

MONTREAL NEUROLOGICAL
INSTITUTE
and
MONTREAL NEUROLOGICAL
HOSPITAL



McGILL UNIVERSITY

THIRTY-FIFTH ANNUAL REPORT
1969-1970

Thirty-fifth Annual Report
of the
MONTREAL NEUROLOGICAL
INSTITUTE
and
MONTREAL NEUROLOGICAL
HOSPITAL
and the
DEPARTMENT OF NEUROLOGY
AND NEUROSURGERY
of
McGILL UNIVERSITY

1969-1970

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EDITORIAL NOTE

This 35th Annual Report records again the clinical, scientific, and teaching activities of these twin institutions, both dedicated to the relief of disorders of the brain and nerves, a task that continues on an ever-widening frontier. And perhaps there is no end to that task if we agree with Ramón y Cajal, who once said, "As long as the brain is a mystery, the universe, the reflection of the structure of the brain, will also be a mystery". Our distinguished Visiting Neuroanatomist this past year, Professor Alf Brodal, put it a bit differently. "The brain of man", he stated, "is so complex that it cannot yet understand itself". So there is more work ahead for us and for all those engaged in the neurosciences.

The cooperation of the medical and clerical staff members in providing these annual reviews and the most helpful supervision of the manuscripts and proofs by Mrs. Rose Slapack are acknowledged.

W.F.
Editor



MRS. RUTH REITMAN

Ruth Reitman's friendship for the Montreal Neurological Hospital and its Staff began when she was admitted as a patient of Dr. Bill Cone in 1947. Through his surgical skill, she was restored to normal health. As a token of her gratitude, she planned a party for the Staff at Christmas 1947, and arranged every detail with loving care. The party was held in the kitchen on Two South, Mrs. Reitman presided as the gay hostess, and Dr. Cone carved the turkey. It was a great success, so great, in fact, that it was repeated in 1948, and inevitably Mrs. Reitman's party became an annual Hospital event.

Each year the Christmas party grew in size as the Staff of the Hospital and the Institute expanded, but it was always planned with the same happy, personal touch, and with Mrs. Reitman's friendly presence. It was a "love-feast" still expressing her deep feelings of gratitude to the people of this Hospital. Each party was the occasion for renewing old friendships and meeting new staff members.

In spite of serious illness during 1969, Mrs. Reitman insisted on planning her party as usual, and it was held on December 19, 1969.

Our pleasure in remembering her last party is mixed with sadness and a sense of loss, for we have all lost a dear friend.

F. Mc.N

REPORT OF THE DIRECTOR

DR. THEODORE RASMUSSEN

This combined report of the Institute to the Principal and the Board of Governors of McGill, and of the Hospital to the Board of the Hospital Corporation, occurring, as it does, at the beginning of a new decade, provides an occasion and a stimulus to pause and glance back briefly at a few highlights of the record of the 60's, a decade of progress, a decade of expansion and a decade of change.

The introduction of the Quebec Hospitalization Insurance Service at the beginning of the decade required the incorporation of the hospital activities of the Institute as the Montreal Neurological Hospital, thus formalizing the financial separation of the hospital budget from the teaching and research budget, as was established with wisdom and forethought by Dr. Penfield on the opening of the M.N.I. 36 years ago. Although formal responsibility for the hospital activities was thus transferred from the McGill Board of Governors to the new Hospital Corporation, there has been no lessening of ties with McGill, since the six elected and the three ex-officio members of the Board of the Hospital Corporation are all members of either the McGill Board of Governors or the McGill Teaching Staff.

I should like to record our appreciation and gratitude to the non-medical members of the McGill Board of Governors who have served with Dr. Penfield on this Board: Mr. A.D.P. Heeney, Mr. Greville Smith, Senator Molson and his successor, Mr. Arnold Hart, and especially Mr. S.M. Finlayson, President of the Board during its first seven years. We extend a warm welcome to Mr. Jean de Grandpré who has just been elected to the Board, and to the Presidency, as Mr. Finlayson's successor.

