

To

THE DIRECTOR,

MONTREAL NEUROLOGICAL INSTITUTE.

Sir,

I have the honour to submit the third annual report of the Montreal Neurological Institute, for the calendar year of 1937. The professional staff for the year was as follows:

1937

Edwin Boldrey ^{mid Feb.} 3628 Lorne Cres. Ma 8444
 J. Norman Petersen 406 Pine Ave. W. Ha 2710
 Arthur Childs 5010 Hampton Ave. N. E. 4054
 Staddo Keith 4865 Wilson Ave. De 3473
 Francis McNaughton 537 Lansdowne Fi 1351
 Heber ^{March} 520 Milton Apt 2 Pl 7535
 Guy ^{March} Adom 3650 Oxenden Apt 5 Ha 8622
 M. Clure 3622 Lorne Cres. Apt 5 Ma 4995
 Storvick ^{March} Nicholks 554 Prince Arthur PE 2382
 Cipriani 3504 Park Ave Apt 18 La 1598
 Russel
 Mackay
 Young
 Erickson
 Cones
 M. E. Chapman ^{March} Rudenz 538 Milton Apt 6
 Hukphrey Stevens
 Kirschman Elvidge
 F. Rechin ^{Ha 2866} Ma 9820 - Feb 20
 Reid 3602 Durocher St. Bryan

MEDICAL STAFF

Positions in Institute

ROMA AMYOT, B.A., M.D. (Paris)
Associate Consulting Neurologist.

ANTONIO BARBEAU, M.D., PH.D.
Associate Consulting Neurologist.

A. E. CHILDE, M.D.
Roentgenologist.

WILLIAM V. CONE, B.S., M.D., F.R.C.S. (C)
Neurosurgeon, Neuropathologist

ARTHUR R. ELVIDGE, M.Sc., M.D., C.M., PH.D.,
F.R.C.S. (C)
Associate Neurosurgeon.

HERBERT H. JASPER, PH.D., D. ES SCI. (Paris)
Consulting Electrophysiologist.

HADDOW M. KEITH, M.B. (Tor.)
Assistant Registrar, Assistant Neurologist.

EMILE LEGRAND, M.D., Médecin Légiste (Paris)
Associate Consulting Neurologist.

FRED H. MACKAY, M.D., C.M., F.R.C.P. (C)
Consulting Neurologist.

DONALD MCEACHERN, M.D.
Associate Neurologist, Biological Chemist.

FRANCIS L. MCNAUGHTON, B.A., M.D., C.M.
Clinical Assistant.

A. G. MORPHY, B.A., M.D.
Associate Neurologist.

WILDER G. PENFIELD, Litt.B., M.D., B.A., M.A., B.Sc.,
D.Sc. (Oxon), F.R.C.S. (C), F.R.S.C.
Director.

Other Hospital Associations

Notre Dame Hospital
Verdun General Hospital
Sanatorium Prevost

Hospital for the Insane, Bordeaux
Jail

Children's Memorial Hospital

Royal Victoria Hospital
Montreal General Hospital
Children's Memorial Hospital
Women's General Hospital
Homocopathic Hospital
Catherine Booth Mothers
Hospital

Royal Victoria Hospital
Montreal General Hospital
Montreal Children's Hospital
Verdun Protestant Hospital

Bradley Hospital, Providence, R.I.

Children's Memorial Hospital
Montreal Children's Hospital
Women's General Hospital

Hotel Dieu
St. Jean de Dieu

Montreal General Hospital
Children's Memorial Hospital
Shriners Hospital
Military Hospital, Ste. Anne de
Bellevue
Mental Hygiene Institute

Royal Victoria Hospital

Montreal General Hospital

Royal Victoria Hospital
Lovat Hall, Lancaster, Ont.

Royal Victoria Hospital
Montreal General Hospital
Children's Memorial Hospital
Jewish General Hospital
Verdun Protestant Hospital

J. NORMAN PETERSEN, B.Sc., M.D., C.M.
Registrar, Associate Neurologist.

Royal Victoria Hospital
St. Mary's Hospital
Mental Hygiene Institute
Mary Fletcher Hospital,
Burlington, Vt.

COLIN K. RUSSEL, B.A., M.D., C.M., F.R.C.P (C)
Neurologist.

Royal Victoria Hospital
Children's Memorial Hospital
Mental Hygiene Institute

JEAN SAUCIER, B.A., M.D. (Paris), M.D. (Montreal)
Associate Consulting Neurologist.

Notre Dame Hospital
St. Justine Hospital
Sanatorium Prevost
St. Jean d'Arc Hospital

NORMAN VINER, B.A., M.D., C.M.
Associate Consulting Neurologist.

Montreal General Hospital
Jewish General Hospital
Verdun Protestant Hospital

ARTHUR W. YOUNG, M.D., C.M., F.R.C.P (C)
Associate Neurologist.

Royal Victoria Hospital
St. Mary's Hospital
Children's Memorial Hospital
Mental Hygiene Institute

HOUSE STAFF

DAVID L. REEVES, A.B., M.D.

EDWIN B. BOLDREY, A.B., A.M., M.Sc., M.D.

FRANK ECHLIN, M.D., C.M. Service began July 1937.

C. W. V. McCUTCHEON, M.D. Service began July 1937.

ROBERT H. PUDENZ, B.S., M.D.

I. M. TARLOV, B.A., M.D., M.Sc. Service terminated July 1937.

W. M. WITHERSPOON, M.D. Service terminated July 1937.

NEUROPATHOLOGICAL FELLOW

W. LISTER REID, M.B., B.S. (Adelaide) Service terminated September 1937.

GEORGE Y. McCLURE, B.S., M.D., C.M. Service began September 1937.

RESEARCH FELLOWS

ANDRÉ J. CIPRIANI, B.Sc.

T. C. ERICKSON, B.S., M.Sc., M.A., M.D.

JOSEPH P. EVANS, B.A., M.D., M.Sc., Ph.D. Service terminated September 1937.

