this wor and will be continuing research on the cerebral circulation at the Medic al School of the University of Alberta in Calgary, where he has an aca demic appointment in Neurosurgery.

(c) *Computer Analysis of Cerebral Blood Flow Measurements*

The computerized analysis of cerebral blood flow measurements using the PDP-12 computer and the program worked out in collaboration with Dr. Clive Hohberger of the Brookhaven National Laboratory has proved in practice to be most helpful. Not only has it reduced the time in calcu- lating flow values from area curves, but it has improved the accuracy and reproducibility of these values. A direct clinical advantage derived from this research was the application of the measurement of cerebral blood flow to special vascular problems in the operating room, particu- larly during the surgery of arteriovenous malformations. The use of the computer technique provides the surgeon with flow values minutes after occlusion and excision of these difficult vascular lesions.

(d) *Cadmium-Tellurite Detector System*

Several units of this new system, which has approximately ten to twenty times the sensitivity of the lithium detectors, were used both in the experimental laboratory and in the operating room. Mr. Ernst Meyer has continued development of his work on this and a report is now in preparation.

(e) *Cerebral Circulation in Trauma*

Dr. Louis Bouchard, who had worked with Dr. Carl Dila on this proj ect, completed the preliminary phase. This was a study of controlled mild trauma to the cortex of the exposed dog brain and analysis of the immediate changes in cerebral circulation. A method for arranging gradu ated levels of trauma was designed and early studies in the micro circulation were recorded by fluorescein angiography and xenon ^{133} stud ies. Dr. Dila continues this work with the support of the Medical Re search Council grant.

(f) *Analysis of Vascular Changes in Freezing Lesions*

Because of the important effects of prostaglandins on the small vessels of the brain, a project was initiated to study the vascular changes oc curring after experimental freezing lesions of the brain. Such lesions have

been widely used to study an experimentally produced cerebral oedema, but no knowledge of the vascular changes had yet been available. One of the main results is a reduced flow through the area subjected to freezing and some degree of shunting into the venous circulation. In preliminary experiments certain agents of the anti-prostaglandin series show a remarkable protective effect in preventing the extreme vascular changes and the oedema itself. This work is being carried out in collaboration with Dr. Hanna Pappius and Dr. Wolfe.

(g) *Cerebral Circulation and Increased Intracranial Pressure*

Dr. Dila and Dr. Ravvin set up an experimental model for measuring cerebral blood flow with miniature silicon detectors mounted in the skull. This allowed for a study of changes in the cerebral circulation during alterations in intracranial pressure. An extension of this study will be made to monitor intracranial pressure and cerebral blood flow in patients with closed head injuries.

Reports of these various research projects were made to the Royal College of Physicians and Surgeons of Canada, to the International Congress of Neurosurgery in Tokyo, Japan, and to the Japan Neurosurgical Society. Dr. Feindel reviewed the recent advances in the cerebral microcirculation at the Royal Canadian Institute in Toronto and at the Annual Lecture of the McGill Chapter of Sigma Xi.

We are grateful to Mrs. Andrea Duczczyszyn, to Miss Pamela Bottomly for supervising the brain scan records, to Mr. George Lootus for keeping the electronic instruments in expert shape and to Miss Cindy Delaney for her secretarial support in the Research Laboratory.

Neurological Research

LABORATORY FOR NEUROPHARMACOLOGY

Head	Allan L. Sherwin, B.Sc., M.D., C.M., Ph.D., F.R.C.P.(C)
Research Fellow	Carl Sacks, M.D.
Technicians	Christine D. Sokolowski, B.Sc. (Chem.)
	Marie T. Parent
	Heather D. Hollis
Summer Students	Catherine A. Cotter, B.A.
	Peter Martin, B.Sc.

Research in the past year included studies of the distribution of anticonvulsant drugs in brain, plasma and cerebrospinal fluid. Drug levels were determined in human brain obtained incidental to neurosurgical therapy. There was a good correlation between the brain and plasma levels of phenobarbital and diphenylhydantoin. Amino acid analysis of brain tissue, plasma and cerebrospinal fluid of patients with epilepsy, with spe-

cial reference to the role of taurine, continued in association with Dr Van Gelder of the University of Montreal.

John Armstrong completed his studies of the brain isoenzyme of creatine kinase and found immunochemical evidence for a possible control mechanism for this isoenzyme in cardiac and skeletal muscle. Measurements of the plasma levels of the radio-contrast medium diatrizoate (Hypaque-M) employed to visualize brain tumors by computerized x-ray tomography (EMI Scan) were performed by Doctors Ethier and Leppik and Miss Cotter. The information obtained will permit precise calculation of the optimal dosage for individual patients. Dr. Sacks and Dr Sherwin prepared a self instruction module on the pharmacology of antiepileptic drugs for the College of Family Physicians of Canada ; this has been widely utilized in Canada and the USA.

The service laboratory was overwhelmed with work due to the wide acceptance of the importance of drug monitoring in clinical medicine. In 1973 a total of 3170 samples were assayed by gas liquid chromatography to quantitate various anti-epileptic drugs. Over a 1000 of these tests were for other Montreal hospitals. A number of samples were also received from various parts of Canada as well as from other countries.

LABORATORY FOR NEUROMUSCULAR RESEARCH

Head..... George Karpati, M.D., F.R.C.P.(C)
Research Fellow..... Calvin Melmed, M.D., F.R.C.P.(C)
Technicians..... Miss Carol Allen, B.Sc.
Mr. Steven Prescott.

In 1973 histochemical processing and study of 131 muscle, 71 nerve and 66 skin biopsies took place. Of these, about half were biopsies in children under 16 years of age.