Administration

The administrative load increased sharply as the QHIS struggled with its growing pains, and it soon became clear that we needed more expert help in this area. This led to the strengthening of our administrative structure by the appointment of Mr. Gurd as Administrator and Mr. Heavysege as Personnel Director, and by the consolidation of financial affairs under Mr. Thomas as Controller. Mr. Rochette, in charge of maintenance, and Mr. Yorke, the building superintendent, complete a strong administrative team for the years ahead.

Building

As the sixties began, we had just completed extensive renovations of the laboratories and offices on the 6th floor. Urgent needs, however, soon led to even more extensive renovations in the basement, to provide expanded and up-to-date facilities for the Laboratory of Electroencephalography and Clinical Neurophysiology, the Psychology Department, the Electronics Department, nurses', maids' and orderlies' locker rooms and lounges, housekeeping storeroom, etc. An addition was constructed on the 6th floor, expanding the Laboratory of Neuropathology to provide space for an electron microscopic

unit; the Institute's fourth elevator was installed in the empty shaft waiting for it in the McConnell Wing, and the 4-North Ward was transformed into an Intensive Care Unit.

Staff

Three disputes between various sectors of the Province's hospital community and the Government marred the decade's record of hospital — QHIS collaboration in ministering to Quebec's health needs, but left no permanent scars of significance here at the M.N.I. Hopefully, lessons learned in this past decade, in this regard, will lessen the likelihood of disruptions in the seventies.

The beginning of the sixties saw Dr. Penfield completing his transition to a second career. Dr. K.A.C. Elliott, Dr. Herbert Jasper and Dr. Fred Brindle moved from the Active to the Consulting Staff. Dr. Ronald Millar and Dr. Donald McRae moved on to bigger posts. Dr. Francis McNaughton handed the baton of Neurologist-in-Chief to Dr. Preston Robb. Dr. Elvidge retired and turned his neurosurgical service over to Dr. Gilles Bertrand. Miss Eileen Flanagan passed on the leadership of the superb nursing corps she had fashioned to her long-time associate and co-worker, Miss Bertha Cameron, who immediately had to grapple with the problems of building up the nursing staff, to cope with the transition to the 40-hour week. After distinguished service as Director of Nursing, Miss Cameron will reach retirement age this fall, and a selection committee is at work choosing a successor, to carry on in the high tradition of excellence and devotion set by her and Miss Flanagan. Miss Anne Dawson handed the executive secretary's post over to Mrs. Malecka, and embarked on her own second career of putting the Institute's archives and records in order. Death claimed two of Quebec's and Canada's best-loved and most colourful neurologists, both long associated with the M.N.I., Dr. Reuben Rabinovitch and Dr. Jean Saucier, and also Mrs. von Nida, whose gay and energetic supervision of the Registrar's office will be long remembered.

The active permanent professional staff increased by one-fourth, from 29 to 36. The Fellowship staff, exclusive of rotators from other McGill residency-programmes, increased by over one-third, from 40 to 55, partly as a result of the growth and development of the neurological and neurosurgical departments at the Montreal General and Montreal Children's Hospitals. Eleven members of our permanent staff went on to bigger responsibilities elsewhere in Canada, the U.S. or Britain during this decade.

Education

Nearly 250 Fellows, exclusive of rotators from other McGill programmes, have studied here for periods of one to five years, during this ten-year period. Of the 190 or so, who have completed their training, twelve are now on the M.N.I. staff and one-fourth of the remainder are already in major academic posts, or in charge of important clinical services. During this decade, over 320 rotators from McGill residency programmes in Medicine, Anaesthesia and Radiology have studied here for periods of two to six, and occasionally twelve months.

Curriculum and time-table restrictions during the sixties, as in earlier decades, have severely hampered our efforts to provide the experience with clinical aspects of the nervous system that we feel each medical student should have. This constitutes unfinished business for the seventies.