DONALD O. HEBB, M.A., Ph.D. (Harvard)
Rockefeller Fellowship Service began September 1937

S. T. HUMPHREYS, A.B., M.D. Service began October 1937.

JOHN KERSHMAN, B.Sc., M.D., M.Sc. Service terminated June 1937.

FRANCIS L. McNAUGHTON, B.A., M.D., C.M.

W. MARTIN NICHOLS, M.B., Ch.B., F.R.F.P.S.
(Glas.) Ure Fellowship.

GUY ODOM, M.D.

- ✓ W. LISTER REID, M.B., B.S. (Adelaide).....Service began September 1937.
 J. S. M. ROBERTSON, B.Sc., M.D. (Glas.), F.R.C.S.
 Rockefeller FellowshipService began September 1937.
 KÁLMÁN VON SÁNTHA, M.D., Priv. Doc. (Budapest)
 Rockefeller FellowshipService terminated October 1937.
 EXUM WALKER, M.D.....Service terminated July 1937.

Members of the Staff hold the following teaching appointments.

MCGILL UNIVERSITY

<i>Professor of Neurology and Neurosurgery</i>	WILDER PENFIELD
<i>Associate Professor of Neurology</i>	COLIN RUSSEL
<i>Associate Professor of Neurosurgery</i>	WILIAM CONE
<i>Clinical Professor of Neurology</i>	F. H. MACKAY
<i>Lecturers in Neurology</i>	DONALD MCEACHERN J. N. PETERSEN N. VINER A. W. YOUNG
<i>Lecturer in Neurosurgery</i>	A. R. ELVIDGE
<i>Lecturer in Neurological Roentgenology</i>	A. E. CHILDE
<i>Lecturer in Pediatric Neurology</i>	H. M. KEITH
<i>Lecturers in Clinical Psychology</i> (<i>Department of Neurology and Neurosurgery</i>).....	MOLLY HARROWER DONALD HEBB
<i>Demonstrator in Neurosurgery</i>	T. C. ERICKSON
<i>Demonstrator in Neurology</i>	F. L. MCNAUGHTON
<i>Assistant Demonstrator in Neurosurgery</i>	W. L. REID
<i>Assistant Demonstrators in Neuropathology</i>	E. B. BOLDREY G. Y. McCLURE
<i>Research Fellows</i>	A. CIPRIANI F. ECHLIN S. HUMPHREYS J. KERSHMAN W. NICHOLS G. ODOM J. ROBERTSON

UNIVERSITY OF MONTREAL

<i>Professeur Agrégé of Neurology</i>	EMILE LEGRAND
<i>Assistant Professors of Neurology</i>	ROMA AMYOT JEAN SAUCIER
<i>Associate Professor of Neurophysiology</i>	ANTONIO BARBEAU

OTHER UNIVERSITIES

Brown University, Providence, R.I. <i>Assistant Professor of Psychology</i>	H. H. JASPER
University of Vermont, Burlington, Vt. <i>Acting Professor of Neurology</i>	J. N. PETERSEN

In September 1937 Dr. Joseph P. Evans, who had been associated with our department since 1929, and who, at the time, occupied the positions of Assistant Neurosurgeon and Demonstrator in Neurosurgery, resigned to accept appointments at the Cincinnati General Hospital and the University of Cincinnati, in the latter of which he occupies the position of Associate Professor.

Dr. Antonio Barbeau, Associate Professor of Neurophysiology at the University of Montreal, accepted an appointment as Associate Consulting Neurologist on our staff. By this appointment our already close association with the French speaking population of the City and the Province is further strengthened.

During 1937 we have had a greater number of Research Fellows carrying on investigations in our laboratories than at any previous time and the individual reports of the laboratories attest to the volume and character of the work being done.

The advent of Dr. Donald Hebb to our research staff has opened up the entire field of psychological investigation which can be explored so well with the material which we have available. The value of such investigation has become strikingly apparent in studies now under way.

During the year Dr. T. C. Erickson and Mr. A. J. Cipriani were engaged in work preparatory to adding electroencephalography to our methods of clinical investigation. To aid in this work, and in other problems, Dr. Herbert H. Jasper of Brown University, Providence, R.I., has joined our staff as Consulting Electro-physiologist.

The report of Miss E. C. Flanagan, relative to our nursing staff, emphasizes the heavy demands made upon our clinical accommodation and it was largely due to her ingenuity that we were able to meet them as well as we have. Our turnover has been a little less rapid than in 1936, but, in spite of this, we have accommodated 41 more patients in the Institute and have had 21 more direct admissions to it than in the preceding year. Our capacity has been taxed to its fullest throughout the year. Thirty-eight more operations were performed than in 1936.

Our death rate has remained the same as in 1936 but we have obtained an appreciably greater number of autopsies. The value of post-mortem examination in our cases cannot be over-emphasized as it leads directly to a better comprehension of the clinical problems with which we have to deal.

We are still urgently in need of a second elevator as our present equipment is called on to transport patients, visitors, stretchers, beds, food trucks, freight, etc., and cannot render proper service under these circumstances. We have, however, no funds available from which such an expenditure can be met.

Members of the staff held the following offices in Societies and Social Agencies.

DR. WILDER PENFIELD, Vice-President of the International Neurological Association and President of the Association for Research in Nervous and Mental Diseases.

DR. COLIN RUSSEL, President of the Montreal Neurological Society, Trustee and Member of Council of the Montreal Medico-Chirurgical Society, Member of Council of the American Neurological Association, Chairman of the Advisory Committee of the National Committee for Mental Hygiene of Canada, Member of the Nominating Committee of the Association for Research in Nervous and Mental Diseases, Member of the Board of Directors and Executive Committee of the Mental Hygiene Institute of Montreal.

DR. FRED. H. MACKAY, Secretary of the Mental Hygiene Institute of Montreal.

