

To

DR. F. CYRIL JAMES,
PRINCIPAL AND VICE-CHANCELLOR,
MCGILL UNIVERSITY,
MONTREAL.

Sir,

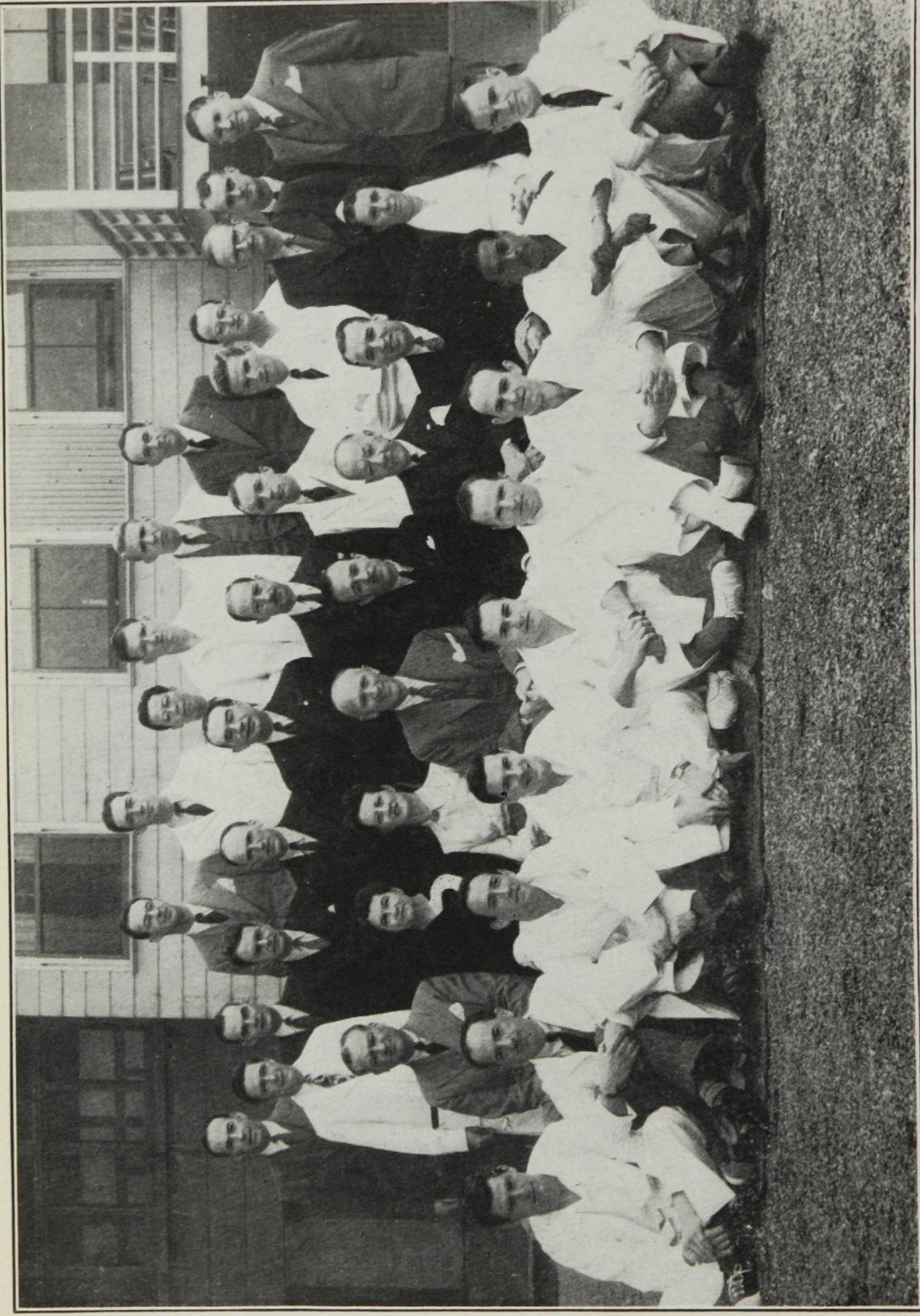
On behalf of the Executive Committee I have the honour to submit the eleventh annual report of the Montreal Neurological Institute. It includes a summary of the clinical work for the calendar year of 1945, together with the scientific and research record for the academic year of 1945-46, and the list of professional staff at the close of the academic year.

Respectfully submitted,

J. PRESTON ROBB, M.D.,

Registrar.

*Executive Committee of the Montreal Neurological Institute:
Wilder Penfield, Chairman, W. V. Cone, A. R. Elvidge, H. H.
Jasper, J. Kershman, F. H. Mackay, D. S. McEachern, F. L.
McNaughton, C. K. Russel, J. P. Robb, A. W. Young.*



Back Row: W. H. FEINDEL, H. F. STEELMAN, C. J. CHEN, A. A. MORRIS, JR., C. W. CURE, T. B. RASMUSSEN.
 Third Row: C. M. FISHER, J. M. THOMPSON, D. McRAE, K. A. C. ELLIOT, F. L. McNAUGHTON,
 J. KERSHMAN, H. H. JASPER, A. POPE, J. S. MYER, G. E. JORON, J. FORTUYN, A. A. BAILEY, A. R. ELVIDGE.
 Second Row: D. McEACHERN, MRS. E. McL. DAVIDSON, DR. FRANCES RICHARDSON, W. PENFIELD,
 PRINCIPAL JAMES, C. K. RUSSEL, W. V. CONE, MISS E. C. FLANAGAN.
 Sitting In Front Row: E. W. PETERSEN, R. RABINOVITCH, I. SCHIFFER, G. W. THOMAS, C. BERTRAND,

CLINICAL STAFF

Director	WILDER PENFIELD, C.M.G., M.D., D.Sc., F.R.C.S. (C). Hon. F.R.C.S. (Eng.) F.R.S. (C). F.R.S. (Lond.)
Honorary Neurologists	A. G. MORPHY, B.A., M.D. COLIN RUSSEL, B.A., M.D., F.R.C.P. (C).
Chief of Neurological Service	DONALD McEACHERN, M.D.
Consulting Neurologist	F. H. MACKAY, M.D., F.R.C.P. (C).
Associate Neurologists	JOHN KERSHMAN, B.Sc., M.D., C.M., M.Sc. FRANCIS McNAUGHTON, B.A., M.D., C.M. ARTHUR W. YOUNG, M.D., C.M., F.R.C.P. (C).
Associate Consulting Neurologists	ROMA AMYOT, B.A., M.D. (Paris) ANTONIO BARBEAU, M.D., Ph.D. EMILE LEGRAND, M.D. Médecin Légiste (Paris) JEAN SAUCIER, B.A., M.D. (Paris and Montreal). NORMAN VINER, B.A., M.D., C.M.
Clinical Assistants in Neurology	ALLAN A. BAILEY, M.D., M.S. C. MILLER FISHER, B.A., M.D. J. PRESTON ROBB, B.Sc., M.D., C.M.
Chief of Neurosurgical Service	WILLIAM CONE, B.S., M.D., F.R.C.S. (C). F.R.S.C.
Associate Neurosurgeons	ARTHUR ELVIDGE, M.Sc., M.D., C.M., Ph.D. F.R.C.S. (C). THEODORE RASMUSSEN, B.S., M.D., M.S.
Clinical Assistants in Neurosurgery	CLAUDE BERTRAND, B.A., M.D. MURTON SHAVER, B.A., M.D. *O. W. STEWART, B.S., M.D. H. S. STEELMAN, B.S., M.D.
Roentgenologist	DONALD L. McRAE, M.D.
Consulting Roentgenologist	CARLETON B. PEIRCE, B.A., M.Sc., M.D., F.A.P.C.
Physician in charge of Electroencephalography	HERBERT H. JASPER, Ph.D., D.ès Sci. (Paris) M.D., C.M.
Anaesthetist	FRANCES RICHARDSON, B.Sc., M.D., C.M.
Consulting Anaesthetist	F. A. H. WILKINSON, M.D., D.A. (R.C.P. & S. Eng.)
Supervisor of Nurses	EILEEN FLANAGAN, B.A., R.N.
Assistant Supervisor of Nurses	BERTHA CAMERON, R.N.
Director of Social Service	ELABEL McL. DAVIDSON

*On active service.

RESIDENT STAFF (1945-1946)

Resident Neurosurgeon	CLAUDE BERTRAND, B.A., M.D.
Resident Neurologist	WILLIAM C. GIBSON, B.A., M.Sc., Ph.D., M.D., C.M.
First Ass't. Resident Neurosurgeon	WILLIAM K. WELCH, B.S., M.D.
Second Ass't. Resident Neurosurgeon	H. F. STEELMAN, B.S., M.D.; GORDON W. THOMAS, B.A., M.D., C.M.*
Interne in Neurosurgery (1)	E. M. FOUNTAIN, A.B., M.D.; I. SCHIFFER, M.D.
(2)	J. W. PATRICK, B.A., M.D., CM.*; N. SLOAN, M.D.*, J. CHANDY, M.B., B.S., M.D.
(3)	W. A. LOCKINGTON, M.D.*; W. F. CAVENESS, A.B., M.D., F. H. O'BRIEN, A.B., M.D.
(4)	C. M. FISHER, B.A., M.D.**; J. G. WISWELL, B.A., B.Sc., M.D., C.M.**
Interne in Neurology (5)	J. R. WILSON, M.D., C.M.***; Consuelo Keller, A.B., M.D.**; C. J. CHEN, M.D.; H. G. KELLY, M.D., C.M.

*Combined Services Neurosurgical Treatment Centre.

**Assistant resident on rotation from Medicine, Royal Victoria Hospital.

***Seconded from the R.C.N. for six months service.

NURSING STAFF

Supervisor	MISS EILEEN C. FLANAGAN, B.A., R.N.
Assistant Supervisor	MISS BERTHA CAMERON, R.N.
Instructor	MISS ELIZABETH LONG, R.N.
Night Supervisor	MISS MARION BARROWMAN, R.N.
Assistant Night Supervisor	MISS LILLIAN MCAULEY, R.N.
Operating Room Supervisor	MISS ELIZABETH MACRAE, R.N.
Assistant Operating Room Supervisor	MISS M. CURRIE, R.N.