Research

Both clinical and basic research flourished during this past decade, and the record is documented by the list of scientific publications that has averaged 50 to 60 per year, and by an impressive list of contributions of the staff to scientific symposia and to national and international meetings.

Finances

The spectre of uncontrollable hospitalization deficits has run as a continued story throughout most of the preceding 34 annual reports, and the spiral of hospitalization costs has not yet slowed down. The QHIS despite all its many growing pains, has proven to be a potent force in improving Provincial health services, and in safeguarding the viability of most of the Province's hospitals. Although we do not yet have our final settlement for 1968, it is gratifying to note that during the period 1961 through 1967, for which final year-end settlements have been received, we have reduced our hospital deficit, held by McGill, by a little over \$100,000. Undue delays in the final settlements, however, and unrealistic reductions in our yearly budget submissions continue to make efficient hospital administration and planning difficult, and impose an unfortunate financial burden on McGill.

A key factor in the growth and productivity of our twin institutions Institute and Hospital, is the support we have had, and are receiving, from both the private and the public sectors of the community. The sixties saw five endowments established, headed by the Killam Bequest, and saw individual gifts, of various sizes, increase from an average of 45 to an average of 75 donations per year. The welcome, continuing support of the Women's Auxiliary of the R.V.H. this year includes the purchase of a gas chromatography apparatus for the Neurological Research Laboratory, as well as plans for the redecoration of certain patient rooms, in addition to the Auxiliary's annual contribution to the Harvey Cushing Relief Fund. We appreciate the help of the Auxiliary's committee, working with the architects on plans for the new Coffee Shop which we hope to have in operation before the seventies are very far advanced.

Grants for specific research projects from Canadian and U.S. philanthropic foundations have continued to play a significant rôle in supporting both clinical and basic-research programmes, and will become of increasing importance now that the continuing research and educational support we have had through the years from the U.S. Public Health Service is being phased out, as a result of the budget restrictions being imposed on the National Institutes of Health.

We are grateful for the steadily growing research support we have received from the Medical Research Council of Canada, initially through a

Consolidated Grant that was superseded first by an institutional Block 7 Grant and, subsequently, by increasing aid through both the Personal Support Programme — MRC Associateships, Scholarships and Fellowship and the Research Grant-in-Aid Programme. In addition, Major Equipment Grants provided our electron microscope, a data acquisition system and computer unit just installed on the 7th floor.

There are many other facets, aspects and vignettes of the sixties clamour for mention, but they must yield to the prospects, plans and needs of the coming decade, where we have important good news to announce.

The Future

The proposed new wing, which we have been planning during the three years, was only an indefinite possibility at the time of last year's annual meeting. Now realization is assured. Generous donations by Col. I. McLaughlin, by an energetic anonymous Western friend and by Mr. T. J. Molson and Senator Hartland de M. Molson were matched by another anonymous benefactor and good friend of the Institute. These magnificent gifts, added to the Robert Bruce and Walter Adams Bequests, received earlier in the past decade, guaranteed half the construction costs. Our application to the Quebec Government was then approved, and Order-in-Council No. 4084 was issued on December 17th, 1969, authorizing the preparation of preliminary plans paving the way for coverage of the remaining half of the estimated construction costs from the Federal Health Resources Fund. The preliminary plans have now been presented to the Department of Health, and authorization to prepare the detailed specification drawings is expected soon. Barring unexpected delays, the time-table now indicates that the construction of the new wing, to be located between the M.N.I. and the Pathological Institute, should be under way early next spring.