DR. ARTHUR W. YOUNG, Honorary Secretary of the Montreal Medico-Chirurgical Society, President of the Montreal Psychiatric Society, Member of the Board of Directors of the Mental Hygiene Institute of Montreal.

DR. JEAN SAUCIER, Vice-President of the Montreal Neurological Society.

DR. DONALD MCEACHERN, Secretary of the Montreal Neurological Society.

DR. HADDOW M. KEITH, Vice-President of the American League Against Epilepsy.

DR. J. NORMAN PETERSEN, Member of the Board of Directors and Executive Committee of the Mental Hygiene Institute of Montreal.

NURSING STAFF

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

Assistant Supervisor and Ward Teacher MISS HELEN M. EBERLE, R.N.

Night Supervisor MISS BERTHA CAMERON, R.N.

Night Assistant, Wards MISS MILDRED HOWLETT, R.N.

Night Assistant, Operating Room MISS LUCIE MILLETTE, R.N.

Operating Room Supervisor MISS CORA MACLEOD, R.N.

Assistant Operating Room Supervisor MISS ANNA HUDSON, R.N.

Head Nurses MISS LORRAINE MACNICHOL, R.N.
MISS CONSTANCE LAMBERTUS, R.N.
MISS MARGARET GOLDIE, R.N.

General Duty, Operating Room MISS M. E. MACDONALD.

General Duty, Floors MISS EVELYN SCOTT, R.N.
MISS MARGUERITE MACLIMONT, R.N.
MISS CELESTE COLPITTS, R.N.
MISS ISABEL DICKSON, R.N.
MISS ISABEL GILLESPIE, R.N.
MISS C. T. LEBLANC, R.N.
MISS L. ROBICHAUD, R.N.
MISS JEAN YOUNG, R.N.
MISS OLGA HISCOCK, R.N.
MISS M. FENWICK, R.N.



Back Row—G. ODOM, E. B. BOLDREY, G. Y. MCCLURE, T. C. ERICKSON, A. CIPRIANI, J. KERSHMAN, S. HUMPHREYS, F. ECHLIN.
Third Row—W. M. NICHOLS, F. L. MCNAUGHTON, H. M. KEITH, D. O. HEBB, D. MCEACHERN, A. E. CHILDE, A. W. YOUNG,
 A. G. MORPHY, N. VINER, M. HARROWER, A. R. ELVIDGE.

Second Row—R. AMYOT, F. H. MACKAY, C. K. RUSSEL, W. G. PENFIELD, W. V. CONE, J. SAUCIER, J. N. PETERSEN.

Front Row—F. H. HANSON, R. H. STEVENS, W. L. REID, R. H. PUDENZ, O. W. STEWART.

The nursing staff of the Institute is appointed by the Superintendent of Nurses of the Royal Victoria Hospital. There is a permanent staff of twenty-one, divided as follows: a general supervisor who is in charge, an assistant who acts as ward teacher, two night supervisors, four operating room nurses, three head nurses on the wards, and ten general duty nurses.

In addition there are five post-graduate students who remain from six months to a year, and six undergraduate nurses of the Royal Victoria Hospital, who stay for six weeks. This means a total of thirty-two.

In order to train graduate nurses for neurological and neurosurgical nursing a post-graduate course is given in the Institute. The minimum length of time is six months and this may be extended to two years if operating room experience is required. Lectures are given each week by members of the medical staff, on neuroanatomy, neurophysiology, neurology, and neurosurgery, and the ward teacher conducts a class in nursing each morning.

The post-graduate students are assigned to the wards on day and night duty, and are given a considerable amount of supervision and teaching while on duty. These students who have come from all parts of Canada, and several from the United States, either return to their own hospitals to carry on neurosurgical nursing, remain on the staff of the Institute, or do private nursing for our service.

The number of patients treated in the Institute was again greater during the past year, with a bed occupancy of 100%. This is made possible by changing the small wards and rooms to accommodate in turn, children, semi-private or ward patients, according to the temporary demand.

The rapid turnover of patients, and the high bed occupancy, means that we are caring for patients in the acute stage of illness only, and this in turn means a heavy load on the nursing staff as well as on the physical, medical and surgical equipment.

There are advantages, however, in this condition both from the teaching point of view, and from the patients' point of view as it makes the service particularly interesting and instructive, and this is reflected in a better nursing service to the patients. It also means that all equipment must be kept at the maximum efficiency at all times.

There has been no change in the total number of nurses this last year, but the permanent staff has been increased by two, and the student nurses reduced accordingly. The operating room now has a nurse on duty at night for emergencies, who assists with treatments and procedures in the ward dressing rooms when not required in the operating room.

TECHNICIANS AND LABORATORY ASSISTANTS

MISS DORIS D. BROPHY, B.A., Licenciée ès Sciences	Chemistry.
MISS LORRINE CODE, B.A., M.T.	Chemistry.
MISS C. DART, R.N.	Neurophysiology.
MR. A. GODDARD	Neuropathology.
MR. H. S. HAYDEN, F.R.P.S.	Photography.
MR. G. PELADEAU	Neurophysiology.
MR. J. WARNER	Neuropathology.
MR. W. WHITEHOUSE	Roentgenology.

SECRETARIAL STAFF

MISS H. LEWIS	Departmental Secretary.
MISS A. DAWSON	Office.
MISS E. FANNING	Half-time, Manuscripts.
MISS I. MEAGHER	X-ray and Administration
MISS H. O'MARA	Records.
MISS W. SMITH	Neuropathology.

HOSPITAL DIVISION

Under the Department of Neurology and Neurosurgery patients are cared for not only in the Montreal Neurological Institute but also in the Royal Victoria Hospital. The clinical services in the public wards are subdivided into (1) a neurological service under the immediate direction of Dr. Colin K. Russel as neurologist, and (2) a neurosurgical service under the immediate direction of Dr. William V. Cone as neurosurgeon. The Director holds a supervising control over both services while the Registrar acts as executive officer. 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.