Operating Room Staff

MISS EVA CHONG, R.N.	MISS M. HAGGART, R.N.
MRS. BERYL LEONARDS, R.N.	MISS M. MCLELLAN, R.N.
MRS. IRENE GEDDES, R.N.	MISS M. HERRIOTT, R.N.
MISS KATHLEEN DRISCOLL, R.N.	MISS M. FILER, R.N.
MRS. GERTRUDE COLIVERAS, R.N.	MRS. VERONICA SWANEY, R.N.

Head Nurses—Wards

MISS M. MACKENZIE, R.N.	<i>Assistants</i>
MISS BRENDA DAVIS, R.N.	MISS B. THOMAS, R.N.
MISS M. CAVANAUGH, R.N.	MISS E. JOHNSON, R.N.
MISS E. EVANS, R.N.	MISS A. CROFT, R.N.
MISS E. MANSFIELD, R.N.	MISS E. SAWDON, R.N.

Dressing Room Assistants

MISS M. COMEAU, R.N.	MISS VERA YOUNG, R.N.
MISS I. MILLER, R.N.	MRS. L. DAGENAI, R.N.
MISS J. MCGREGOR, R.N.	MRS. M. CORRIGAN, R.N.

General Staff Nurses

MISS C. MILLER, R.N.	MISS L. MACDORMAND, R.N.
MISS D. BILOKRELEY, R.N.	MISS E. CHRISTENSON, R.N.
MISS C. LAMOUREUX, R.N.	MISS T. MURRAY, R.N.
MISS J. SEWELL, R.N.	MISS B. FORSYTHE, R.N.
MISS O. MCCONNELL, R.N.	MISS NELL KOSIEC, R.N.
MISS L. FRAPPIER, R.N.	MISS MARY GREENE, R.N.
MISS A. FILION, R.N.	MISS MARY CAMPBELL, R.N.
MISS J. POLLARD, R.N.	MISS ALICE JEFFREY, R.N.
MISS M. DAWSON, R.N.	MISS IRENE BOUDREAU, R.N.
MISS C. LAWRENCE, R.N.	MISS MARION MCAFEE, R.N.
MISS J. COWIE, R.N.	MISS GRACE MCEWEN, R.N.
MISS D. MACDONALD, R.N.	MISS VERA NASH, R.N.

EXECUTIVE STAFF OF THE MONTREAL NEUROLOGICAL INSTITUTE

Director	WILDER PENFIELD
Registrar	J. PRESTON ROBB
Financial Supervisor	JOHN KERSHMAN
Building Administration Supervisor	MISS EILEEN FLANAGAN
Secretary to the Director	MISS ANNE DAWSON

LABORATORY AND RESEARCH STAFF

Neuropathologist	WILLIAM CONE, B.S., M.D.
Assistant Neuropathologist	MURTON SHAVER, B.A., M.D.
Fellow in Neuropathology	ARTHUR A. MORRIS, JR., A.B., M.D.
Neurochemist	DONALD MCEACHERN, M.D.
Research Neurochemist	K. A. C. ELLIOTT, M.Sc., Ph.D.
Neurophysiologist	HERBERT H. JASPER, Ph.D. D.ès Sci. (Paris) M.D., C.M.
Neuroanatomist	FRANCIS MCNAUGHTON, B.A., M.D., C.M.

Research Fellows of Montreal
Neurological Institute

C. W. CURE, A.B., M.D. (Indiana)
I. SCHIFFER, M.D. (Toronto)
A. POPE,* A.B., M.D., (Harvard)
H. F. STEELMAN, B.S., M.D. (Duke)
R. RABINOVITCH, B.A., M.D. (Paris)
J. FORTUYN** B.A., M.D. (Amsterdam)
J. LECUIRE*** M.D., (Lyon)

*U.S.N.R.C. Fellowship.

**Rockefeller Travelling Fellowship.

***French Government Travelling Fellowship.

TEACHING STAFF

A. Department of Neurology and Neurosurgery, McGill University Faculty of Medicine.

Professor of Neurology and Neurosurgery	WILDER PENFIELD
Associate Professor Neurology	COLIN RUSSEL
Associate Professor of Neurosurgery	WILLIAM CONE
Clinical Professor of Neurology	F. H. MACKAY
Assistant Professors of Neurology	K. A. C. ELLIOTT DONALD MCEACHERN FRANCIS MCNAUGHTON ARTHUR W. YOUNG
Assistant Professor of Neurosurgery	ARTHUR ELVIDGE
Assistant Professor of Neurological Radiology	DONALD L. MCRAE
Assistant Professor of Neurophysiology	HERBERT JASPER
Lecturers in Neurology	JOHN KERSHMAN NORMAN VINER
Lecturer in Neurosurgery	THEODORE RASMUSSEN
Demonstrators in Neurology	ALLAN A. BAILEY C. MILLER FISHER J. PRESTON ROBB
Demonstrator in Neurosurgery	*O. W. STEWART
Assistant Demonstrator in Neurosurgery	H. S. STEELMAN
Assistant Demonstrator in Neuropathology	W. K. WELCH

B. Faculty of Medicine of the University of Montreal.

Professeur de Psychiatrie	EMILE LEGRAND
Professeur de Neurologie	ANTONIO BARBEAU
Professeurs Agrégés de Neurologie	ROMA AMYOT JEAN SAUCIER

C. Department of Neurology and Neurosurgery, McGill University Faculty of Graduate Studies and Research.

Professor	WILDER PENFIELD
Associate Professor (in charge of graduate studies)	WILLIAM CONE
Assistant Professors	K. A. C. ELLIOTT FRANCIS MCNAUGHTON DONALD MCEACHERN HERBERT JASPER

*On active service.

APPOINTMENTS HELD IN GENERAL HOSPITALS OF MONTREAL
BY MEMBERS OF STAFF

ROYAL VICTORIA HOSPITAL

DEPARTMENT OF NEUROLOGY AND NEUROSURGERY

Neurologist and Neurosurgeon-in-Chief	WILDER PENFIELD
Neurologist	DONALD MCEACHERN
Neurosurgeon	WILLIAM V. CONE
Associate Neurologists	JOHN KERSHMAN FRANCIS L. MCNAUGHTON ARTHUR W. YOUNG
Electroencephalographer	HERBERT JASPER

Associate Neurosurgeon	ARTHUR R. ELVIDGE
Clinical Assistants in Neurosurgery	MURTON SHAVER T. B. RASMUSSEN
Clinical Assistants in Neurology	J. PRESTON ROBB C. MILLER FISHER

MONTREAL GENERAL HOSPITAL

DEPARTMENT OF NEUROLOGY

Neurologist	FRED H. MACKAY
Associates	ARTHUR R. ELVIDGE FRANCIS L. MCNAUGHTON NORMAN VINER
Assistants	ALLAN A. BAILEY J. PRESTON ROBB
Consulting Neurosurgeons	WILLIAM V. CONE WILDER PENFIELD

HOTEL DIEU

Neurologist-in-Charge	ANTONIO BARBEAU
Consulting Neurologist	EMILE LEGRAND

HOPITAL NOTRE-DAME

Neurologist-in-Chief	ROMA AMYOT
Assistant Neurologist	JEAN SAUCIER

ST. MARY'S HOSPITAL

Consultant in Neurology	ARTHUR W. YOUNG
Consultant in Neurosurgery	ARTHUR R. ELVIDGE

JEWISH GENERAL HOSPITAL

Chief of Department of Neuropsychiatry	JOHN KERSHMAN
Consultants	WILDER PENFIELD NORMAN VINER

REDDY MEMORIAL HOSPITAL

Consulting Neurologist	FRED H. MACKAY
Consulting Neurosurgeon	ARTHUR R. ELVIDGE
Attending Neurologist	JOHN KERSHMAN

VERDUN PROTESTANT HOSPITAL

Neurosurgery Consultant	WILDER PENFIELD
Neurosurgery Associate	ARTHUR R. ELVIDGE

CHILDREN'S MEMORIAL HOSPITAL

Honorary Consultants	FRED H. MACKAY COLIN RUSSEL
Consultant	WILDER PENFIELD
Neurologist	ARTHUR W. YOUNG
Associate Neurologist	FRANCIS L. MCNAUGHTON
Neurosurgeon	WILLIAM V. CONE
Associate Neurosurgeon	ARTHUR R. ELVIDGE

HOMEOPATHIC HOSPITAL

Consultant in Neurosurgery	WILLIAM V. CONE
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COMBINED NEUROSURGICAL TREATMENT CENTRE

Montreal Neurological Institute.....	Chief of service	LT.-COL. WM. CONE
Montreal Military Hospital	Consultant.....	COL. W. PENFIELD
St. Anne's Military Hospital	Consultant.....	MAJOR A. ELVIDGE

REPORT OF DIRECTOR

In September 1934 the Montreal Neurological Institute was "dedicated to the relief of sickness and pain and the study of neurology" We have cared for the sick from Montreal, from Quebec, and from a wider area. We have laboured as best we could to extend the frontiers of knowledge in our field and to train a new generation of workers. The time has come to discover whether this was enough, for we have reached an impasse.

Increasing costs have produced a financial situation that makes it impossible to continue the hospital activity of this institution unless further public support is forthcoming. We must therefore state the situation clearly. The report of the Executive Assistant on Hospitalization deals with our financial dilemma in some detail, so that I may speak in more general terms.

BUILDING

This Institute owes its existence to the generosity of various agencies: the Rockefeller Foundation, public spirited citizens of Montreal, the Province of Quebec, and the City of Montreal. A group of Montreal citizens paid for half of the cost of the original construction of the building, which was completed in 1934. The other half was donated by the Rockefeller Foundation. The addition of the Laboratory of Electroencephalography in 1938 was made possible by a second gift from the Rockefeller Foundation, which was matched again by Montreal citizens. The second addition, a Military Annex for service patients, was built as a war emergency measure by the Department of National Defence of the Dominion Government in 1944.