This new wing with 65,000 square feet of space, plus the extensive associated renovations planned for the original building, will provide urgently needed additional space and facilities for both the basic and the clinical research programmes, as well as for expansion, modernization and improvement of most of the hospital departments. There will be an enlarged modern operating room suite, an improved intensive care unit, just beneath the operating rooms, and improved facilities for radiology. Our bed capacity will be expanded from 135 to 155. The dietary department will be improved by centralization and modernization of the kitchen-facilities, and a new spacious Coffee Shop will occupy the present Social Service area. New space and facilities will be provided for medical students, the Nursing Education programme and the Social Service Department. There will be limited expansion in the Neurology, Psychology and Business Administration office space and in the Library. The new wing will provide space for our hospital chancery thus completing the gradual transition of our record-room functions from the R.V.H. to the M.N.I., and will give us some badly-needed new space for storage of hospital equipment and supplies.

We will thus soon have vastly improved facilities with which to meet the challenges and the opportunities of the years ahead in all spheres, patient

graduate and undergraduate teaching, basic and clinical research. Continued and expanded financial support from the public will be needed, first to assist with the cost of equipment for these new facilities and, second, to increase our endowment funds, so that long-range research planning, basic and clinical, can be based on more assured financial support. We have at the M.N.I. a happy marriage between the clinical and the basic aspects of the nervous system. With a continuing partnership of active public financial support, the prospects for still greater contributions to man's neurological health, and to understanding of his nervous system and his mind, are bright indeed.

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LESLIE STERN, M.D. (Univ. of Manitoba) — KILLAM SCHOLAR — (at M.G.H.)

*Six months on this service.

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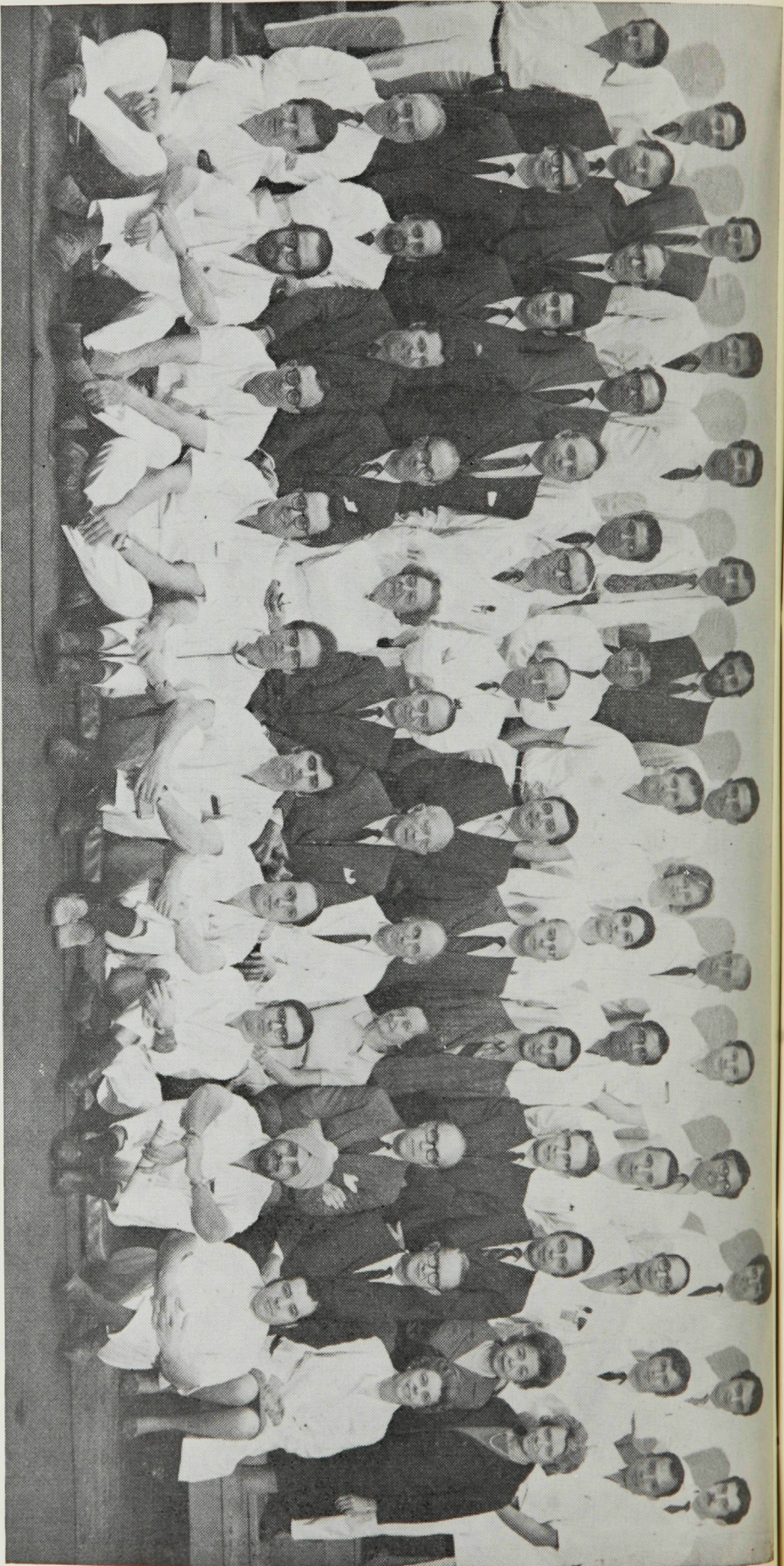
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 Second from Bottom: Drs. P. Gloor, R. Ethier, G. Bertrand, W. Feindel, Miss B. Cameron, Drs. T. Rasmussen, W. Penfield,
 F. McNaughton, B. Milner, Mr. C. Gurd, Miss C. Griffin.
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GRADUATE STUDIES & RESEARCH