OUTPATIENT DEPARTMENT

Outpatient clinics are held five days each week in the Royal Victoria Hospital.

Monday and Thursday Neurology

Tuesday and Friday Neurosurgery

Wednesday Neurology (Epileptic)

	<i>Neuro- logy</i>	<i>Neuro- surgery</i>
New cases	344	168
Re-visits	3532	506
	3876	674

Total outpatient visits 4550

ADMISSIONS TO HOSPITAL

	1937	1936
Admitted directly to Montreal Neurological Institute	908	877
Admitted directly to Royal Victoria Hospital	123	108
	1031	985
Transfer of patients between the Montreal Neurological Institute and the Royal Victoria Hospital took place freely so that the total number of patients cared for in the former was		
	953	912

Of the direct admissions to the Institute 565 were males and 344 females who were cared for as follows:

	1937	1936
Private patients	133	130
Semi-private patients	161	145
Public patients	614	612
Total days' treatment	18,315	17,667
Average stay	20 days	18 days
Daily average of patients	50	48
Daily average percentage of capacity (based on 50 beds)	100%	96%
Trips made by ambulance	167	194
Residents of Montreal	391	523
Residents outside Montreal	517	364
Total deaths in Department	62	70
Deaths occurring within 48 hours of admission	9	20
Death rate (on deaths after 48 hours)	5.18%	5.18%
Autopsies obtained	53	58
Percentage of autopsies obtained	85.4%	82.8%

During the year Dr. Russel and his assistants on the Neurological service saw 256 patients in consultation on other services in the Institute and in the Royal Victoria Hospital.

ROENTGENOGRAPHIC DEPARTMENT

DR. A. E. CHILDE, *Roentgenologist*

	1937	1936
Roentgenographic examination of patients	1893	1677
Roentgenographic examination for research purposes	141	310
Films used	7951	7924
Encephalograms	339	397
Ventriculograms	77	87

The X-Ray Department reports examination of 1893 patients, representing a gain of 216 over the previous year and 582 over the year 1935. The original radiographic tube which was installed in September 1934 had to be replaced early in the year. It had given a good deal longer service than could be expected with this type of tube. A new type shockproof rotating anode tube was purchased in its place and has afforded much more satisfactory examination of heavy parts of the body. A new Bucky grid has been installed in the head Bucky and now considerably more rapid exposures can be obtained than before. This has been a very decided advantage in semi-comatose patients and young children.

No radically new methods of examination have been introduced during the past year. A demonstration of some of the findings shown by axial examination of the skull has been given before the Montreal Medico-Chirurgical Society. Some of the more important findings by encephalography and ventriculography in childhood were discussed at the Canadian Medical Association meeting in Ottawa in June. The accompanying exhibit received a Certificate of Merit.

LABORATORY AND RESEARCH DIVISIONS

The neuropathological, neurophysiological and chemical laboratories, under the direction of Dr. W. V. Cone, Dr. A. R. Elvidge, and Dr. Donald McEachern respectively, have been active throughout the year and reports dealing with each of these appear elsewhere in this record.

Because of decreased income from securities, the funds derived from the endowment given by the Rockefeller Foundation are ten thousand dollars less annually than the minimum which was estimated as necessary for the proper maintenance of the laboratory and research activities. Consequently the laboratory work has been handicapped and has fallen short of its full possible realization. Increased income is needed particularly for the endowment of research fellowships.

NEUROPATHOLOGICAL LABORATORIES

DR. W. V. CONE, *Neuropathologist*

The routine work of the laboratories has increased requiring practically the full time of the two technicians, Mr. Arthur Goddard and Mr. James Warner. For this reason, it has been necessary for the research fellows to prepare most of the microscopic preparations required in the study of their various problems. Two more technicians, one devoting his time to sections for cyto-architectonics and tract studies and one aiding the fellows or senior staff with the preparation of special material, could be employed advantageously. The amount and diversity of the material passing through the laboratories continues and material classified by routine study, but available for further investigation, continues to accumulate.

Dr. W. L. Reid was neuropathological fellow for the first six months when he withdrew to devote the last six months of the year to the study of the cause of ipsilateral dilatation and fixation of the pupil in expanding cerebral lesions. Dr. G. Y. McClure then became neuropathological fellow. Together they reported on two hundred and forty-six surgical specimens, sixty-four autopsies and twenty-three specimens sent for opinions from other clinics. As in years past, the Department of Pathology of McGill University and the Royal Victoria Hospital has been co-operative and most helpful, and gradually very valuable amounts of gross anatomical lesions are being accumulated and placed on permanent display in the museum where they can be easily obtained for teaching purposes or for study.

Research fellows in the laboratory have made special studies of the following problems: Dr. T. C. Erickson — The central distribution of the nervus terminalis; Dr. S. P. Humphreys — The innervation of the blood vessels in the normal and epileptic brains and in brain scars; Dr. John Kershman — The origin of the medulloblast and the embryological development of the central nervous system in relationship to gliomas, and also with Dr. Erickson — The production of experimental intracranial neoplasms by injection of carcinogenetic substances. Dr. J. S. M. Robertson completed a study of the parietal cortex in relationship to somatic growth changes and studied the influence of increased intracranial pressure on the healing of brain wounds. Dr. W. M. Nichols has standardized our Horsley Clarke apparatus for cats' brains by histological studies.

Dr. Reid, reviewing all the accumulated pathological material bearing on his problem and by experimental work, completed his study. Dr. G. Y. McClure began investigations on the various factors causing acute swelling of oligodendroglia.