The reorganization for enlargement of clinical facilities within the Institute, which was necessitated by the building of the Military Annex, was made possible by donations amounting to nearly \$90,000.00 from the Maple Leaf Division of the British War Relief Fund through the influence of loyal Canadians in New York City.

MAINTENANCE

The maintenance of the Institute has been provided for from the beginning by annual grants of \$20,000 from the Province of Quebec and \$15,000 from the City of Montreal. The research laboratories and the academic work of the Department of Neurology and Neurosurgery of McGill University have been supported by income from an endowment of \$1,000,000.00 donated by the Rockefeller Foundation. Further research projects in laboratories and clinic have received additional financial support from lesser gifts originating in Canada and the United States.

In summary, therefore, Montreal citizens built the clinical portion while the Rockefeller Foundation built the laboratories and endowed them without undertaking any responsibility for the sick poor of this country This was properly considered to be a responsibility of this community and of this country, and the annual provincial and municipal grants were made in recognition of this to defray the resultant hospitalization deficits.

The hospital activities in the Institute are administered by the Royal Victoria Hospital, but any loss incurred must be borne by the Montreal Neurological Institute and McGill University. The University has never contributed from general funds to hospitalization costs. This has been taken care of by income from patients and the deficit on public cases has been covered by the annual contribution of Province and City. At the present time, with 100 patients instead of the initial 45, this contribution must be greatly increased if we are to continue to serve the public.

SPECIFIC NEEDS

The Montreal Neurological Institute must have:

First: Increased annual support for hospitalization. This is imperative.

Second: The building of a small addition to house that part of the clinical activity that was crowded over into the scientific portion of the building during the war emergency.

The above needs are clinical, but I should speak also for the scientific side. We have urgent need of support of research far beyond our present resources. In this newly won era of peace there are projects which deserve the assistance of the national government, a support which seems to be forthcoming in Britain and Russia, and probably also in the United States, for similar institutions in those countries. Perhaps it is not too presumptuous to urge that this Institute could spend Government funds for research as effectively as the institutes of those countries, and it seems self-evident that Canada will benefit from research within her own borders.

SERVICE TO THE PUBLIC

The Neurological Institute has served as a clearing house for the most critical cases throughout Quebec, and to some extent the Maritimes and the Western Provinces. The medical staff consists of both French and English practitioners, and through their other affiliations we maintain a very close contact with most of the hospitals of Montreal.

The Institute has been in operation for more than eleven years, the first five in peace and the last in war. During this latter period we mobilized our wards, our laboratories and our staff for war purposes. We have entered now into a new stage, and it becomes apparent that we cannot proceed without help from the public.

INTERNAL ORGANIZATION

A word should be added as to our internal organization.

There is no separate medical board nor board of governors for this Institute. The Director, the executive staff and the executive committee have taken full responsibility under authority from McGill.

There has been a widening spread of responsibility. The increased volume of clinical work has been dealt with by Dr. Cone and Dr. Russel, the chiefs of the two services, and by the executive staff, Dr. Robb and Dr. Kershman, as well as the Nursing Supervisor, Miss Flanagan.

My own desire during the next five years is to find time to carry out the scientific work which lured me into this field.

Further reorganization of administration is now proposed, and it seems well to list the Executive Staff so as to avoid confusion:

Financial Supervisor.....	DR. JOHN KERSHMAN
Acting Registrar	DR. C. MILLER FISHER
Supervisor of Building Administration	MISS EILEEN FLANAGAN
Director of Social Service	MRS. E. MCL. DAVIDSON
Secretary of the Director	MISS ANNE DAWSON

Dr. Russel has resigned as neurologist-in-charge and is succeeded by Dr. McEachern. But this is in no sense a retirement for Dr. Russel, who will continue to work here and to guide and stimulate the staff as in the past.

EDWARD ARCHIBALD

I cannot close this report without paying tribute to Canada's first neurosurgeon, Edward Archibald. After a long illness he died on December 18th, 1945. Life goes on in hospital and university. Men forget and sometimes they fail to recognize true greatness close at hand.

Dr. Archibald was a distinguished surgeon, scholar and linguist. He was also a gentleman — kindly, whimsical, and chivalrous. As a young man he was fascinated by the unexplored areas of surgery, and he chose to develop two non-existent special fields: the surgery of the brain and the surgery of the lung. Before long he had written a treatise on head injury in *American Practice of Surgery* which was a classic in the first decade of the twentieth century.

But after becoming Professor of Surgery at McGill University and Chief Surgeon at the Royal Victoria Hospital, he decided to restrict his work, and he therefore brought others to Montreal to take up neurosurgery. He handed over his practice, raised money for the support of the newcomers' laboratory, and enlisted the sympathetic assistance of Dean Martin. Thus it may be said that he, more than any other man, created neurosurgery here and laid the groundwork for the development of this Institute.

He then turned his full attention to the further development of the surgery of the lung, to such good purpose that Edward Archibald is now recognized the world round as one of the founders of this speciality.

We mourn his passing and acknowledge him as the founder of this school of neurosurgery.

REPORT OF THE NEUROLOGIST

DR. DONALD MCEACHERN

The life of an institution such as this is ever changing but its three-fold purpose remains the same. This, as I conceive it, includes care of the sick and relief of suffering, research work and investigation and, finally, the training of young men. I am given to hope that the Neurological Service is levelling to these aims. The staff, depleted and overworked during wartime, has been reinforced from the services. Enthusiastic and mature young men are returning keen for resident duty and post-graduate work. It is a privilege to work with them.

Dr. Colin K. Russel has retired from active charge of the service but has retained his keen interest much to the benefit of the service. His kindly wisdom and experience add much to our ward rounds and meetings.

The shortage of hospital beds remains a bugbear. We have ceased now to fret about this, and have devoted ourselves to using the available beds with the greatest possible efficiency. As a result, admissions and discharges for public patients have increased during the past six months from 34 per month to 44 per month, and the waiting list has been cut to nil. For this, all credit goes to my House Staff, to the untiring efforts of the nurses, and to the cooperation of the x-ray, electroencephalographic and other departments. The result has been that the average time for bed occupancy on the Neurological Service has fallen to 14 days as compared to 21 days for all patients. This abbreviation of hospital stay is not always a good thing for the patient.

Be that as it may, we have been forced to become a diagnostic service, and any attempts at long-term treatment (often desirable) have been abandoned. We, therefore, propose to set up an outpatient Neurological Treatment Clinic. This will follow the lead of the successful Histamine Treatment Clinic organized by Dr. A. W. Young, and will be under his direction. It will be staffed and equipped to enable daily service. We hope to provide special technical therapy, intravenous, intramuscular and intrathecal medication, peripheral nerve injections and physiotherapy. In this way, tried remedies may be applied and new and promising techniques assessed.

During 1945 there were 433 patients admitted to the Neurological Service. If the present rate of admission continues, this will be exceeded by 120 cases in 1946. One hundred and fifty-three consultations were given to other services. The outpatient clinics continued to be well attended. Five hundred and thirty-three new cases were seen last year, and there were 2,747 re-visits. The House Staff plays an essential role in these increasing activities, and provision will soon have to be made for another interne in order to cover the work adequately.

We welcome the return of service men who desire advanced training in neurology. Four have already come for short periods of 3 to 6 months and have done splendid work. Four others have been accepted for the three-year diploma course in neurology which will give them advanced training.

The Social Service Department, directed by Mrs. Davidson, has been of great help to the work of our service, and has added much to the care given patients both within and without the walls of the Institute.

After a year's vacation from it, thought must soon be given to undergraduate medical teaching. McGill was the real cradle of the Oslerian method — "The Student at the Bedside". We have not followed Osler's precept in this Institute, and will have to create the machinery whereby the student becomes a real co-partner on the wards.

I am not satisfied with our research approach to neurological problems. From the clinical viewpoint much good material remains to be assayed. From the more technical viewpoint, many recent fundamental discoveries await application to our problems on the wards. Such common ailments as epilepsy, disseminated sclerosis and some of the psychoses clearly demand a biochemical and metabolic approach. There is a gap between the two which must be spanned, and I am hopeful that we will find a way to do it.

In closing, may I say how happy I am to return to McGill and to this Institute. It is a pleasure once more to greet my colleagues, and a great stimulus to work with them.

REPORT OF THE NEUROSURGEON

DR. WILLIAM CONE

This report on the activities of the surgical service for the calendar year 1945 and the academic year 1945-1946 covers the eleventh year of the activities of the Neurosurgical Service in the Montreal Neurological Institute. The tenth anniversary report was given at the last annual meeting and the future looked promising. Alterations were under way at that time to make it possible to carry out the scientific study and the treatment of patients requiring neurosurgical therapy more promptly and more effectively.

The alterations have now been completed and have already proven to be so valuable that the hardships and inconveniences incident to them are balanced out. It was a time of considerable anxiety, however. Had it not been for the loyalty, adaptability, interest and skill of the nursing and resident staffs and the understanding tolerance of the patients, it would have been a most trying period. Much credit is due to Mr. H. L. Fetherstonhaugh (of Fetherstonhaugh and Durnford), Mr. E. G. M. Cape (of E. G. M. Cape and Company), Mr. J. D. Fry (of McDougall and Friedman), Mr. P. W. MacFarlane (Superintendent, Department of Building and Grounds, McGill University) and the Department of National Defence (Army), and all their various staffs for their thoughtful consideration. The work of the surgical department was not interrupted. The admission of patients was not curtailed. No complications attributable to the dislocation of routine arose.

Looking back over the year, it is difficult to understand how it was possible to do more than in the preceding year. Yet, there were nine hundred and fifty-five major operations carried out, ninety-nine more than in 1944, when eight hundred and sixty-four operations were done. Approximately twenty per cent of these were urgent cases requiring priority and interfering with planned work. This figure is five per cent lower than last year and it is hoped that with earlier diagnosis by the referring doctors, the percentage will continue to fall.

Now with alterations completed, more beds, increased facilities for operating, additions to the x-ray, electroencephalography and chemistry departments, it is already evident that with this additional backing, the responsibilities of the surgical service can be more readily met.

Dr. Donald McRae, in charge of Roentgenology, has won confidence, respect and gratitude. It seemed improbable that any one could take Dr. Arthur Childe's place, but Dr. McRae has done it well.