Clinical research included studies on the following conditions :

1. Carnitine deficiency myopathy. This recently recognized inborn error of metabolism represents a treatable disease. Our own patient has shown gratifying response to carnitine replacement therapy.
2. Hunter's syndrome (mucopolysaccharidosis II) presenting as multiple peripheral nerve entrapment in adults in a family.
3. Inflammatory myopathies. On morphological grounds we have come to recognize at least four types of polymyositis. It is likely that a different pathogenesis (and possibly etiology) is operating in each type.
4. Lafora's disease. The skeletal muscle involvement in a patient with this disease was shown to be peroxisomal storage of polyglucosans.
5. Cerebromacular degeneration. Histochemical study of peroxidase activity of involved cells in skin and muscle biopsies of these patients is pursued in view of recent claims of peroxidase deficiency in this group of diseases.

Experimental Animal Work

1. Ischemic myopathy. The first phase of the research in ischemic myopathy is completed. Experimental ischemia in rat solei shows sufficient

differences from human Duchenne dystrophy to allow us to doubt that ischemia is a primary factor in the pathogenesis in that disease.

2. Effects of prostaglandins upon skeletal muscles. Intensive study of intra-arterial infusion of prostaglandin E_1 (PGE_1) into the lower extremities of rats failed to reveal consistent influence upon the morphology and histochemistry of skeletal muscles. PGE_1 failed to protect the rat soleus from the morphological effects of ischemia produced by aortic ligation.

3. Experimental mitochondrial myopathy. Intra-arterial infusion of mitochondrial oxidative phosphorylation (i.e. 2,4-dinitrophenol and carbonyl-cyanide m-chlorophenyl hydrazone) and an inhibitor of mitochondrial adenine nucleotide translocase (excessive oleyl CoA) produced prominent morphologic abnormalities in mitochondria from rat leg muscles. These changes shared many features with the mitochondrial abnormalities observed in human muscle in disease.

4. Effects of reserpine upon skeletal muscles. High parenteral doses of reserpine cause an acute myopathy in the rat soleus by an unknown mechanism. Long-term doses of reserpine cause muscle rigidity in rats and transformation of the physiological and probably the histochemical state of rat leg muscle.

5. The correlative physiological and histochemical study of myopathic and neurogenic models in rats revealed good correlation and validated our current concepts relating to the fate of motor units in human neuromuscular diseases.

Dr. Calvin Melmed has completed a year of fruitful activities in the laboratory and contributed to many of the above projects. Close cooperation continued with Drs. Stirling Carpenter and Andrew Eisen in many projects. Dr. Leon Wolfe and Dr. François Ng of the MNI as well as Drs. Gerald Klassen and Orval Mamer of the RVH contributed to the study of the patient with carnitine deficiency. Clinical cooperation continued successfully with Drs. Gordon Watters, Stanley Rothman and Peter Humphreys at the Montreal Children's Hospital.

Dr. Karpati was guest lecturer at the Hospital for Sick Children in Toronto and the University of Sherbrooke, as well as at the McGill International Symposium on limb replantation.

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)
Henry Triller, Ph.D. Susan Colby, B.Sc. Allan Sazant, B.Sc.

Investigation of cell-mediated hypersensitivity to nervous system antigens in disease of the central and peripheral nervous systems is continuing. Data has been obtained which indicates the presence of hypersensitivity to basic myelin A_1 protein immediately preceding clinical attacks of multiple sclerosis. Development work has been initiated on lympho-

blastic transformation, in order to facilitate the clinical application this type of assay.

In continuing studies on the Guillain-Barré syndrome, we have demc strated hypersensitivity to basic myelin protein of peripheral nerves. A tered immunity to viral antigens in these disorders is also being ev uated.

Dr. Gratton is assisting in a study of psychiatric aberrations of m tiple sclerosis and relationship to other parameters. Dr. Kirk Osterla and Dr. Barbara Bain are cooperating in other investigations. Studies retrobulbar neuritis with Dr. Brian Younge continue.

The multiple sclerosis clinic, within the RVH Polyclinic, is functioni well and is an invaluable adjunct in clinical investigation.

Neuropsychology

Neuropsychologist and Medical Research Council Associate	Brenda Milner, Ph.D., Sc.D.
Associate Neuropsychologist	Laughlin B. Taylor, B.Ed., M.Sc.
Medical Research Council Fellow	Morris Moscovitch, Ph.D. (Pennsylvania)
Post-Doctoral Fellow	Arnold Wilkins, Ph.D. (Sussex)
Graduate Students	Marilyn Jones, M.A. Gina Jaccarino, B.A. (Pennsylvania)
Clinical Assistants	Mary Kay Ajersch, M.A. Enda McGovern, B.A., Dip. Psych.

This year has seen a further upswing in our clinical activities, wi memory testing after intracarotid injection of Sodium Amytal proving increasingly useful screening device for patients suspected of harbouri bilateral hippocampal lesions. The fact that, with implanted electrod Dr. Olivier has been able to demonstrate an unilateral origin for seizu in several patients previously thought to have independent bilateral te poral-lobe foci has increased the demand for Amytal-memory studies such cases. With Dr. Carl Dila we have this year carried out 72 carot Amytal tests in 37 patients, in 17 of whom the main purpose of the te was to assess possible risk to memory if the hippocampus on one s were excised. In addition, Dr. Milner is now trying to assess left and ri hippocampal function preoperatively, using two learning tests (one v bal, the other spatial), which Corsi has found to be differentially sensit to the extent of hippocampal removal in left and right hemispheres, spectively. Dr. Milner's preliminary results suggest that these tasks m have considerable diagnostic power.

The Amytal technique also continues to provide new and valuable formation concerning the patterns of speech representation in lefthan and ambidextrous subjects. Results for 371 consecutively studied patie were reported by Dr. Milner at the Annual Meeting of the Ameri

Psychological Association, Montreal, and by Dr. Rasmussen at the Otfrid Foerster Symposium on Cerebral Localization in Cologne.