PHYSIOLOGICAL LABORATORIES

DR. A. R. ELVIDGE, *Neurophysiologist*

DR. T. C. ERICKSON, *Assistant Neurophysiologist.*

The physiological laboratories have been used more and more in the study of neurophysiological as well as clinical neurological and neurosurgical problems. Two hundred and seventy-five acute and sterile operations were done during 1937 and two hundred and thirty-seven minor operative procedures. Research has covered a wide field of neurophysiology but most of it has been closely correlated. A most efficient utilization of technical experience, of time, and of materials has been made possible by the unselfish cooperation of the research fellows, the medical and

the technical staffs and much credit is due especially to Miss C. Dart for her excellent assistance.

Various aspects of cerebral circulation and epilepsy have been studied under Dr. Penfield's direction by the following workers: Cipriani, Echlin, Erickson, Kershman, Nichols and Santha. Mr. Cipriani has devoted much time to the development of electroencephalographic apparatus as well as acting as a consulting physicist on other problems. The spread of epileptic discharge and excitation across the cortex and the corpus callosum has been studied with blood flow and electrographic methods by Dr. Erickson. Dr. Nichols has utilized the Horsley Clarke stereotaxic apparatus in his thermocouple studies of nervous connections. Dr. Echlin has been studying cerebral ischemia and possible humoral factors in the etiology of convulsions. Dr. Kershman has been studying the mechanism of insulin convulsions. Dr. Odom has been engaged in a study of vitamin deficiencies and other problems with the Department of Chemistry. The facilities of these laboratories have also been frequently utilized by physicians from various other departments in the Royal Victoria Hospital as well as in the Neurological Institute.

CHEMICAL LABORATORIES

DR. D. MCEACHERN, *Biological Chemist*

The number of determinations carried out in the Chemical Laboratories during the year 1937 was as follows:—

Cerebrospinal Fluid

Pandy	1030
Proteins	1045
Sugar	27
Chlorides	55
Lange curves	310
Miscellaneous	33
	2500

<i>Blood Bromides</i>	19
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Estimations of Basal Metabolic Rate on Institute patients were taken over from the Medical Laboratories of the Royal Victoria Hospital on March 21st. and this change has saved considerable time and inconvenience since it is no longer necessary to move patients from the Institute for such tests. Ninety-two determinations were carried out.

A total of 2611 determinations of all types were made in the chemical laboratory of which 721 were on private and semi-private patients and 1890 on public patients.

Research problems completed during the year include:—

A study of the alleged convulsant properties of brain extracts with Dr. H. M. Keith.

A study of the neurological defects produced in animals by B₁ avitaminosis with Mr. Moro.

Paroxysmal hypertension due to pheochromocytoma, with Dr. David W. McKenzie.

Studies of the metabolism of brain and of red blood cells in hyperthyroidism with Miss Doris Brophy.

Dr. Guy Odom is at present working on the electrical phenomena and the results of therapy in Myasthenia Gravis and related conditions.

CLINICAL SERVICES AND FELLOWSHIPS

The internship of eighteen months' duration consists of six months neurosurgery, six months neurology, and six months as senior interne in the Neurological and Neurosurgical Outpatient Department combined with traumatic neurosurgical work. This eighteen months' appointment is available on January 1st and July 1st.

The internes live in residence in the Royal Victoria Hospital and have their meals there.

The appointment of neurological and neurosurgical Resident is of two years' duration. No candidates are considered unless they have had previous work on this service and in the Laboratory. The Resident has his quarters in the Neurological Institute.

The appointment of Neuropathological Fellow is a yearly one open to men who have had previous work as interne or Laboratory Fellow. It carries with it residence in the Institute and a monthly stipend. The Neuropathological Fellow is responsible for pathological reports on autopsy material and surgical specimens, under the supervision of Dr. Cone.

Two fellowships are available for research in neuropathology, neuroanatomy, neurophysiology or biological chemistry. These fellowships carry with them residence in the Institute and a small stipend. Applicants for these fellowships must have demonstrated the fact that they are capable of independent work.

There is opportunity for two or more voluntary Fellows to do fundamental work of the type described above. The qualifications for these appointments are similar to those of the other Fellows.

An externship in either neurology or neurosurgery is available to men who are not in residence but who are qualified to play an active role in the service. No stipend is attached to these services. In neurosurgery the externe is expected to work up cases and to act as second assistant at operations, at the discretion and under the supervision of the Resident.

The Fellows and Externes are enabled to follow the progress of clinical problems by attending complete rounds once a week. A weekly pathological conference makes it possible for them to see the pathological material of the week, and weekly meetings of the Montreal Neurological Society are so planned that they may attend and take part in the discussions. These weekly meetings alternate between clinical demonstrations at the different hospitals and scientific lectures.

Applicants for Internships, Fellowships and Externships should send to the Registrar, with their applications, the names of three men as references, a careful description of their University, Hospital and Laboratory work up to the time of writing, an outline of future plans and a statement of age, nationality, religion, schooling and if possible their rank in their final medical examinations.

TEACHING DIVISION

The lecture amphitheatre in the Institute, seating one hundred and twenty, is used not only by the Department of Neurology and Neurosurgery but also, on occasion, by all the other teaching departments of the Royal Victoria Hospital. Teaching facilities for small groups are available also in the library and in special rooms on the public clinical floors.

Undergraduate teaching in Neurology and Neurosurgery is carried out in the fourth and fifth years of the medical course and consists of formal lectures, ward teaching and case presentations to small groups in the outpatient department. In addition an elective course of weekly case presentations of diseases of the nervous system is given by Dr. Wilder Penfield. This is open to students and practitioners before whom physical signs, diagnosis and treatment are discussed. Throughout the academic year a special elective course, with weekly lectures, was given. It was divided into the following sections:--

Neuroanatomy, by Drs. Petersen, McNaughton and Erickson.

Neurophysiology, by Dr. Elvidge.

Physiological Chemistry by Drs. McEachern and Keith.

Roentgenology, by Dr. Childe.

The courses described above as elective for undergraduates form part of the post-graduate teaching in the Department. In addition graduate students attend a weekly colloquium in neuropathology, conducted by Drs. Cone and Penfield, weekly meetings of the Montreal Neurological Society and weekly complete ward rounds.