DR. PIERRE GLOOR

While the neurologists and neurosurgeons, ably assisted by our splendid team of nurses, valiantly struggle at the front line with the multitude of problems presented by human disease, each unique and individually different, another more silent struggle is waged in the quiet recesses of our laboratories. The objectives of the latter may appear to be more remote from every day realities. They are certainly less dictated by the immediate exigencies of unique clinical situations. Yet to adequately understand the latter and to deal with them successfully, our fund of theoretical, scientific knowledge requires continuous growth, updating and a willingness to discard old concepts that are becoming obsolescent in the light of new scientific facts. To promote this need of continuous rejuvenation is the proper rôle of scientific research.

The growth of scientific thinking in clinical neurology and neurosurgery, and the application of basic science knowledge and techniques to these clinical disciplines which has been increasingly evident over the last few years has therefore been a gratifying sign that can only bode good for the future of these specialties. This increasing interdigitation between clinical thinking and practice on one hand and basic scientific concepts on the other has been much in evidence in our own group here. I find it most encouraging that some of the most active basic research carried out at this Institute has helped us to increase our understanding of fundamental mechanisms of human disease: four laboratories have been most actively involved in this kind of work, often in a cooperative effort, the Neurochemistry Laboratories, the Laboratory for Neurological Research, the William Cone Laboratory for Neurosurgical Research and the Electron Microscopy Laboratory in the Department of Neuropathology.

I shall take as an illustrative example the work on neurolipidoses which has been so successfully carried out in our Neurochemistry Laboratories by Dr. Wolfe and Mr. Callahan. This research effort originated from two sources: Dr. Wolfe's interest in the biochemistry of cerebral lipids, especially gangliosides, and Dr. Andermann's clinical interest in the problem of what one used to describe by the rather pejorative term of "degenerative neurological diseases". This term suggested a situation of utter hopelessness. Even though modern biochemical research has not yet progressed to the point where a therapy can be proposed for these conditions, the elucidation of a biochemical mechanism whereby the mode of disease production can be understood in precise chemical terms has at least lifted the veil of ignorance sufficiently to encourage cautious hope that equally precise biochemical means of cure or, even better, prevention of these conditions may become available in the future.