The bulk of our research is still directed to the study of memory processes in patients with various cortical excisions. The emphasis has shifted slightly, in the sense that we are no longer simply looking for functional differences between the hemispheres but are trying to get a clearer idea of how the two hemispheres interact in normal learning. Marilyn Jones continues to explore the role of visual imagery in the memorization of new and complex material and Gina Jaccarino is studying the possible interfering effects of verbal labels upon the subsequent accuracy of picture recognition by patients with temporal-lobe lesions. Dr. Morris Moscovitch, on leave from the University of Toronto, has been collaborating with Dr. Arnold Wilkins in a study that focuses on the encoding stage of memory. He has compared the performance of patients with left-and right-hemisphere lesions on tasks requiring either rapid naming of pictures or rapid classification according to either semantic or spatial dimensions ; the recall of these items is then tested after a delay. The results indicate that patients with damage to the dominant hemisphere for speech have difficulty in encoding material according to verbal-semantic categories but behave normally on spatial encoding tasks, the reverse being true for patients with lesions of the minor hemisphere.

Dr. Wilkins has also collaborated with Dr. Andermann in a study of three patients whose seizures are elicited by certain kinds of visual pattern. In the one intensively-studied case, Dr. Wilkins was able to delineate some of the critical features in the triggering mechanism and to suggest a possible treatment. We congratulate Dr. Wilkins on his appointment as a research psychologist in the MRC Unit at Cambridge and wish him luck in his new venture.

Next year Mr. Taylor will also be in Britain, on sabbatical leave, and his contributions to both clinical and research work will be sorely missed. This year he has been ably supported in the routine evaluation of patients by our two clinical assistants, Mary Kay Ajersch and Enda McGovern, as well as by Marilyn Jones. He has also collaborated with Dr. Milner in the evaluation of learning deficits in patients tested in California after cerebral commissurotomy. These findings were presented by Dr. Milner at a recent colloquium on Callosal Disconnection Syndromes, in Lyons, France.

This year we set up a departmental seminar, in which we were greatly helped by colleagues from abroad. Our visiting speakers included Dr. R. W. Sperry (Cal. Tech.), Dr. H.-L. Teuber (M.I.T.), Dr. L. Weiskrantz (Oxford), Dr. L. Vignolo (Milan), Mr. Malcolm Piercy (Cambridge), Dr. G. Assal (Lausanne) and Dr. C. Darwin (Sussex). We were pleased that Dr. Donald Doehring and his students from the School of Human Communication Disorders were able to take part in the seminars and we look forward to further collaboration with them.

Neuroanatomy

Neuroanatomist	Donald G. Lawrence, B.Sc., M.D., C.M.
Advisory Neuroanatomist	Francis McNaughton, B.A., M.Sc., M.D., C.M. F.R.C.P.(C)
Teaching Associates	Allan Morton, M.D., Ph.D.
	Charles Olanow, M.D., F.R.C.P.(C)
Graduate Student	Janet Robbins, B.A.
Technician	Giovanni Gaggi

The activities of the Laboratory of Neuroanatomy over the past year have been primarily concerned with the organization and teaching of the nervous system course for the medical students. The introduction of the new medical curriculum in September 1973 made it necessary for the course to be taught to second year students in the fall of 1973 and to first year students this spring. Reorganization of the course, in particular of the laboratory classes, called for the preparation of a large amount of teaching material and this has occupied much of the time of Mr. Gaggi. The willingness of all those who agreed to augment, revise or withdraw their teaching contributions as the new course was reorganized out of the old is gratefully acknowledged. Special thanks are due to Miss Delaney for her tireless efforts in producing both the old and the new course guide.

Mrs. Robbins, in addition to making a large contribution to the teaching in the fall, has made progress in studying the connections of a nucleus (the nucleus tegmenti pedunculopontinus) in the brainstem related to the motor system.

In January Dr. Lawrence was visiting professor at St. Louis University and gave a paper before the St. Louis Society of Neurological Sciences. Later that month he gave one of a series of seminars on the motor system at the University of Ottawa.

Neuro - Ophthalmology

Neuro-Ophthalmologist	Brian R. Younge, M.D., F.R.C.S.(C)
Rotating Residents	Bonnie Skove, M.D.
	Elliot Werner, M.D.

The section of Neuro-Ophthalmology became functional in October 1973, with an Ophthalmologist, Dr. Brian R. Younge, who had obtained an extra year of training in Neuro-Ophthalmology at the Mayo Clinic during 1972-73. There is a rotating resident from the Royal Victoria Hospital assigned to the consultant services, and this resident participates 3 mornings a week in the Neuro-Ophthalmic service at the Montreal Neurological Hospital.

The Neuro-Ophthalmic examining area is located on the 2nd floor. The service provides in-patient consultation services both to patients in the

Royal Victoria Hospital and the Montreal Neurological Hospital ; in addition appointments are arranged for out-patient consultations. Dr. Younge participates in the Neurosurgery and Neurology Rounds and runs Neuro-Ophthalmology Rounds, in which interesting cases seen the previous week are presented.

Future projects include the provision of an ERG (Electroretinography) Diagnostic service, as well as coordination of Electronystagmography with the Department of Neuro-Otolaryngology at the Royal Victoria Hospital.

The work is stimulating and it is hoped that the service provided, and the teaching, will contribute to the clinical service and the academic atmosphere of the Montreal Neurological Hospital and McGill in general.

Neurophotography

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

This past year has been a very active and successful one for this department.

Two large exhibits were designed and built. One was produced for Dr. Sherwin and the other, on Computerized Axial Tomography, for Dr. Ethier and his associates. The latter exhibit won first award at the Canadian Association of Radiologists Meeting in Vancouver.

These exhibits each require over two weeks of concentrated effort by all members of this department including considerable overtime. I am grateful to Judy Little and Neil Robbins for their dedication and for relinquishing their own personal time to complete these exhibits on schedule.

This past year, in the experimental laboratory, five different projects requiring cerebral fluorescein angiography were carried out. Over 15,000, 35 mm. photographs were taken, processed, mounted and labelled for a total of 61 experiments.