The surgical service now depends on the x-ray department of the Royal Victoria Hospital under Dr. Carleton Peirce for its emergency x-rays. Dr. Peirce's cooperation and kindness in dealing with these patients and the help of his staff are very much appreciated. When Dr. McRae has more assistance, this load, carried so helpfully by Dr. Peirce and his department, can be transferred back to the department here with advantage because of the problem of transportation and nursing of these emergency cases. To Dr. Peirce and his staff, the neurosurgical service is also grateful for the kindly consideration, interest and treatment that neurosurgical patients requiring deep x-ray therapy receive. Little Freddie Furey, a precocious boy aged six, whose medulloblastoma had previously been held in check by x-ray therapy, described his feelings and the feelings of

other patients so treated when he said on his return to the hospital with symptoms of recurrence: "Give that guy Bouchard (Dr. Jean Bouchard) another two days and my headaches will be gone"

When Dr. Frances Richardson joined Dr. Wilkinson's staff of Anesthetists at the Royal Victoria Hospital to take over the supervision of anesthesia here, the serious handicap, due to the shortage of anesthetists, was corrected. More than this, she brought with her, training, experience and teaching ability that have impressed every one. Complicated procedures have been less hazardous and have taken less time because of her skill and protection of the patients. The two new anaesthetic rooms have helped to lighten the load in the operating room and make the routine work run more smoothly.

As far as the operating rooms themselves are concerned, there have been some additions. Theatre No. 1 and No. 2 have improved air conditioning and a third theatre, also air conditioned, has been added. Each theatre has ultraviolet germicidal lamps installed to specifications prepared by Dr. Elvidge. The operating room lighting has been replaced by new Castle lights especially designed to meet the special requirements of neurosurgical work. Mr. E. Boucher, of Casgrain and Charbonneau, worked earnestly and persistently with the Castle Company until the exact needs were met. The lights are superb. Each theatre has oxygen piped to it from a central oxygen depot. Mr. William Jones, in charge of Surgical Instruments and Supplies at the Royal Victoria Hospital, designed the system and supervised its installation. It is no longer necessary to have oxygen tanks in the theatres; there is therefore more room and traffic is reduced. The department is also indebted to Mr. Jones for making new instruments and modifying others. New Castle washing and instrument sterilizers and one large Castle sterilizer for drums have been added. I know of no operating rooms which are as satisfactory as the ones here for the work we have to do and where the safety factors are greater.

The department is indebted to Simmons Limited for developing special beds, traction apparatus for cervical fractures, a special turning fracture frame used in management of fractured thoracic and lumbar spines, and operating tables all to meet our special requirements. This has been done at a time when supplies seemed to be unobtainable and facilities taxed to the full. Yet Mr. A. C. Guthrie, President of the Company, permitted the work to be done on a research basis and Mr. Leo Flanagan managed it. To Mr. William Mingle we are particularly indebted; his long experience with the Company and his mechanical genius have enabled him to make things that work and last and have proven to be very helpful.

It is obvious how much others have contributed to the work and workings of the surgical department. It would seem perhaps that with this recording of additional beds, facilities and equipment, the department should be satisfied. It is proud again of what has been accomplished. It is still concerned because there are as yet no adequate facilities for the hospitalization of infants and young children. The arrangements for female patients are still unsatisfactory. There is great difficulty in arranging for the care of the chronically ill whose special treatment has been completed here but still require medical care and cannot humanely be discharged until such care can be arranged for. This is a community responsibility. To see that the community accepts it, is one of the many

problems Mrs. Davidson is working on. At present, the situation is a very serious one, for such patients occupy beds which others who could promptly be restored to useful activity might have.

Finally, the resident staff needs to be increased if the full responsibility of the surgical service for scientific advance is to be realized. No better example of how productive the scientific approach to clinical medicine and the scientific results obtained from clinical studies controlled in the laboratory can be cited than the work Dr. Penfield has done on epilepsy. Out of it have come new facts on localization of function in the cerebral cortex applicable to all neurological problems; new facts on the pathological lesions causing epilepsy; new facts on treatment; he may even yet find the seat of the soul! This approach needs to be applied as intently to so many other problems if progress is to be steady and not fortuitous.

These are some of the changes that seem to be of greatest importance now and perhaps they may be realized in the coming year or years, just as many things have come to fruition in this past one. In any case, a prayer attributed to Admiral Hart and quoted in "Where Away" was called to my attention by Dr. Tarkington when things seemed to need changing, and it is one that can help us as we work next year.

"Dear God, give us strength to accept with serenity the things that cannot be changed. Give us courage to change the things that can and should be changed, and give us wisdom to distinguish one from the other".

REPORT OF THE FINANCIAL SUPERVISOR

DR. JOHN KERSHMAN

At the end of its eleventh year of activity, the Montreal Neurological Institute is faced with a serious financial problem. The hospitalization activities are now creating a serious deficit and indications are that the situation is gradually assuming grave proportions.

During 1945 the cost per patient per day rose another 13% over 1944. Since 1941, which was the most economical year of hospital operation, costs have increased steadily and now amount to 47% more per patient per day. Up to the end of 1943 there was a corresponding increase in income which more or less kept pace with the rising costs. This was due partly to the greater ability of the public to pay, and partly to the raising of hospital charges. During the past year, however, there has been an increasing disparity between the climbing costs and the earning power of the hospital. I confess that it makes me self-conscious to speak of the earning power of the Montreal Neurological Institute in terms of dollars and cents. Those of us who see the daily pattern of our hospital in terms of human values and try to think in terms of medical and social usefulness of the problems with which we strive, can only feel unpleasantly embarrassed when faced with the crudities of weighing all this in terms of a financial balance sheet. Yet, at the end of every month and at the end of every year a financial statement must be faced and ways and means must be found to balance it.

The Institute is in a rather unique position. We are a relatively small hospital owned by McGill University and administered by the Royal Victoria Hospital. When the financial statements balance we feel the proud equal of both, a sturdy part of an equilateral triangle. When the red ink creeps into the calculations we feel exposed and vulnerable on two fronts, like the proverbial buffer state between two powerful neighbors.

Anticipating the financial difficulties which we must now face, during the past few months a detailed and careful survey was made of every aspect of hospitalization costs. It was found that every phase of hospital activity had increased in cost by approximately the same amount. The operating room, the x-ray department, domestic and nursing care, have each been responsible for about 20 - 25% of the total increase, while the cost of administration accounted for nearly 10%. The reason for these increases lies in the fact that since 1941 hospital payrolls have gone up 40%, and the cost of supplies has risen 44% per patient per day. The hope that increasing the number of patients would decrease their cost per day has not been realized, mainly because of external factors beyond our control. The results of this survey indicated that the present costs represent the basic needs of the Institute if we are to continue to care for patients on what we consider to be an adequate level. Further economy can only be effected by sacrificing something essential in this care, and this, we must not do. Indeed, it is my feeling that the present staff is overworked and should be substantially increased to improve our efficiency. We owe a great deal to the loyalty of our staff (especially the nurses and secretaries) which has made them carry a much greater burden of work due to the increased number of patients. We feel very grateful for that loyalty, but it would not be fair to test it much further.

It is necessary to point out again, as was done last year, that one of the causes for the increasing deficit is the lack of accommodation for semi-private and private patients. If we had more facilities for these to balance our public beds, there would be a relatively larger income.

The collection of accounts was about 10% better this year than last. It is felt that among other things, social service admitting played a valuable role in this.

One source of loss of cash revenue to the Institute is the number of indigent patients who come to our door from other provinces. Here is a prime example of the conflict between humanitarian motives and the financial balance sheet. We cannot turn away the sick who want the help that we are organized to offer. It is only a greater social challenge to us if being sick they are also needy; and we must be prepared to face this challenge. Yet, so far, there is no legal *modus operandi* by which the indigent neurological patient from one province may have his care paid for in another.

Faced with a greater cash deficit than ever before, we have during the past few months given considerable thought to what measures may be taken.

The time has come when the Institute must test its friends. We must ask them for a concrete and substantial token of their faith in our future. The City of Montreal, the Province of Quebec, and many private individuals have from the start and through the years given us a considerable measure of financial support, but it has not been enough. If we are to continue to fulfill our functions adequately as a hospital and take care of the ever increasing demands made upon our facilities, we must find a way to achieve financial security. I feel that our record of public service entitles us to have confidence that this can be done.

REPORT OF THE REGISTRAR

J. PRESTON ROBB

CARE OF PATIENTS

The clinical services in the public wards of the Institute are subdivided into a neurological service which is under the immediate direction of Dr. Donald McEachern, and a neurosurgical service which is under the direction of Dr. William Cone and Dr. Arthur Elvidge. The Director holds a supervisory control over both services. All members of the medical staff share in the care of public patients and all are permitted to admit and care for private and semi-private patients. In addition to the patients hospitalized in the Montreal Neurological Institute, the Department of Neurology and Neurosurgery also takes care of the neurological and neurosurgical patients in the Royal Victoria Hospital.

The clinical work of the Institute has increased year by year. In spite of the difficulties encountered during the changes in the Institute, and the addition of the Military Annex, there were still more patients than ever before, and overcrowding is still a major problem.

The progressive increase in work done in the Institute is indicated by the following figures:

	Patients cared for	Hos- pital days	Average stay	Death rate	Autopsy rate	Opera- tions
1934 (3 mos.)	190			5.21%	86.8%	92
1935	841	14928	17.8	6.29%	77.6%	348
1936	912	17667	19.4	5.18%	82.8%	456
1937	953	18315	19.2	5.18%	85.4%	508
1938	999	18856	18.9	4.95%	89.4%	608
1939	1079	19742	18.3	4.72%	72.1%	517
1940	1093	19428	17.8	6.79%	86.8%	600
1941	1179	20482	17.4	6.03%	88.5%	566
1942	1416	23939	16.9	4.53%	83.3%	700
1943	1623	29718	18.3	3.97%	77.0%	742
1944	1657	30501	18.4	5.1%	65.0%	864
1945	1681	34223	21.4	4.28%	64.5%	955

The total admissions to the Montreal Neurological Institute and the Royal Victoria Hospital under the care of the Staff of the Institute and the Department of Neurology and Neurosurgery of the Royal Victoria Hospital were 1,776 as compared to 1,768 for 1944. The number of admissions to the Institute per day was 4.6.