Lectures to undergraduate and to graduate nurses are also given in the Institute by members of the staff.

Guest speakers appearing before the Montreal Neurological Society during the year were:

Dr. Kurt Goldstein, Montefiore Hospital, New York City.

Dr. James C. White, Massachusetts General Hospital, Boston, Mass.

Dr. Max Peet, University Hospital, Ann Arbor, Mich.

Dr. Pierre Masson, University of Montreal.

Dr. Percival Bailey, University of Chicago.

Dr. Roy Farquharson, University of Toronto.

Dr. John Fulton, Yale University.

Dr. William Lennox, Harvard University.

Dr. Karl S. Lashley, Professor of Psychology at Harvard University, delivered the second Hughlings Jackson Memorial Lecture on April 7th., 1937, and this was entitled, "Factors Limiting Improvement After Central Nervous Injuries".

THE NEEDS OF THE INSTITUTE

Clinical Activity

From the beginning the Neurological Institute has been filled with patients to its capacity. The Institute belongs to McGill University but the clinical unit, comprising about fifty beds, public and private, is administered for the University by the Royal Victoria Hospital. The majority of the patients come under the heading of "public" and it is not considered to be the province of the University to undertake financial responsibility for the deficit which inevitably arises from the care of such patients. Hospitalization expense is quite properly covered by the contributions from the City of Montreal and the Province of Quebec, but there are crying needs not covered by the present generosity of the City and Province.

From other provinces and from the United States come sufferers who have raised enough money for the journey but who are unable to pay for a bed even at the daily public ward rate of \$3.00 (which in reality is about one-half of the actual cost of maintaining that bed). Nevertheless, these patients come to our door in the desperate hope that they will be admitted. It is no doubt logical to suggest that they should be sent back, or that local subscription in their place of origin ought to have been made, as it often is, to cover all expenses of hospitalization. But as long as endowed research as well as special equipment and training make special forms of treatment available here, such patients will continue to throw themselves upon the mercy of the staff from time to time. To refuse help may mean suffering and perhaps death.

To meet such emergencies a "Transfusion and Clinical Relief Fund" has been created. At the time of the opening of the Neurological Institute on September 27, 1934, Professor Harvey Cushing of Yale University gave \$150.00 for "some deserving patient." Having learned during his brilliant career as neurosurgeon how often destitute sufferers stretch the heartstrings as well as the purse-strings of a clinic staff, Dr. Cushing made this unsolicited donation and with it the fund was capitalized. It was rescued from immediate extinction by the timely gift of \$696.00 from a Montreal friend, Mrs. A. A. Hodgson. In 1936 Mrs. J. Howard Means of Boston replenished the fund by the generous donation of \$1000.00.

As the title suggests, this fund is used for the cost of transfusions when needed urgently by indigent patients as well as to pay hospitalization expenses when no other support is available. It serves another useful purpose, to defray the costs of occasional clinical studies which are required for scientific purposes rather than for the immediate therapeutic need of the patient. For example, additional X-rays of a rare bone-condition may be of considerable value to the staff in the study of that disease although it would be unfair to burden the account of the patient with such charges.

There is a further need for at least two endowed beds in the public ward for patients who do not fall under the Quebec Public Charities Act.

Scientific Activity

The second purpose of the Neurological Institute is the advancement of knowledge in a field which is in some ways the most obscure and yet filled with the greatest possibility of good to mankind. This scientific activity which includes pathological, physiological and biochemical studies of the nervous system is supported in part by an endowment given by the Rockefeller Foundation.

But because of decreased income from securities the funds derived from this endowment are annually ten thousand dollars less than the minimum which was estimated as necessary for this purpose. Consequently the laboratory work has been handicapped and has fallen short of its full possible realization. Increased income is needed particularly for the endowment of research fellowships.

Specific Needs

For the information of those who might desire to help the work of the institute a few specific examples of our needs are added below.

A.—Transfusion and Clinical Relief Fund. Donations of any size are welcome and may be addressed to the Montreal Neurological Institute and marked for this fund.

B.—Free Beds. The cost of endowing one public bed in perpetuity in the Institute, to be named by the donor and maintained free for indigent patients, is \$25,000.00.

C.—Research Fellowships. \$1,200 annually or as a permanent endowment \$30,000. If desired by the donor these fellowships may be named as a memorial and publications of work done during the tenure of such a grant would bear the name of the fellowship, e. g. "John Smith Memorial Fellowship". Each of these would support a recent graduate in medicine while carrying out advanced study and research. At least four such fellowships are urgently needed.

D.—The Fellows' Library. This library contains journals and special neurological books needed for the studies in progress both scientific and clinical. The books here supplement those in the University Medical Library without duplicating them. There is a waiting-list of books and journals which cannot be purchased without exceeding the library appropriation. Any donation to the library would bear the donor's name on the fly-leaf. Ten dollars will purchase a text-book, \$400. a many-volume handbook of neurology and \$900. the back file of a neurological journal.

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.

Gifts and Bequests During 1937

Special grant in aid of psychology:	
ROCKEFELLER FOUNDATION	\$3,000.00
Special fund for the study of cerebral circulation:	
SIR HERBERT HOLT	2,250.00
MR. G. H. DUGGAN	500.00
To the Transfusion and Clinical Relief Fund:	
Bequest of the late HERMAN KLUGER	100.00
VULTURES CLUB, London	<i>half a guinea.</i>

CLASSIFICATION OF DISEASES

Nervous System Generally:

Neurosyphilis	37
Multiple sclerosis	17
Neuromyelitis optica	1
Progressive muscular atrophy	1
Amyotrophic lateral sclerosis	4
Familial periodic paralysis	1
Friedreich's ataxia	1
Myasthenia gravis	4
Cephalalgia of undetermined origin	17

Meninges:

Meningocele	7
Chronic adhesive arachnoiditis	10
Meningitis, pneumococcus	4
" streptococcus	3
" staphylococcus	2
" tuberculous	3
" aseptic	4
Tuberculoma of pia	1
Extradural abscess	1
Subdural effusion	8
Extradural haemorrhage, traumatic	6
Subdural haemorrhage, traumatic	19
Subarachnoid haemorrhage	13
Subarachnoid haemorrhage, traumatic	44
Sinus thrombosis	2
Laceration of dura	2
Meningeal cicatrix	2
Post-traumatic headache	18

Brain :

Defect of septum pellucidum	1
Oxycephaly	1
Encephalomeningocele	3
Infantile cerebral hemiplegia	3
Infantile cerebral diplegia	1
Hydrocephalus	7
Arnold-Chiari malformation	1
Encephalitis periaxialis diffusa	1
Cerebral abscess	8
Cerebral concussion	75
Brain contusion and laceration	13
Compression of brain	1
Meningocerebral cicatrix	14
Cerebral cicatrix	11
Cyst of brain	5
Epilepsy	107
Epilepsy, focal	62
Carotid sinus syndrome	1
Narcolepsy	1
Migraine	4
Migraine, ophthalmoplegic	1
Cerebral arteriosclerosis	10
Cerebral haemorrhage	5
Cerebral thrombosis	25
Cerebral infarction	1
Cerebral angiospasm	1
Vascular anomaly, angioma	1
Intracranial aneurysm	12
Cerebral atrophy	21
Encephalomalacia	2
Porencephaly	1
Sydenham's chorea	1
Paralysis agitans	9
Spasmodic torticollis	5
Syringobulbia	1

Tumours of Nervous System :

Blood vessel tumours	4
Total gliomas	46
Astroblastoma	2
Astrocytoma	16
Ependymoma	1
Glioblastoma multiforme	16

Medulloblastoma	6
Neuroepithelioma	1
Oligodendroblastoma	1
Spongioblastoma polare	1
Glioma—unclassified	2
Von Recklinghausen's disease	2
Perineurial fibroblastoma	3
Meningeal fibroblastoma	8
Dural and extradural sarcoma	2
Metastatic sarcoma	1
Metastatic carcinoma	10
Myeloblastoma	1
Cholesteatoma	1
Sympathoblastoma	1
Pap. adenocarcinoma choroid plexus	1
Pinealoma	2
Pituitary adenoma	7
Craniopharyngeal pouch tumour	2
Hypophyseal duct tumour	1
Unclassified tumour	2
Unverified tumour	10
Tumour suspect	26
 <i>Spinal Cord:</i>	
Myelomeningocele	12
Duplication of spinal cord	2
Dermoid cyst of cauda equina	2
Acute anterior poliomyelitis	3
Post-poliomyelitic paralysis	4
Contusion of spinal cord and/or laceration	2
Compression of spinal cord	19
Thrombosis, spinal artery	2
Syringomyelia	4
Dorsolateral sclerosis	5
Atrophy of spinal cord	1
Myelopathy	4
 <i>Cranial and Peripheral Nerves:</i>	
Optic atrophy	3
Toxic amblyopia	1
Retrobulbar neuritis	1
Ocular palsy	1
Trigeminal neuralgia	62

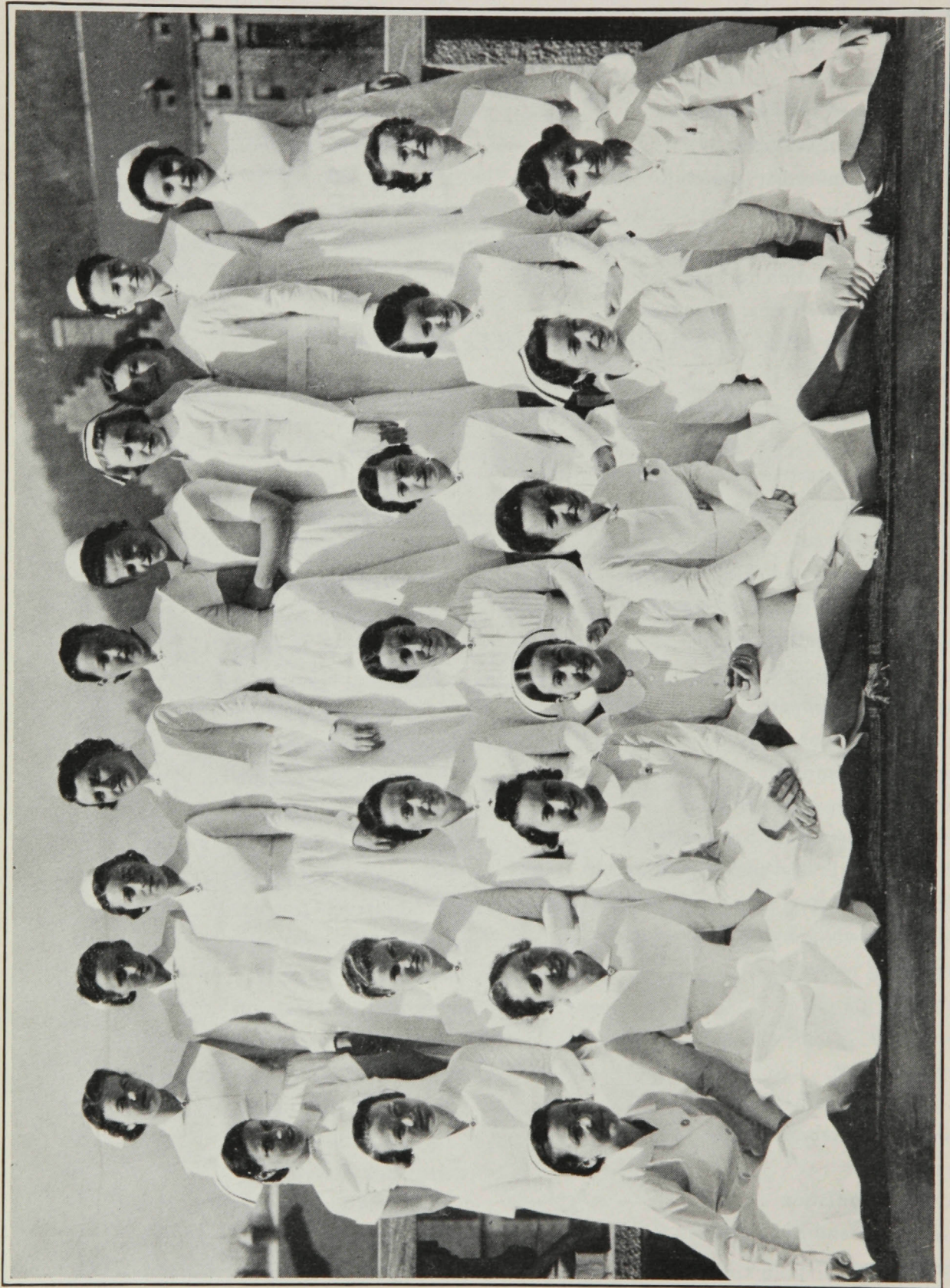
Facial paralysis, peripheral	5
Meniere's syndrome	11
Paralysis, recurrent laryngeal nerve	2
Paralysis brachial plexus and branches	10
Compression brachial plexus	5
Paralysis lumbosacral plexus and branches	5
Radiculitis	2
Herpes zoster	5
Post-herpetic neuralgia	1
Multiple neuritis	4
Sciatic neuritis	2
Neuralgias	5
<i>Autonomic Nervous System:</i>	
Sympathicotonia	2
Scleroderma	2
<i>Mental Diseases:</i>	
Mental deficiency	12
Alcohol addiction	33
Drug addiction	4
Psychoneurosis	84
Manic-depressive psychosis	22
Dementia praecox	9
Schizoid personality	3
Symptomatic psychosis	5
Korsakoff's psychosis	2
Miscellaneous	8
<i>Other Systems and Miscellaneous:</i>	
Cranium bifidum	3
Rachischisis	3
Spina bifida	21
Cervical rib	8
Nucleus pulposus herniation	5
Specific infectious diseases	2
Typhus	1
Malaria, therapeutic	10
Tuberculosis	16
Latent syphilis	6
Fracture of skull	57
Fracture and/or dislocation vertebral column	28
Other fractures	24
Other dislocations	1
Lacerations, contusions, abrasions and/or haematomas	77