A twelve-minute sound movie on computer analysis of EEG's was completed for the Computer Department and has been shown in Cannes, France.

After years of making all the charts and graphs for the hospital and institute, Miss Judy Little has moved to the photographic part of the department and is now becoming a medical photographer.

During this past year Miss Little and Mr. Hodge attended the annual meeting of the Biological Photographic Association in Richmond, Virginia. Mr. Hodge also attended the Cerebral Blood Flow Meeting in Philadelphia, as well as the International Congress of Neurosurgery in Tokyo, Japan.

Tumour Registry

DR. ARTHUR R. ELVIDGE

During 1973 the Tumour Registry processed 264 case records of tumour and tumour suspect, directly or indirectly involving the Nervous System. Ninety-seven of these were new admissions and 167 re-admissions. Tumour cases have maintained a fairly constant level over the past 4 years. They represent 12% of the total admissions to the Montreal Neurological Hospital. Eighty-six of the new cases, and 23 with recurrence, were verified by pathological examination and at autopsy. There were 83 surgical operations which figure includes 67 new cases and 16 re-admissions. They comprise 10% of the total operative load of the hospital. Forty-nine patients, 33 new and 16 re-admissions, were treated by roentgen therapy. Of the 33 new patients, 13 were treated by radiation alone. There were 43 mortalities and autopsy was performed in 15. The total number of visits to clinic was 87.

Library

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

Thanks to our improved financial position it is now possible to acquire more worthwhile publications in the neurosciences. Slightly over 400 books and bound periodicals were added to the Institute's holdings; 260 in the Library and the remainder in various departments.

However, this happy situation has contributed to a critical problem – that of space. After calculating our needs for the next 24 to 30 months, i.e. until the construction of the new wing is completed, the only way to deal with the space crisis is to store infrequently-used materials. At present, periodicals published before 1940 have been put into " deep storage " and can be supplied only through loans from other libraries. Periodicals published between 1940 and 1950 have been shelved in less accessible areas of the Library or elsewhere on the 6th floor.

These measures provide only temporary relief as far as current acquisitions are concerned. Unless another group of older books are placed in storage there will be no room for new materials by the summer of 1974.

Our recataloguing project is nearing completion and by mid-1974 each book will have its permanent location and library users will once again know where to find their favorite volumes.

A closed bookcase has been installed and a larger number of books have been placed " on reserve " for greater after-hours security.

Miss Joan Darling was in charge of the Library during Mrs. Boski's absence in November and December. We would like to thank her for a job

well done. Miss Hiroko Ozaki has joined the Library staff on a temporary basis to help with the recataloguing. With her assistance we hope to complete this project by September 1, 1974.

Montreal Neurological Society

President..... Dr. D.W. Baxter
Vice-President..... Dr. N. Giard
Secretary-Treasurer..... Dr. R.R. Hansebout

During the past year meetings were held once a month from October 1973 through May 1974. The meetings were hosted by the Montreal Neurological Institute and the Notre-Dame Hospital.

Papers read before the Society were as follows :

DR. SADEK K. HILAL, Professor of Radiology, Neurological Institute, New York, New York : " Therapeutic Embolization of Cerebral Arteriovenous Malformations ".

DR. T. A. LAMBO, Assistant Director-General, World Health Organization, Geneva : " The World Health Organization Program in the Neurosciences ".

DR. IGOR KLATZO, Chief of Laboratory of Neuropathology and Neuro-anatomical Sciences, N.I.N.D.S., U.S.A. and DR. H.J. REULEN, Associate Professor of Neurosurgery, University of Mainz, Germany : " Symposium on Experimental Cerebral Ischemia ".

DR. ROMEO ETHIER, Director, Department of Radiology, Montreal Neurological Hospital : " L'Emi Scan, une nouvelle dimension ".

DR. JEAN CAMBIER, Professor of Neurology, Neurological Clinic of the Faculty Xavier Bichat, France : " Sémiologie Motrice des Syndromes Frontaux ".

DR. LABE C. SCHEINBERG, Professor of Neurology, Director, Department of Neurology, St. Barnabas Hospital, New York : " Cerebellar Stimulation for Epilepsy and Motor Disorders ".

DR. THEODORE H. BULLOCK, Department of Neurosciences, School of Medicine, University of California, San Diego : " Noise in the Neurons : some distinctions among issues and controversies on how brains work ".

The Annual Dinner of the Society was held on May 29, 1974, at the Mount Stephen Club.

The Society officers for the 1974-75 year are : President, Dr. N. Giard ; Vice-President, Dr. G. Watters ; Secretary-Treasurer, Dr. I. Woods.

Fellows' Society

President..... Patrick J. Murray, M.D.
Vice-President..... Eugene Kuchner, M.D.
Secretary-Treasurer..... André Gagnon, M.D.

The Fellows' Society enjoyed an active year which was highlighted by the Annual Fellows' Society Lecture and Banquet in June. This year's guest is Dr. Sean Mullan, Professor of Neurosurgery, University of Chicago.

Socially we had a delightful evening in the company of Dr. André Barbeau, and another in the company of the Wives' Society, when Dr. R. Ethier and Dr. G. Bertrand gave us all a " big-fish " story. We also had two dance parties where we entertained wives and nurses.

The traditional hockey game showed the exceptionally smooth skill of both doctors and wives on the ice.

The Fellows' Society wishes to acknowledge with gratitude the several donations received this year from former Fellows.

The Officers for 1974-75 are :

President..... Ilo Leppik, M.D.
Vice-President..... Jean-Guy Villemure, M.D.
Secretary-Treasurer..... James St. John, M.D.

The Montreal Neurological Women's Society

1973-74

President..... Pam Ball
Vice-President..... Joan Kuchner
Editor..... Jan Ives
Secretary..... Sue Terry
Treasurer..... Shirley Epps
Book Club Chairwoman. Anita Heller
Welcoming Committee Chairwoman..... Nicole Thompson

The new Fellows and their spouses were welcomed in July at the annual swimming pool party.