OUTPATIENT DEPARTMENT

Outpatient Clinics are held Five Days Each Week
in the Royal Victoria Hospital

	Neu- rology	Neuro- surgery	Totals
Monday and Thursday		Neurology	
Wednesday		Neurology (Epileptic)	
Tuesday and Friday		Neurosurgery	
New Cases	533	374	907
Revisits	2747	621	3368
	<hr/>	<hr/>	<hr/>
	3280	995	4275

There were 20 more new cases seen during 1945 than in 1944. The Social Service Department is to be congratulated for the excellent manner in which these clinics are managed. When one sees the amount of time put in by members of this department, not only at the Clinic, but looking after the problems of the patients between Clinics, one realizes what a difficult task they are doing, and how well they do it.

To Dr. George Stephens and his Staff of the Royal Victoria Hospital we would like to express our gratitude for the way in which they have helped us with so many of our problems during the past year.

REPORT OF THE NURSING SUPERVISOR

MISS EILEEN C. FLANAGAN, B.A., R.N.

This department has endeavoured to fulfil its obligations to the patients, not only by expert nursing skill but also with thoughtfulness and kindness, and to the Medical Staff by assisting them in every way possible.

The demands made on the nurses increase each year, as medical care becomes more exacting, and the time has arrived when many duties once considered to be the function of the nurse, must be transferred to a nursing aide — this is essential from the point of economy, both of skill and of money.

We are receiving an increasing number of applications for postgraduate experience. It will be advisable to consider whether the course given here should not now be coordinated with the School for Graduate Nurses, so that the different needs of the nurses coming here may be met.

During the past year we had twelve postgraduate students, coming from all parts of Canada; and sixty-five undergraduate students of the Royal Victoria Hospital School of Nursing, who each remained for two months.

There were 902 special nurses on duty last year, giving 8,470 nursing periods. The lack of sufficient living accommodation in this vicinity is one of our greatest difficulties in securing nurses, especially for the evening and night duties, as they change periods at 11:30 p.m. This is a great hardship in the winter.

The nursing department wishes to express its appreciation to all the members of the medical staff who have given so much time and thought to the teaching programme for the nurses, and I would like to especially thank the House Staff for their keen interest in teaching in the wards and dressing rooms.

We have had, like all other hospitals during and since the end of the war, to demand a great deal from our nurses, too much many times, but I am sure that no other hospital has had more conscientious or loyal service.

DEPARTMENT OF SOCIAL SERVICE

(MRS.) E. MCL. DAVIDSON, *Director*

The sobering, and yet exciting, experience of evaluating our year's work brings us to a realization that while there can be no sharp division, yet the work of the department naturally falls into two parts. The first is the day by day job with its service to the patient in his immediate need, and the second, the effort to point out adverse social conditions or lack of community resources as they affect our patients.

Figures can be deceptive and results intangible but during the year of 1945, 2,499 patients were served. One patient was helped in his adjustment to his illness, another's family was given a better understanding of his needs and still another was followed through his long road of rehabilitation. Of this number more than half were ward patients but as the attendance at the out-door clinics has increased, the work with clinic patients has been proportionately larger. The need for a permanent clinic secretary is pressing. Systematic follow-up of our patients is being attempted but it is impossible to give adequate service until we have adequate staff. The majority of the patients were referred by attending doctors or through social admission but the importance of maintaining and strengthening community relationships is revealed when 51 different social and health agencies, both French and English, private, federal, provincial and municipal, the clergy and industrial personnel departments, refer patients to the Social Service Department and the department, in turn, makes use of seventy-six such agencies.

Interpretation through service is the best method in any field. In addition, exhibits have been held at the meetings of the Montreal Medico-Chirurgical Society. Staff members have participated in community committees on social action and through volunteers in clinic and office routine, the department has emphasized the mutual responsibility of hospital and community in the care of the sick.

The staff was not at full strength for several months. We were fortunate to have so able a worker as Mrs. Joan Thomas join the staff in February, succeeding Miss Jean Stewart, who resigned in September to accept work with the American Red Cross.

Our department is being used in the training of social workers. Under the supervision of Mrs. Celia Deschin, Instructor and Field Supervisor on the Staff of the Montreal School of Social Work, two students are working in the department three days each week. This is in line with other departments of recognized standing.

A year ago the hope was expressed that a medical-social study might be made of epileptic patients under the care of the Seizure Clinic. To-day that hope is by way of being realized. With the aid of a grant from the Provincial Government and a gift already reported, Mrs. Doris Laverty, a social worker of broad experience began work on a part-time basis as of October 1st, 1945. The objective of this study of some three hundred patients will be both individual and community planning to meet the social needs of these patients.

A second group of patients for whom we have no resources and whose immediate needs are even more acute, are the paraplegics. Faced with the knowledge that we will continue to have no resources unless the Province can be stimulated to provide for their care and retraining, a survey of the paraplegic patient was made between Nov. 15th, 1945 and Feb. 15th, 1946 by Miss Marie Parr, assisted by Miss Mariette Gosselin with Dr. Arthur Elvidge giving medical supervision. The Universities of Laval, Montreal and McGill gave active support and the Ministry of Health and Social Welfare of the Province of Quebec enlisted the aid of the Provincial Health Units and all active hospitals of the Province. To Dr. Antonio Barbeau we are particularly grateful for his encouragement and help, and to the Quebec Division of the Canadian Red Cross for financing the survey. The extent of the problem is too great to be ignored. Our hope is that next year we will be able to report our paraplegic patient as moving out into a rehabilitation centre where he will have the same opportunity to become self-sufficient as has the paraplegic veteran at St. Anne's. This added knowledge of one group of chronically ill patients again emphasizes the need for community facilities for all chronically ill patients.

Unless one is close to the scene of patient after-care it is difficult to realize the crippling effect of insufficient or non-existent housing. The community owes to her citizens decent places to live; ours is the responsibility to indicate the results of the failure to fulfil this responsibility.

Recently a local business man, a private patient, commented to a friend that after many hospital experiences he had found, in the Institute, integration in his treatment, "It is a hospital where the entire staff, doctors, nurses, social workers, technicians, everyone, seem to exchange ideas, to pool their thinking and their findings." May we hope that our hospital will one day achieve this standard for all its sick and that the Social Service Department, by the quantity and quality of its work, perform its rightful share. When it does, it will not have failed in its focus, namely, the patient.

DEPARTMENT OF RADIOLOGY

DR. DONALD McRAE

There has been a steady increase in the amount of work done in the Department of Radiology since it opened. In 1945, 4,560 examinations were made and 22,435 films were made. The total number of encephalograms and ventriculograms is the same as last year. There were 35 more myelograms performed in 1945 than in 1944. This increase in volume of work has been made possible by the addition of an auxiliary radiographic room. The auxiliary x-ray unit was installed by the R.C.A.M.C. as part of the necessary equipment of the Military Annex. The load on the dark room equipment is extreme and the technical quality of the films has become lower as a consequence.

No new methods of examination have been devised. It is felt that the accuracy of myelography has been increased by using 10 cc. of pantopaque rather than 6.5 cc. so that the subarachnoid space is completely filled — not just the anterior portion of the space. There has been no difficulty in obtaining pantopaque recently but the price remains high.

In the autumn of 1945 the laboratory moved from the 6th floor to newly constructed accommodation on the 7th floor. Dr. Elliott drew the plans, and the space, although no larger, is much more effectively used and workable. A part time technician has continued to do blood counts and sedimentation rates in the ward laboratories and has thus saved the house-staff (who are relatively senior interns) much time.

DEPARTMENT OF ELECTROENCEPHALOGRAPHY

DR. H. H. JASPER

This department has been operating at maximum capacity during the past year. We regret that there have been many requisitions for E.E.G. examinations which could not be carried out or the examinations were delayed. This was unavoidable with the limitations of staff and equipment existing during the past year. This is being remedied to some extent so that better service can be rendered during 1946.

The distribution of examinations on patients with different diagnoses was similar to that existing for previous years; the major group being the epilepsies followed by patients with head injury.

Epilepsy	684
Head injury	215
Brain tumour	82
Vascular lesion or disease	28
Mental disorder	59
Deferred	344
	<hr/>
Total	1412

About one-half of the patients examined in this department were from those admitted to the Montreal Neurological Institute or other Royal Victoria Hospitals. The remainder were referred from Outdoor Clinics (321), the Armed Services (188) or from private offices (297).

The most important factor in the smooth operation of this department is the excellent work of Mr. Lewis Henderson, chief technician. Mr. Henderson began his work with us in the Spring of 1938. His devotion and untiring enthusiasm, coupled with a high degree of natural ability (among other attributes), have enabled him to make a most important contribution to the development of this department.

DEPARTMENT OF NEUROPATHOLOGY

DR. W. V. CONE, *Neuropathologist*

DR. MURTON SHAVER, *Assistant Neuropathologist*

DR. ARTHUR MORRIS, *Fellow in Neuropathology*

Work this past year in the laboratory has been difficult. For some months the entire physical set-up was disrupted by the alterations in the x-ray department and the building of the new operating room and new biochemistry laboratories. Also, Mr. Fred Putt, our senior technician resigned to take over as technician-in-charge in Pathology at Yale University's School of Medicine. Then,

too, Mrs. Lucy Lafortune resigned to do technical work under one of the National Research Council projects. She had worked in the laboratory for eight years. Both of them are missed. However, with the ending of the war and the return of the Fellows for further training, the laboratory is resuming the activities and interests which had to be dropped for the urgent problems requiring investigation from 1939 to 1945.

The routine work has been heavy. The number of examinations carried out were as follows:

Surgical specimens	600
Autopsies	62
Miscellaneous	9
Experimental	29

It has been fortunate that Dr. Arthur Morris has been able to spend the entire year and his full time as Neuropathological Fellow. In spite of the technical difficulties, the reports have been kept up to date and he has had time to prepare, with other members of the staff, a number of papers for publication and also to investigate problems of special importance to the neurological and neurosurgical services.