Carcinoma	12
Adrenal adenoma, phaeochromocytoma	1
Diseases of cardiovascular-renal system	91
" " respiratory system	48
" " gastro-intestinal system	20
" " genito-urinary system	35
" " haematopoietic system	8
" " endocrine system	31
Diseases of locomotor and integumentary system	70
" " eyes, ears, nose and throat	72
Miscellaneous	6
Diagnosis deferred	21

CLASSIFICATION OF OPERATIONS

Craniotomy,	7
" exploration	15
" decompression	8
" removal of tumour	27
" partial removal of tumour	24
" removal of cyst	1
" aspiration of cyst	4
" excision of cicatrix	17
" removal of aneurysm	2
" lobectomy	1
" drainage of abscess	4
" removal of carbuncle of brain	1
" drainage of subarachnoid space	1
" drainage of subdural space	12
" suture of dura	1
" rhizotomy	24
" removal of extradural haemorrhage	3
" separation of adhesions	4
" ligation of middle meningeal artery	2
" drainage of intracerebral haemorrhage	3
" acoustic neurectomy	1
Laminectomy	3
" exploration	5
" decompression	4
" exploration and fusion	1
" removal of tumour	4
" partial removal of tumour	4
" removal of cicatrix	1
" rhizotomy	3
" removal of nucleus pulposus	4

" separation of adhesions	3
" removal of hyperostosis	1
" incision of syringomyelic cavity	2
Plastic repair of spina bifida	10
" " " cranium bifidum	3
Trepanation	68
" and exploration	4
" ventriculography	11
" ventricular puncture	1
" biopsy	9
" exploration and/or drainage subdural space	9
" aspiration of cyst	1
Encephalography, lumbar puncture	339
Ventriculography	66
Spinal insufflation	13
Arterial encephalography, injection of thorotrast	8
Myelography	12
Carotid sinu-neurectomy	28
Ligation of external carotid artery	21
" " internal " " 	1
Elevation of depressed skull fracture	10
Debridement and suture of wound	8
Application of skull traction	7
Repair of meningocele	4
Plastic repair of wound	7
Re-elevation of bone flap	7
Re-opening of wound	3
Drainage osteomyelitis of skull	4
Section of scalenus anticus muscle	3
Exploration of bracial plexus or branches	3
Exploration of nerve, removal of neuroma and nerve suture	2
Nerve anastomosis, hypoglossal—facial	1
Avulsion of nerve	8
Neurolysis	4
Neurectomy	1
Sympathectomy	2
Splanchnic sympathectomy	14
Drainage of cerebral abscess	2
Re-exploration	2
Subdural insufflation	2
Spinal fusion and bone graft	11
Miscellaneous	21
	TOTAL
	929



Back Row—I. GILLESPIE, M. HOWLETT, E. SCOTT, M. MACLIMONT, L. MILLETTE, C. COLPITTS, A. ROSENQUIST, M. ROACH.
 A. HUDSON, I. CANTERO, Second Row—B. HARRIS.

Middle Row—C. LAMBERTUS, C. MACLEOD, B. CAMERON, E. FLANAGAN, H. EBERLE, L. MACNICHOL, M. GOLDIE.

Front Row—L. ROBICHAUD, L. POTVIN, C. LEBLANC, B. CAMERON, M. COOK, E. OGILVIE, J. MACISAAC.

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DR. D. MCEACHERN

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Respectfully submitted,

J. N. PETERSEN, M.D.

Registrar.