Mrs. Feindel hosted the first general meeting in September at which time the purpose of the group was outlined.

Two enjoyable events occurred in November :
A down-hill ski talk by Valerie Reiger highlighted the general meeting which was held in the home of Mrs. Ford, and at the invitation of the Royal Victoria Women's Group we joined them at a Montessori School Program evening.

December was filled with the usual holidays and activities. These included the annual children's Christmas party and a bake sale. The proceeds from the bake sale were donated towards the improvement of the children's play balcony of the Montreal Neurological Hospital.

In February the general meeting was held at the home of Mrs. Rasmussen at which time constitutional amendments were discussed. It was proposed that non-medical students and staff members in allied fields be officially included in the Women's group. It was also suggested that the committee chairmanship assume their duties in ample time to enable them to be well organized for an early start of activities in September.

The Annual Hockey Game between Staff and Nurses was held in February. This was well attended both on and off the ice and was most enjoyable.

At the March meeting, which was held at the Faculty Club, Dr. Bertrand and Dr. Ethier showed a championship tuna fishing and hunting film which was taken in the northern wilds.

April was a busy month with a sugaring-off party at La Goudrelle. A joint meeting was held with the members of the Royal Victoria Wives. The guest speakers at this meeting were Dr. W. Burnham of Zero Population Growth and Lou Collon of Family Planning.

The final event of the year was the Potluck Supper which was held in the home of Mrs. Robb.. Many interesting dishes were presented by the individual members.

The Book Club continued with its interesting and varied selection of novels.

Officers for 1974-75 are :

President	Joan Kuchner	*Secretary*	Margo Smith
Vice-President	Peggy Leppick	*Treasurer*	Brenda Murray
Co-Editors	Jan Ives	*Welcoming Committee*	
	Julie Mathieson	*Chairwomen*	Anita Heller
Book Club Chairwoman	Harriet Rothman		Barbara Sherwin

Clinical Training Opportunities

NEUROLOGY

The Department of Neurology and Neurosurgery of McGill University offers opportunities for clinical training in Neurology in the four major McGill Teaching Hospitals – The Montreal Neurological Hospital, the Royal Victoria Hospital, the Montreal General Hospital, and the Montreal Children's Hospital – and the Jewish General Hospital.

Residency training is available at three levels and is open to graduates who have completed a year of interneship and a year of Internal Medicine at approved hospitals :

Assistant Resident (1 year)
Resident (1 year)
Teaching Fellow (1 year)

The Assistant Resident and Resident appointments are each divided into two six-month periods, with rotations arranged among the McGill Hospitals.

The Teaching Fellow appointment offers a third year of clinical experience open to candidates who have completed their earlier training in this Department.

Laboratory training fellowships are available in Electroencephalography, Clinical Neurophysiology and Neuropathology. Appointments are usually made for periods of twelve months, though some appointments may be for six-month periods.

Other 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 Hospital Insurance Service 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 program Director for Neurology, Montreal Neurological Institute, 3801 University Street, Montreal H3A 2B4, P.Q.

NEUROSURGERY

The Department of Neurology and Neurosurgery of McGill University offers opportunities for clinical training in Neurosurgery in three of the major McGill Teaching Hospitals, the Montreal Neurological Hospital, the Montreal General Hospital and the Montreal Children's Hospital.

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

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

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

A limited number of training stipends are provided by the Quebec Hospital Insurance Service and from Institute funds.

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

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

Courses of Instruction

UNDERGRADUATE

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

GRADUATE

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

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

NEUROSCIENCES SEMINAR

G531-602H This is a course of weekly seminars, given during the academic year, designed to present over a 2-year period a concise, up-to-date review of the basic neurological disciplines. Mondays, 4:30 – 6:00 p.m. Professors Gloor, Wolfe, Feindel, and other members of the Departments 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 8:30 p.m. monthly during the Academic Year. Staff and Visiting Lecturers

G531-631H Seizure and EEG conference – alternate Thursdays 5:30 p.m. Professors Rasmussen, Andermann, Gloor, Milner and Ethier

NEUROCHEMISTRY

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

NEUROPATHOLOGY

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

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

G531-652A Introduction to Histopathology of the Nervous System, a short basic course for a limited number. By special arrangement. Professors Mathieson

NEURORADIOLOGY

G531-660H Practical instruction in techniques and interpretation.

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

ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY

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

NEUROPSYCHOLOGY

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

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

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1973-74

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MONTREAL NEUROLOGICAL HOSPITAL

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

BALANCE SHEET AS AT DECEMBER 31, 1973

GENERAL FUND

ASSETS	1973	1972
Cash	$ 516,171	$186,026
Accounts receivable—less provision for doubtful accounts	388,494	318,636
Due from The Quebec Department of Social Affairs		
Operating grants	428,568	270,432
Special grant	90,000	90,000
Inventory of supplies at cost	124,657	115,384
	$1,547,890	$980,478
LIABILITIES		
Bank loan	$ 249,125	$ –
Accounts payable	91,966	151,719
Due to Royal Institution for the Advancement of Learning		
Current account	1,206,799	828,759
Advances to cover deficit	563,031	418,800
DEFICIT (Note 1)	(563,031)	(418,800)
	$1,547,890	$980,478

PLANT FUND

ASSETS			
Cash		$ 47,363	$ 4,039
Due from The Quebec Department of Social Affairs		226,148	41,866
Fixed assets, at cost			
Equipment	$2,102,776		
Less : Accumulated depreciation	813,969	1,288,807	720,808
		$1,562,318	$766,713
LIABILITIES			
Due to Royal Institution for the Advancement of Learning.		$ 273,511	$ 45,905
CAPITAL		1,288,807	720,808
		$1,562,318	$766,713