Dr. Murton Shaver assumed supervisory responsibility for the study and reporting of autopsies. He has carried out some experimental studies, with Dr. Gordon Thomas, on the use of bone powder with its nitrogen and fat removed for repair of bone defects.

Dr. Alfred Pope, Fellow of the National Research Council, U.S.A., has brought new methods of investigation with him and has been studying the oxidase reactions and choline esterase content of the epileptogenic cortical specimens which Dr. Penfield has excised in the treatment of epilepsy.

Dr. Reuben Rabinovitch has carried out a series of investigations on the intervertebral disc. Professor Lyman Duff's help and encouragement in this work are gratefully acknowledged. Indeed, Professor Duff and Dr. Waugh have both given of their time and experience to help with many of the problems incident to diagnosis.

Dr. Harry Steelman has been at work in the laboratory making cortical maps and following up the results of cortical excisions for focal epilepsy. He has also been carrying out experiments on monkeys and cats to determine which method of cortical resection is most satisfactory.

Dr. Irving Schiffer spent six months in the laboratory as part of the requirements for the Diploma in Neurology.

Studies on the effect of ultraviolet radiations on the exposed brain which Dr. Elvidge began some time ago have been carried on with Dr. Morris' assistance. Dr. Morris and Dr. Pope have produced lesions in monkeys, resulting in recurring Jacksonian seizures. The physiological, chemical and histological alterations in the epileptogenic cortex are to be studied. Dr. Morris and Dr. Rabinovitch have completed a paper recording the histological characteristics and the biological behaviour of a malignant chordoma in which metastases to the brain were an unusual feature. Dr. Morris has carried out a series of studies on

the use of Aralac as an absorbable suture and hemostatic material. Aralac is the trade name of a protein derivative of milk and from which cloth is made. Its practical application to neurosurgery may prove to be considerable. Dr. Morris has continued the work begun some years ago on the use of smears of tumor tissue for diagnosis of tumor type. It is not intended that the method replace other standard technical methods, but the additional criteria that are being added, make presumptive diagnoses possible within a relatively few minutes and sometimes permit of final diagnosis. The staining technique developed by Dr. William L. Reid, when he served as Neuropathological Fellow, has continued to be used as the standard method of staining the smears and gives very satisfactory results.

Finally, now that the laboratory activities are returning to normalcy, I would like to acknowledge indebtedness to Dr. William Feindel, who in his last year in Medicine at McGill carried, in addition to his scholastic work, the duties of neuropathological fellow last year.

DEPARTMENT OF NEUROPHYSIOLOGY

DR. H. H. JASPER, *Neurophysiologist*

A large portion of the work of this department has continued under the sponsorship of the Associate Committee on Army Medical Research of the National Research Council. Towards the end of the year, with the return of more graduate research Fellows, after the end of the war, our activities have been gradually converted to investigations of more general problems in neurology and neurosurgery.

The principal subjects of investigation were as follows:

Further Studies of the Perineural Space.

Dr. Chen Chao-Jen and Dr. W. V. Cone.

Action Potential and Histological Studies of Nerve Regeneration.

Dr. H. H. Jasper and Mr. John Meyer.

Experimental Studies of Aseptic Meningitis.

Dr. Carlos Corona and Dr. W. G. Penfield.

Effect of Exposure to Ultra Violet Light on the Electrical Activity of the Brain in Relation to Pathological Studies.

Dr. Arthur Elvidge and Dr. Arthur Morris.

Use of Bone Powder in the Repair of Cranial Defects.

Dr. Murton Shaver, Dr. W. V. Cone and Dr. G. Thomas.

Studies of the Intervertebral Disc in Monkeys.

Dr. R. Rabinovitch and Dr. W. V. Cone.

Effect of Acetylcholine on Brain Function in Relation to Head Injuries.

Mr. Murray Bornstein.

Experimental Studies of Brain Oedema.

Dr. K. A. C. Elliott and Dr. H. H. Jasper.

Studies of Irrigation Fluids for the Exposed Brain.

Dr. H. H. Jasper and Dr. K. A. C. Elliott.

The Physico-Chemical Nature of Focal Epileptogenic Lesions of the Cortex in Monkeys.

Dr. A. Pope, Dr. Arthur Morris and Dr. K. A. C. Elliott.

For the above studies there has been a total of 104 major procedures and 207 minor procedures carried out during 1945. Experimental animals included 9 dogs, 92 cats, 17 monkeys, 107 rabbits, 2 sheep and numerous rats.

It is with sincere regret that we have to announce the loss to this department of Mr. George Pelideau, who contributed so much to the development of these laboratories since their beginning. He finally yielded to the recurrent temptation to become a farmer. His excellent and untiring services are missed by all those working in this department.

It is with pleasure that we welcome an increasing number of keen capable graduate research Fellows to the Neurophysiological Laboratories. With the diminution of war-time grants in aid from the National Research Council and the increasing cost of apparatus and supplies, additional financial aid will be required to carry on the growing demands of work in this department.

DEPARTMENT OF NEUROANATOMY

FRANCIS L. MCNAUGHTON

This department has now expanded into its new laboratory on the sixth floor, and some equipment and furniture have been obtained. During the winter months an elective course of lecture-demonstrations in neuroanatomy was given each week and was well attended throughout. A group of twelve students and fellows took part in the brain-modelling course, and the new class room has proved very useful for this purpose. Two undergraduates in medicine have done part time work in the department during the year.

In the coming year it is planned to expand the teaching and research activities of the department, and to improve the collection of teaching material. Through the interest and generosity of Mr. Harold Crabtree, a Neuroanatomy Research Fund has been established which will be used to provide equipment for the research laboratory.

THE FELLOWS' SOCIETY

ARTHUR A. MORRIS, *Chairman*

ALFRED POPE, *Secretary*

The Fellows' Society has completed a very active year. Most of the meetings were utilized as teaching sessions for the interns and fellows of the Neurological Institute. Interesting informal discussions provided a pleasant atmosphere for the meetings.

Twenty-one lectures were given to the Society between October 1945 and April 1946. Prominent visiting speakers and their subjects were:

Experimental Lesions of the Basal Ganglia.

Dr. Margaret Kennard.

Mechanisms of Conduction in the Nervous System.

Dr. Albert Fessard.

Cerebral Manifestations in Cerebral Malaria.

Dr. T. B. Rasmussen.

The Arnold-Chiari and Related Malformations.

Captain D. B. Foster.

Secondary Sensory Cortical Projections.

Dr. Clinton N. Woolsey.

Prefrontal Leucotomy.

Dr. Walter Freeman.

Clinical Aspects of Prefrontal Lobotomy.

Dr. A. S. Rose.

A Panel Discussion on Acetylcholine Mechanism.

Dr. Otto Loewi, Nobel Prize Winner 1936.

Electroencephalography in Acute Head Injuries.

Dr. R. S. Dow.

The remaining speakers were members of the "Fellows' Society" and from the staffs of the Neurological Institute, the Royal Victoria Hospital, and the McGill University Department of Physiology.

THE FELLOWS' LIBRARY

F. L. MCNAUGHTON, *Librarian*

During the past year, a large number of new books has been added to the library and one new journal. Forty-two journals are now received regularly. Our aim is to make this strictly a reference library, and the circulation of books and bound journals is being limited as far as possible.

There has been steady growth of departmental libraries within the Institute under control of the Fellows' Library and financed through the library budget. All books are indexed in the library file but remain on permanent loan to the

departments. These smaller libraries are now located in Neuropathology, Neurochemistry, X-ray and Social Service Departments, and consist of special reference books and journals which are of interest mainly to the one department. This seems to be a satisfactory arrangement.

During the coming year the arrangement and cataloguing of books in the main library is to be reorganized.

We are pleased to acknowledge the gift of books from Dr. J. P. Evans, Cincinnati, and Dr. J. J. Michelsen, Boston. We wish to thank Miss Gordon and her Staff of the McGill Medical Library for their advice and help throughout the year.

MONTREAL NEUROLOGICAL SOCIETY

OFFICERS FOR 1946-47

Chairman.....	DR. DONALD MCEACHERN
Vice-Chairman.....	DR. ANTONIO BARBEAU
Secretary-Treasurer.....	DR. T. B. RASMUSSEN

The Montreal Neurological Society has had an active year --- with weekly meetings from October to May inclusive. Clinical Conferences have been held at the Neurological Institute, the Montreal General Hospital, Hotel-Dieu and Notre Dame Hospital, as in past years. All of our meetings have been well attended.

Unfortunately, Dr. F. H. Mackay's illness in November deprived us of his leadership during the greater part of the year, and Dr. Jasper, as Vice-Chairman, took charge in his absence.