MONTREAL NEUROLOGICAL HOSPITAL
STATEMENT OF OPERATIONS
FOR THE YEAR ENDED DECEMBER 31, 1973

	1973	1972
INCOME :		
Quebec Department of Social Affairs (Note 1)	$3,933,713	$3,612,606
Revenue from patients	1,327,943	1,172,568
Grants – Quebec Department of Social Affairs	90,000	90,000
– City of Montreal	–	67,500
Other income	16,349	17,668
	5,368,005	4,960,342
EXPENSE :		
Salaries and wages	4,097,433	3,729,026
Fringe benefits	253,265	197,799
Drugs, medical and surgical supplies	255,819	214,399
Services and supplies	1,052,111	960,575
	5,658,628	5,101,799
DEFICIT FOR THE YEAR	$ 290,623	$ 141,457

STATEMENT OF GENERAL FUND DEFICIT
FOR THE YEAR ENDED DECEMBER 31, 1973

Balance at beginning of the year – as reported	$ 663,032	$336,161
Deduct : Estimated year end adjustment of offset income for the years 1971 and 1972 (Note 1)	214,232	57,991
Balance at beginning of the year – as restated	418,800	278,170
Deduct :		
Settlement from The Quebec Department of Social Affairs on account of 1971	191,134	–
Advances from Government of Quebec on account of 1971	–	59,687
Adjustment of prior years' deficit	125	827
	227,541	217,656
Add :		
Salary adjustments retroactive to 1971 and 1972	44,867	–
Salary adjustment retroactive to 1971	–	59,687
Deficit for the year	290,623	141,457
Balance at end of the year (Note 1)	$ 563,031	$418,800

STATEMENT OF PLANT FUND CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 1973

Balance at beginning of the year	$ 720,808	$636,466
Increase in plant capital	699,422	175,664
	1,420,230	812,130
Less : Depreciation on equipment	131,423	91,322
Balance at end of the year	$1,288,807	$720,808

NOTES TO FINANCIAL STATEMENTS
DECEMBER 31, 1973

1. *Quebec Department of Social Affairs*
   Income includes payments from the Government of Quebec to the extent of the amounts approved to December 31, 1973 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.
   In 1973 the Hospital adopted the practice of recording in the accounts the estimated year end adjustment of offset income. As a result the deficit for the year increased $86,862 and the general fund deficit decreased $64,234. The 1972 figures have been restated to conform with this accounting treatment of the offset income adjustment.
   On March 27, 1974, the Hospital received approval of the year end settlement for 1972 and prior years in the amount of approximately $151,000.
2. *Contingent Liabilities*
   Employees' accumulated sickness benefits, which are recoverable from the Department of Social Affairs when paid, amounted to $304,000 at December 31, 1973. These sickness benefits are payable when an employee terminates his services and are expensed at that time.

AUDITORS' REPORT

To the Board of Management,
Montreal Neurological Hospital.

We have examined the balance sheet of the Montreal Neurological Hospital as at December 31, 1973 and the statements of operations, general fund deficit and plant fund capital for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion these financial statements present fairly the financial position of the Hospital as at December 31, 1973 and the results of its operations for the year then ended, in accordance with generally accepted accounting principles applied, except for the accounting for the estimated year end adjustment of offset income, as described in Note 1, on a basis consistent with that of the preceding year.

Montreal, Que.
April 29, 1974.

TOUCHE ROSS & CO.
Chartered Accountants.

MONTREAL NEUROLOGICAL INSTITUTE
RESEARCH AND TEACHING EXPENDITURE SUMMARY
FOR THE YEAR ENDING DECEMBER 31, 1973

M.N.I. – Endowment Funds	$ 475,330.
M.N.I. – Special Funds and Donations	436,938.
General University Funds	21,200.
Research and Fellowship Grants	357,380.
TOTAL	$1,290,848.

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

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. A. Olivier
– Dr. H. Pappius
– Dr. W. Sheremata
– Dr. A Sherwin
– Dr. L. Wolfe
– Dr. I. Woods

Medical Research Council of Canada Associateships

– Dr. B. Milner
– Dr. L. Wolfe

Muscular Dystrophy Association Research Grants

– Dr. S. Carpenter
– Dr. A. Eisen
– Dr. G. Karpati
– Dr. G. Watters

Multiple Sclerosis Society of Canada

– Dr. W. Sheremata

DONATIONS TO SPECIAL FUNDS – 1973-74

ANAESTHESIA RESEARCH FUND :	
BRAIN RESEARCH FUND :	
Mr. A. Murray Vaughan	$ 1,000.00
Mrs. A. Murray Vaughan	1,000.00
CANCER CLINICAL RELIEF FUND :	
Mrs. Edith L. Dawson (In Memory of the late Miss Gail Budd)	25.00
WILLIAM CONE MEMORIAL RESEARCH FUND :	
Dr. David Berger	25.00
Mr. Jacques Boulais	200.00
Mr. K.H. Brown	50.00
The Harold Crabtree Foundation	5,000.00
Dr. Russell N. DeJong	75.00
Mrs. Margaret Flynn	100.00
Col. K.B. Jenckes	150.00
The Macdonald Stewart Foundation	750.00
Mrs. Edna J. Roberts (In Memory of the late Dr. George D. Little)	25.00
Mr. Hugh G. Seybold	50.00
Dr. Harley S. Smith	75.00
COSGROVE RESEARCH FUND :	
Mr. Michel Bourgeois	500.00
Mr. J.A. de Lalanne	200.00
Miss Doreen Jurychuk	20.00
Dr. Abe Rockman	25.00
Dr. Brian Younge	35.00
DICK EPILEPSY FUND :	
GORDON LIBRARY FUND :	
HARVEY CUSHING CLINICAL RELIEF FUND :	
Anonymous	50.00
Canadian Cancer Society	210.00
In His Name Society	81.00
Mrs. Lillian Sandler	30.00
Women's Auxiliary of the Royal Victoria Hospital	2,500.00
HOSPITAL EQUIPMENT FUND :	
MARY MASSABKY FOUNDATION RESEARCH FUND :	
MISCELLANEOUS SPECIAL FUNDS :	
In Memory of the late Mr. Ali Caglar Akgungor	200.00
In Memory of the late Mrs. Charles Allebone	82.75
In Memory of the late Mr. Théophile Aras	15.00
In Memory of the late Mr. J. Howard Beatt	232.00
In Memory of the late Mr. Randall G. Bloom	18.80
In Memory of the late Miss Louise Cohen	208.00
In Memory of the late Mrs. Annie Mabel Hawker	10.00
In Memory of the late Mrs. R.B. Henry	5.00
In Memory of the late Mrs. Elizabeth Jankowski	65.00
In Memory of the late Mr. Max Lemenu	105.00
In Memory of the late Mr. William R., Mardell	25.00