The following addresses were given before the Society during the year 1945-46:

"A Trip to the 220th Jubilee of the Soviet Academy of Science"	DR. HANS SELYE, <i>Montreal.</i>
"Meeting in Honour of the late Prof. Pio del Rio-Hortega"	DR. WILDER PENFIELD, DR. PIERRE MASSON, DR. MIGUEL PRADOS, S/L WILLIAM GIBSON.
"The Clinical Use of Curare"	DR. HAROLD R. GRIFFITH, <i>Montreal.</i>
"Barbiturate Poisoning"	DR. I. M. RABINOWITCH, <i>Montreal.</i>
"Penicillin in the Treatment of Neurosyphilis"	DR. A. S. ROSE, <i>Boston.</i>
"Concussion of the Brain and Spinal Cord in Experimental Animals"	DR. WILLIAM F. WINDLE, <i>Chicago.</i>

“The Long-Term Care of the Paraplegic Patient”	DR. A. R. ELVIDGE, CAPT. G. GINGRAS, R.C.A.M.C. DR. M. R. SHAVER, MRS. E. MCL. DAVIDSON.
“The Application of Aphasia to Cerebral Localization”	DR. J. M. NIELSEN, <i>Los Angeles.</i>
“Autonomic Interrelations with the Somatic Nervous System”	DR. MARGARET KENNARD, <i>New York.</i>
“The Treatment of Causalgia”	DR. T. B. RASMUSSEN
“The Late Management of Head Injuries”	CAPT. D. B. FOSTER, <i>Percy Jones Hospital Centre.</i>
“Delayed Traumatic Intracerebral Haemorrhage”. Discussion of a case related to minor blast injury.	DR. J. C. RICHARDSON, <i>Toronto.</i>
“Dual Afferent Systems to Cerebral Cortex and Cerebellum”	DR. CLINTON N. WOOLSEY <i>Baltimore.</i>
“Experimental Neuroses”	DR. H. S. LIDDELL, <i>New York.</i>
“New Facts about Nerve Regeneration, based on Recent War Experiences”	DR. H. H. JASPER
“Psychical Seizures”	DR. WILDER PENFIELD
“Diagnostic Aids in Epilepsy”	DR. H. H. JASPER, DR. T. B. RASMUSSEN, DR. C. W. CURE.
“Developmental Pathology of Intervertebral Discs”	DR. W. V. CONE, DR. R. RABINOVITCH.
“The Functional Anatomy of the Cerebellum”	DR. R. S. DOW, <i>Portland, Oregon.</i>
“The Canadian Mobile Neurosurgical Team”	MAJOR HAROLD ELLIOTT, R.C.A.M.C. <i>Montreal.</i>

CLINICAL APPOINTMENTS AND FELLOWSHIPS

The following positions are available:

Interne or Assistant Resident in Neurosurgery — one year's duration — available January 1st and July 1st.

Resident in Neurosurgery — This position is of one or two years' duration and no candidate is considered unless he has had previous experience on the Neurosurgical Service.

Interne in Neurology — Six to twelve months' duration — available January 1st and July 1st.

Resident in Neurology — This position is of six to twelve months' duration and no candidate is considered unless he has had previous experience on the Neurological Service.

Fellowship in Neuropathology — Twelve months' duration — available July 1st.

Fellowship in Clinical Electroencephalography — twelve months' duration — available January 1st and July 1st.

The Diploma in Neurosurgery, McGill University, requires at least four years of study including periods of investigative work and neurology.

The Diploma in Neurology, McGill University, requires at least three years of study including periods of investigative work, neurosurgery and psychiatry.

Applicants for Clinical Services are preferred who have a speaking knowledge of the French language.

COURSES OF INSTRUCTION

The Department of Neurology and Neurosurgery cooperates intimately with the Departments of Medicine, Surgery, Pathology and Radiology in their regular teaching. Thus the teaching of neurology, neurosurgery, neuropathology and neurological radiology is carried out as part of the regular course planned by the Chairman of each of the above Departments.

In the Faculty of Graduate Studies and Research, courses are offered leading to the degrees of Master of Science and Doctor of Philosophy. Throughout the year special elective courses are given in neuroanatomy and neurophysiology. The series of lecture demonstrations described as elective for undergraduates, forms part of the postgraduate teaching of the department.

DONATIONS TO THE MONTREAL NEUROLOGICAL INSTITUTE

1945-46

<i>From British War Relief Society — Maple Leaf Division—</i> (Including \$4,037.89 from Ladies Committee of Maple Leaf Canteen). (Canadian funds)	\$13,719.31
<i>From Mr. A. K. Cameron:</i> For the Cone Research Fund	500.00
<i>From Mr. Harold Crabtree:</i> For the Neuroanatomy Research Fund	5,000.00
<i>From Mrs. Gerald Hiam and Friends:</i> For Rehabilitation Fund (Social Service Department)	150.81
<i>From Montreal Rotary Club:</i> For rehabilitation of three patients — (Social Service Department)	310.00
<i>From Quebec Division — Canadian Red Cross Society:</i> For survey of paraplegic patients — (Social Service Department)	2,000.00
<i>From Mrs. H. A. Springle:</i> For the Hobart Anderson Springle Memorial Fund (Electroencephalography)	700.00
<i>From Mrs. Lester Wieder:</i> For the Penfield Research Fund	200.00

THE NEEDS OF THE INSTITUTE

Contributions are invited to the support of the clinical and scientific activities.

The following funds depend on voluntary contributions:

1. The Clinical Relief Fund for Needy Patients (Founded by Dr. Harvey Cushing).
2. Social Service Fund.
3. Special Nursing Fund.
4. Fellows' Library Fund.
5. Neurological Research Fund.

FORM OF DONATION

I give and bequeath to McGill University, Montreal, for the Montreal Neurological Institute \$ the same to be and become a part of the general endowment fund of the said Institute and to be known as the (here insert name of testator or a name selected by him) Endowment Fund the income only to be used for the furtherance of (the charitable) (the scientific) (the charitable and scientific) work of the Montreal Neurological Institute.

PUBLICATIONS

1945

DR. ARTHUR E. CHILDE:

The Role of X-ray in the Diagnosis of Posterior Herniation of the Intervertebral Disc.
Canad. M.A.J. 52: 458-470, 1945.

DR. WILLIAM V. CONE:

(with CARLETON B. PIERCE, ARTHUR R. ELVIDGE, and JAMES G. TYE).
Roentgen Therapy of Primary Neoplasms of the Brain and Brain Stem.
Radiology. 45: 247-252, 1945.

MRS. E. MCL. DAVIDSON:

Social Admitting in a Modern Hospital. Social Worker, December, 1945.

DR. ARTHUR R. ELVIDGE:

see Dr. William Cone, joint author.
see Dr. Herbert Jasper, joint author.

DR. WILLIAM FEINDEL:

(with MIGUEL PRADOS and BERK B. STROWGER).
Studies on Cerebral Edema. I. Arch. Neurol. & Psychiat. 54: 163-174, 1945.
Studies on Cerebral Edema. II. Arch. Neurol. & Psychiat. 54: 290-300, 1945.

DR. HERBERT JASPER:

An Improved Clinical Dermohmmeter. J. Neurosurg. 2: 257-260, 1945.
(with JOHN KERSHMAN and ARTHUR R. ELVIDGE).
Electroencephalography in Head Injury. A. Research Nerv. & Ment. Dis., Proc.
(1943). 24: 388-420, 1945.
(with ERIC W. PETERSON and MURRAY BORNSTEIN).
Effect of Morphine Sulfate on Persons Exposed to Simulated Altitude. War Med.
7: 23-28, 1945.
Effect of Sulfathiazole on Persons Subjected to Simulated Altitude. War Med.
7: 29-31, 1945.
(with J. PRESTON ROBB).
Studies of Electrical Skin Resistance in Peripheral Nerve Lesions. J. Neurosurg.
2: 261-268, 1945.

DR. JOHN KERSHMAN:

See Dr. Herbert Jasper, joint author.

DR. ARTHUR A. MORRIS:

(with G. G. KALZ and E. S. LOTSPEICH).
Ependymitis and Meningitis due to Candida (Monilia) Albicans. Arch. Neurol. &
Psychiat. 54: 361-366, 1945.

DR. DONALD MCEACHERN:

The Diagnosis and Treatment of Epilepsy. Proc. Interstate Postgraduate Assem-
bly of North America. October, 1944.
Rehabilitation of War Personnel Subjected to Aural Trauma. Canad. M.A.J. 53:
421, 1945.
(with W. PENFIELD, G. MORTON, and A. CIPRIANI).
Studies on the Mechanism of Motion Sickness. Tr. Am. Neurol. A. 70: 170,
1944.
(with B.D.B. LAYTON, and E. G. BURR).
Canadian Army Night Vision Training and Testing Unit. War. Med. 5: 283,
1944.

DR. FRANCIS McNAUGHTON :

(with W. DONALD ROSS.

Objective Personality Studies in Migraine by Means of the Rorschach Method.
Psychosomatic Med. 7: 73-79, 1945.

Chronic Posttraumatic Head Symptoms. *Canad. M.A.J.* 53: 12-18, 1945.

DR. GUY ODOM:

(with KARL STERN).

Morphologic Alterations of the Neuron due to Tumour Invasion. *Arch. Path.*
39: 221-225, 1945.

DR. WILDER PENFIELD:

Obituary: Pio del Rio-Hortega. *Arch. Neurol. & Psychiat.* 54: 413-416, 1945.

(with MURTON SHAVER).

The Incidence of Epilepsy and Headache after Head Injury in Civil Practice.
A. Research Nerv. & Ment. Dis., Proc. (1943). 24: 620-634, 1945.

DR. ERIC W. PETERSON:

See Dr. Herbert Jasper, joint author.

DR. REUBEN RABINOVITCH:

Clovis Vincent, Neurosurgeon and Patriot. *J. Neurosurg* 11: 530-534, 1945.

DR. J. PRESTON ROBB:

see Dr. Herbert Jasper, joint author.

DR. ROMA AMYOT:

Méningite à pneumocoque guérie par la pénicilline. *L'Union Médicale du Canada.* 74:
21, 1945.

Propos d'un nouveau rédacteur en chef. *L'Union Médicale du Canada.* 74: 274, 1945.

Du traitement de l'alcoolisme chronique et de l'alcoolomanie. *L'Union Médicale du*
Canada. 74: 319, 1945.

Méningite à staphylocoque traitée et guérie par la pénicilline. *L'Union Médicale du*
Canada. 74: 909, 1945.

Des douleurs lombo-sacrées à la sciatique. *L'Union Médical du Canada.* 74: 1139,
1945.

Aspect neuro-psychiatrique de l'alcoolisme. *L'Union Médicale du Canada.* 74: 1237,
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Un cas de paraplégie traumatique par hématorachis. *L'Union Médicale du Canada.*
74: 1701, 1945.

ITEMS OF INTEREST

During the past year, Dr. Penfield was appointed to the Board of Scientific Directors of the Yerkes Laboratories of Primate Biology, Orange Park, Fla., and was made a member of the Committee on Neurobiology of the National Research Council in Washington. The Association of Surgeons of Great Britain and Ireland elected him an Honorary Fellow, and the University of Montreal conferred on him the honorary degree of Doctor of Medicine.

Dr. Roma Amyot has been appointed President of the Medical Board of Notre Dame Hospital, and Editor-in-Chief of "L'Union Médicale du Canada".