In Memory of the late Mrs. Freda Ostin	112.00
In Memory of the late Mr. Rosaire H. Piotte	325.27
In Memory of the late Miss Beatrice Pollock	10.00
In Memory of the late Mrs. Joan Ramstead	120.00
In Memory of the late Mr. Harold Toulch	10.00
M.N.I. BUILDING FUND :	
Mr. T.H.P. Molson and Hon.H. de M. Molson	100,000.00
M.N.I. NEUROSURGICAL RESEARCH FUND :	
In Memory of the late Mrs. Margaret Bales	325.00
Mr. Ruby Cobrin	1,000.00
In Memory of the late Mr. Stanley Dobranski	195.00
Mr. Sydney Glazer	500.00
Mr. John Nazwalsky	20.00
Mr. Leo Posman	1,000.00
M.N.I. PARKINSON'S DISEASE FUND :	
Mrs. Camilla Marcucci (In Memory of her late Husband)	130.00
In Memory of the late Mr. Lovell C. Carroll	542.00
M.N.I. STAFF LOAN FUND :	
MULTIPLE SCLEROSIS CLINICAL RELIEF FUND :	
Multiple Sclerosis Golf League	300.00
Mr. John D. Symmers	100.00
Montreal Association for Multiple Sclerosis	750.00
MULTIPLE SCLEROSIS RESEARCH FUND :	
Mr. Alain Chavagnac	100.00
Miss Michelle Chavagnac	100.00
Mr. J. Peter Johnson	250.00
Mr. Roland Laurin	100.00
McNAUGHTON NEUROANATOMY RESEARCH FUND :	
FRANCIS McNAUGHTON NEUROLOGICAL RESEARCH FUND :	
Mr. G.A. Bloom	40.00
Mrs. Rita Breitman	90.00
Mr. L. Ljunggren	10.00
Dr. G.R. Long	50.00
Mrs. Carmen Martinat	25.00
Mr. E. Norsworthy	50.00
Mr. Leo Posman	1,000.00
In Memory of the late Mrs. Johanna Rinast	284.00
Dr. Preston Robb	500.00
Mr. Clarence Rosenhek	250.00
Mr. Sydney Ross	10,000.00
Mr. Reginald Simmons	25.00
Mr. J. Clare Wilcox	100.00
NEUROLOGICAL RESEARCH FUND :	
Mr. and Mrs. Gerald J. Killeen (In Memory of their late son Randy)	1,000.00
The Steyning Foundation	3,000.00
J.W. McConnell Foundation	5,000.00
Mrs. Donna Hoppenheim	25.00
Mr. and Mrs. Harold Holst	100.00

NEUROPHYSIOLOGY RESEARCH FUND :

NEURORADIOLOGY RESEARCH AND TEACHING FUND :

NURSING FUNDS :

EILEEN C. FLANAGAN NURSING BURSARY FUND :
M.N.I. NURSING EDUCATION FUND :

Women's Auxiliary of the Royal Victoria Hospital	500.00

OAKLAWN FOUNDATION FELLOWSHIP FUND :

PENFIELD AWARD FUND :

PENFIELD RESEARCH FUND :

RASMUSSEN PORTRAIT FUND :

Mr. William F. Caveness	25.00
Dr. Floyd R. Cooper Jr.	50.00

REUBEN RABINOVITCH MEMORIAL FUND :

REUBEN RABINOVITCH MEMORIAL LIBRARY FUND :

LEWIS REFORD FELLOWS' FUND :

SHERWIN RESEARCH FUND :

Mrs. Fay Fraid Rosenfeld	1,000.00

SPECIAL PROJECTS FUND :

Anonymous	20,000.00

SPINAL CORD RESEARCH FUND :

Anonymous	200.00
In Memory of the late Stéphane Gendron (continued from last year)	318.50
Mrs. Clara Ornstein	20.00
In Memory of the late Mrs. Dorothy Scotcher	3,735.00

THOMAS WILLIS FUND :

R.V.H. WOMEN'S AUXILIARY FUND :

Women's Auxiliary of the Royal Victoria Hospital	3,000.00

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.

Nervous System Generally :

Multiple Sclerosis	75	
Motor Neurone Disease	20	
Friedreich's Ataxia	4	
Tuberous Sclerosis	1	
Demyelinating Disease	1	
Miscellaneous	13	114

Meninges :

Acute Purulent Meningitis	6	
Vertigo	11	
Subdural Haematoma	19	
Subarachnoid Haemorrhage	33	
Extradural Haematoma	14	
Intracerebral Haemorrhage	18	
CSF Rhinorrhea	8	
Miscellaneous	5	114

Brain :

Congenital Anomalies	6	
Hydrocephalus	17	
Abscess	1	
Syncope	7	
Head Injury (Contusion, Laceration, Traumatic Encephalopathy, Concussion, Skull Fracture)	158	
Epilepsy	322	
Tremors	9	
AV Malformation	17	
Arnold-Chiari Deformity	5	
Headache	44	
Migraine	39	
Parkinsonism	44	
Thrombosis, Encephalopathy due to Arteriosclerosis	166	
Aneurysm	11	
Encephalitis	8	
Tay-Sach's Disease	1	
Amnesia	2	
Miscellaneous	21	878

Tumours :

Astrocytoma	24	
Glioblastoma Multiforme	22	
Gliomas	21	
Meningeal Fibroblastoma	10	
Tumours of Nerve Sheath	5	
Pituitary and Hypophyseal Duct Tumours	3	
Brain Tumour Suspected	13	
Metastatic Carcinoma	62	
Chromophobe Adenoma of Pituitary	14	

Schwannoma	9	
Ependymona	5	
Miscellaneous	54	242

Spinal Cord :

Compression of Spinal Cord	7	
Guillain-Barré Syndrome	8	
Myelopathy	13	
Syringomyelia	3	
Cervical Spondylosis	13	
Radiculopathy	30	
Hydromyelia	2	
Spinal Arachnoiditis	8	
Miscellaneous	42	126

Cranial and Peripheral Nerves :

Optic Neuritis	6	
Trigeminal Neuralgia	24	
Menière's Syndrome	4	
Compression Ulnar Nerve	2	
Carpal Tunnel Syndrome	15	
Other Neuralgias	5	
Peripheral Neuropathy	23	
VI Nerve Palsy	3	
Ulnar Nerve Entrapment	13	
Tinnitus	5	
Labyrinthitis	1	
Miscellaneous	30	131

Muscles :

Myasthenia Gravis	16	
Muscular Dystrophy	10	
Myopathy	1	
Spasmodic Torticollis	4	
Dystonia Musculorum Deformans	7	
Familial Tremor	1	
Meralgia Paraesthetica	1	
Familial Spastic Paraplegia	1	
Muscular Weakness	5	
Miscellaneous	10	56

Mental Disease :

Mental Retardation	19	
Depression	15	
Anxiety State	10	
Conversion Hysteria	14	
Alzheimer's Disease	21	
Schizophrenia	2	
Drug Intoxication	5	
Behaviour Disorder	6	
Miscellaneous	3	95

Disc Protrusion	– Lumbar	112	
	– Cervical	41	
Cranial Defects		5	
Fracture and/or Dislocation Vertebral Column		37	
Back Pain		37	
Pain Miscellaneous		42	
Rheumatoid Arthritis		2	
Diabetes Mellitus		11	
Miscellaneous		40	327

TOTAL 2083

CLASSIFICATION OF OPERATIONS – 1973

Craniotomy and Craniectomy		
and biopsy	4	
and decompression	12	
and drainage of abscess	1	
and drainage of subdural haematoma	13	
and drainage of intracerebral haematoma	7	
and drainage of extradural haematoma	4	
and elevation of depressed skull fracture	2	
and excision of epileptogenic focus (lobectomy)	53	
and excision, clipping or wrapping of aneurysm	19	
and hypophysectomy for pituitary or intrasellar tumour	1	
and hypophysectomy (transphenoidal) for endocrine control	5	
and hypophysectomy (transphenoidal) for pituitary or intrasellar tumour	12	
and incision, drainage or removal of cyst	1	
and plastic repair of dura (CSF, rhinorrhea or fistula)	6	
and plastic repair of skull defect (plate, bone or plastic)	3	
and removal of arteriovenous malformation	7	
and removal of posterior fossa tumour	14	
and removal of cerebral tumour	52	
and trigeminal rhizotomy	9	
and ventriculo-cisternostomy (Torkildsen's)	1	226
Trepanation		
and biopsy	3	
and drainage of subdural space	17	
and exploration	1	
and ventriculography	17	37
Shunt Procedure :		
lumbar subarachnoid peritoneal	1	
ventricular caval	30	
ventricular peritoneal	3	34

Stereotaxic Procedure :		
ventriculography	2	
second stage	23	25
Laminectomy and Hemilaminectomy		
anterolateral cordotomy – thoracic	11	
decompression or exploration of spinal cord for spondylosis (dentate ligament section)	12	
decompression or exploration of spinal cord	1	
discoidectomy – lumbosacral	69	
discoidectomy – thoracic	1	
discoidectomy – cervical	4	
incision and drainage of abscess	2	
incision and drainage of intramedullary cyst (syringomyelia)	3	
removal of haematoma	1	
removal of adhesions	1	
removal of tumour – intramedullary	3	
removal of tumour – extramedullary, intradural	7	
removal of extradural tumour – metastatic, bone, etc	4	
rhizotomy	6	
spinal fusion with bone graft – autogenous or bone bank	20	
spinal fusion with wire or plate	7	
spinal fusion – cervical – occipital	1	
percutaneous cordotomy	1	
discoidectomy – anterior approach – cervical	26	180
Nerve Exploration :		
avulsion or section	7	
excision of neuroma	2	
neurolysis, transplantation or decompression	32	41
Artery Exploration :		
endarterectomy (patch graft)	5	
progressive occlusion (Selverstone clamp)	4	9
Wound Re-opening		
drainage of infection	1	
evacuation of haematoma	6	
further removal of brain tissue	1	
further removal of tumour	1	9*
Miscellaneous :		
diagnostic spinal anaesthesia	9	
miscellaneous	32	
plaster cast	1	
tracheostomy	17	
muscle biopsy	87	146
TOTAL		698

Radiological Procedures :		
cerebral angiography :		
– percutaneous, carotid, vertebral or subclavian	370	
– catheterization (brachial, femoral or carotid)	198	
– pneumograms under anaesthesia	273	
TOTAL		841

* Not included in count

CAUSES OF DEATH

Head injury (concussion, contusion, haematomata)	20	
Intracranial aneurysm (haemorrhage, haematomata due to aneurysm)	10	
Cerebrovascular disease (thrombosis, infarction, haemorrhage)	28	
Intracranial tumour, primary	12	
Intracranial tumour, metastatic	9	
Coronary occlusion	4	
Other systems	17	
TOTAL		100