We are glad to welcome back Lt. Col. Donald McEachern after service in the R.C.A.M.C., where he was Consultant on Medical Research and Development, National Defence Headquarters, Ottawa. He is now in charge of the Neurological Service and the Department of Neurochemistry.

Squadron Leader John Kershman has been discharged from the R.C.A.F. and has resumed practice. He is supervisor of the E.E.G. work for the Department of Veterans' Affairs.

Miss Eileen Flanagan, Superintendent of Nurses at the Institute, has been re-elected President of the Registered Nurses Association of the Province of Quebec. It was largely through her untiring efforts that the first licensing act for nurses in Canada was passed by the Quebec Legislature during its recent session.

Dr. Theodore B. Rasmussen has again joined the staff after service with the United States Army. He held the rank of Lieut.-Colonel and was consultant in Neurosurgery in the India-Burma Theatre.

Dr. Allan A. Bailey, formerly Lieutenant-Colonel in the R.C.A.M.C., has joined the staff of the Montreal General Hospital and the staff of the Institute.

Dr. Preston Robb is now on a Travelling Fellowship in the U.S.A. and is at present engaged in neurophysiology at Baltimore.

Dr. William Gibson has been discharged from the R.C.A.F., in which he held the rank of Squadron Leader. He is now completing the Diploma Course in Neurology at the Institute and is at present Neurological Resident.

Captain William H. Bridgers, M.C., U.S.A., served in England as the Chief of the Neurosurgical Section of the 65th General Hospital, Duke Hospital Unit, and is now doing neurosurgery at the Halloran General Hospital at Staten Island.

Dr. Ralph Stuck, of Denver, Colorado, was the Neurosurgeon for an Evacuation Mobile Tent Hospital overseas for 32 months and was through seven campaigns. He returned to practice six months ago.

In a letter from Warsaw, Jerzy Chorobski states: "I take the first opportunity to get in touch with you. We are both safe and sound, although we passed through some rather terrible times. Please, do find some way of communicating with us as we are rather cut off from the outside world — there are some plans to call me to Breslau, to take the place of our old friend, who, as you probably know, died in 1942. Unfortunately the Institute is almost completely destroyed so there will be big difficulties to put it in working order".

Dr. Claude Bertrand, recently discharged from the R.C.A.M.C., has just finished the Neurosurgical Residency and is soon leaving for Oxford to take up his Rhodes Scholarship.

Dr. William Feindel has also been awarded a Rhodes Scholarship and is leaving for England in the near future.

Dr. Gordon Thomas has left to take charge of the medical work of the Grenfell Mission in Labrador.

Dr. Peter Lehmann, until recently a Major in the R.C.A.M.C., is opening a practice in Vancouver, B.C.

Dr. Guy Morton is with the Neurosurgical Treatment Centre in Edmonton, Alta.

Dr. Robert Pudenz, formerly Lt. Commander in the U.S. Navy, will be practicing in Pasadena and is assisting in establishing the Department of Experimental Neurosurgery, California Institute of Technology.

Dr. Murton Shaver has resigned from Ste. Anne's Hospital, where he was in charge of Neurosurgery, and left for Cincinnati where he will resume his neurosurgical training under Dr. Joseph Evans.

Dr. Donald Coburn, after service with the U.S. Navy in the South Pacific, has returned to his practice in Kansas City, Missouri.

Lt.-Col. O. W. Stewart has returned to Canada after being in charge of Neurosurgery at the Basingstoke Neurological and Plastic Surgery Hospital. It is with great pleasure we learn that his health is steadily improving.

After the demobilization of the Basingstoke Neurological and Plastic Surgery Hospital, Dr. Harold Elliott returned to Montreal and is now in charge of Neurosurgery at the Montreal Military Hospital.

Dr. Exum Walker, who has recently been discharged from the U.S. Navy, paid the Institute a visit during the winter. He has resumed his practice in Atlanta, Georgia.

Dr. Allister Finlayson is now discharged from the U.S. Army and has resumed his practice in Omaha, Nebraska. He spent three years in the South Pacific doing Neurology and Neurosurgery.

Major Donald Ross is still with the R.C.A.M.C. in Holland, attached to No. 7 Canadian General Hospital as Neuropsychiatrist.

Dr. Arthur A. Ward has been working at the Neuropsychiatric Institute of the University of Illinois in Chicago.

During the past two years, alterations have been made on several floors of the Institute. The x-ray department has expanded and a third operating room has been completed on the fifth floor. The surgical offices have been moved to the eighth floor. The squash court is no more. In its lower half the new biochemistry laboratory has been built. Behind the Institute a two-story temporary Military Annex has been erected by the Department of National Defence. The upper floor houses 27 patients, while the Social Service Department, the Physiotherapy Department, a much-needed Clinical Conference Room and several offices are accommodated on the lower floor.

STATISTICAL DATA — 1945
CLASSIFICATION OF DISEASES

Nervous system generally:

Neurosyphilis	47
Multiple sclerosis	40
Motor neurone disease	8
Myasthenia gravis	3

Meninges:

Meningocele or myelomeningocele	20
Chronic adhesive arachnoiditis	4
Acute purulent meningitis	7
Meningitis, other types	9
Benign lymphocytic choriomeningitis	1
Meningoencephalitis	3
Spontaneous subarachnoid hemorrhage	14
Traumatic meningeal hemorrhage	5
Subdural effusion	7
Post-traumatic headache	10
Other headaches	15
Subdural hematoma	25

Brain:

Congenital anomalies	2
Hydrocephalus	11
Birth injury of the brain	4
Brain abscess	22
Cerebral concussion	52
Cerebral contusion and/or laceration	15
Epilepsy	177
Migraine	7
Encephalopathy, chronic and of undetermined etiology	12
Bulbar palsy	1
Paralysis agitans	7
Cerebral arteriosclerosis	3
Cerebral hemorrhage, thrombosis or embolism	30
Intracranial aneurysm	18
Intracranial calcification	1
Cerebral atrophy	14
Encephalitis	5

Tumours of the Nervous System:

Glioma	63
Perineurial fibroblastoma	9
Meningeal fibroblastoma	12
Sarcoma	2
Pituitary adenoma	13
Craniopharyngioma	3
Tuberculoma	3
Cholesteatoma	1
Miscellaneous tumour	34
Unclassified tumour	14
Unverified tumour and tumour suspect	10
Secondary tumour of brain and spinal cord	31

Spinal Cord:

Chronic myelopathy	5
Dorsal lateral sclerosis	10
Compression of the spinal cord	12
Concussion, contusion or laceration of the cord	2
Vascular lesion of the cord	3
Syringomyelia	3
Poliomyelitis	5

Cranial and Peripheral Nerves:

Lesions of the optic nerves	8
Trigeminal neuralgia	34
Peripheral facial palsy	2
Nerve deafness	1
Ménière's syndrome	3
Lesions of the brachial plexus and branches	11
Lesions of the lumbosacral plexus or branches	1
Multiple neuritis	8
Other neuralgias	4
Traumatic peripheral nerve lesions	9
Raynaud's disease	2

Mental Diseases:

Mental deficiency	7
Alcohol or drug addiction	6
Psychoneurosis	52
Manic-depressive psychosis	4
Schizophrenia	4
Miscellaneous	9

Other Systems and Miscellaneous:

Spina bifida and cranium bifidum	6
Tumours of the skull	2
Skull defect	12
Herniation of the intervertebral disc (cervical)	13
Herniation of the intervertebral disc (lumbar)	297
Fracture of the skull	113
Fracture and/or dislocation of the vertebral column	43
Gun-shot wound of the head	11
Gun-shot wound of the spine	3
Lacerations, contusions, abrasions and/or hematomas	16
Carcinoma and sarcoma	9

Diseases of the Body as a whole:

Hypertension	50
Diseases of the cardiovascular system	4
Diseases of the respiratory system	4
Diseases of the gastrointestinal system	1
Diseases of the genito-urinary system	5
Diseases of the hematopoeitic system	1
Diseases of the endocrine system	9
Diseases of the locomotor and integumentary system	28
Diseases of the eyes, ears, nose and throat	13
Low-back pain	41
Osteomyelitis of the skull	5
Causalgia	1
Miscellaneous	25
Diagnosis deferred	56

CLASSIFICATION OF OPERATIONS

Craniotomy, Miscellaneous	78
" Decompression	12
" Removal of tumour	107
" Removal of focus	2
" Drainage of intracerebral cyst	4
" Evacuation, intracerebral haemorrhage	4
" Excision cicatrix	13
" Drainage of abscess	21
" Rhizotomy	13
" Removal subdural haematoma	25
" Removal epidural haematoma	11
" Separation of adhesions	3
" Convolectomy	1
Craniectomy	9
Torkildsen Procedure	3
Laminectomy, miscellaneous	38
" antero-lateral cordotomy	16
" removal of tumour	30
" removal herniated disc	228
Spinal fusion	9
Application of traction tongs for skull traction	2
Repair of spina bifida	20
Plastic repair of skull defects, tantalum	17
Plastic repair of skull defects, bone	5
Trepanations, miscellaneous	19
" subdural insufflation	3
" drainage subdural space	5
" drainage subdural haematoma	4
Cerebral arteriography	14
Elevation depressed skull fracture	23
Debridement and suture lacerated wound	16
Exploration of nerve, removal neuroma and nerve suture	8
Neurolysis, neurectomy	3
Sympathectomy and ganglionectomy	49
Miscellaneous	152
TOTAL CASES	967

CHIEF DIAGNOSES IN FATAL CASES

Intracranial tumour	28
Intracranial trauma	20
Cerebral haemorrhage and thrombosis	7
Spinal trauma	6
Spinal tumour	6
Acute meningitis, tuberculous	4
Hypertensive cardiovascular disease	3
Hydrocephalus	2
Intracranial abscess	2
Status epilepticus	2
Cerebral aneurysm	2
Myelopathy of upper cervical cord	1
Acute meningitis, purulent	1
Carcinoma of rectum	1
Subarachnoid hemorrhage	1
Diabetic coma	1
Paralysis agitans	1
Pulmonary embolism	1
Meningoencephalocoele	1
Polyneuritis of unknown etiology	1
	91