Other work carried out in the Neurochemistry Laboratories is of equal interest to the clinician. It dealt with the possible relationship, if any, between cerebral anoxia and the formation of cerebral edema. It has traditionally been assumed that cerebral anoxia leads to edema; however the careful studies

carried out by Dr. Pappius and Dr. Norris have shown that this is not the case and that edema only results if anoxia leads to actual destruction of cerebral tissue.

A cooperative study on the myopathy produced in the rat by vincristine has been undertaken by the Neurochemistry, the Neurology and the Neuropathology Laboratories. Interesting relationships have been found between definite morphological and biochemical changes. This experimental model may be useful in shedding some light on the relationship between biochemistry and morphology in spontaneously occurring myopathies of man.

In the Laboratories of Neurological Research, Dr. Sherwin, Dr. Karpati and Dr. Armstrong have continued to study enzymatic changes found in certain neurological diseases. Although the relationship between the demonstrated enzymatic changes in these conditions and their underlying pathological mechanism is at this moment still unclear, there is no doubt that these techniques and their increasing refinement are important steps in the elucidation of the pathogenesis of many obscure neurological disorders.

The Laboratory of Neurological Research has also added a new dimension to our investigative program in epilepsy by making available new techniques to measure the blood levels of various anticonvulsant drugs in patients suffering from seizures. This should help us to understand better why, among a group of patients suffering apparently from the same type of seizure disorder, a particular drug may prove effective in one individual while being totally, or partially, ineffective in another.

In the same laboratories, Dr. Karpati has continued his elegant histochemical studies on muscle diseases. Of special interest have been his studies on nemaline myopathy and the exciting discovery of lipid storage in skeletal muscle of patients suffering from cerebral lipidoses.

In the William Cone Laboratories for Neurosurgical Research Dr. Feindel and Dr. Yamamoto have developed radioactive techniques for measuring cerebral blood flow in small areas of the brain. Especially they have studied the relationship between the arterial carbon dioxide levels and local blood flow in brain areas rendered ischemic by occlusion of medium-sized arterial vessels. The outcome of these studies is of practical importance since there still exists a great deal of controversy whether patients who have suffered a stroke should be subjected to measures increasing or decreasing the arterial carbon dioxide in order to minimize the extent of permanent brain damage.

In the Anesthesia Laboratories, studies on respiratory mechanisms during anesthesia and artificial respiration were carried out and have led to better understanding of respiratory mechanics and gas exchange in the lungs during these conditions.

New, exciting aspects of frontal lobe function and hemispherical specialization emerged from recent studies carried out by Dr. Milner's team in the Neuropsychology Department. The rôle of the frontal lobe in ordering events

in time has been examined and right — left differences were again found, showing that the left hemisphere is more concerned with the verbal aspects of this function than the right. These findings are similar to those on hippocampal function where a similar hemispherical specialization had been found for which further confirmation was obtained during recent work carried out in the past year.

Besides this research of obvious clinical import, basic research projects less obviously related to clinical problems have been pursued in our laboratories.

Dr. Pace-Asciak's studies in Neurochemistry further advanced our biochemical knowledge of certain prostaglandins with regard to their identification, metabolism and synthesis. The recent purchase of a mass spectrometer, shared with the Biochemistry Laboratories of the Royal Victoria Hospital, has greatly assisted in the chemical characterization of these substances which often can be isolated only in minute amounts.

In the Neurophysiology Laboratories further progress has been made in investigating neural mechanisms of thermoregulation in the hypothalamus. The physiological properties, the modes of activation and the sensitivity to anesthetics of anterior and posterior hypothalamic nerve cells acting as part of the organism's temperature control system have been studied in collaboration with Dr. Nutik, Dr. Mitra and Mr. Jell. In the analysis of the results generated by these experiments a data acquisition system devised by Mr. Jell, our biomedical engineer, was of great assistance. It allowed us to communicate directly with the IBM 360 computer of the McGill Computing Center and to obtain accurate quantitative and statistical measures for our results. It is with regret that we announce that Mr. Jell left us in November to take a new position at the physiology laboratory of the University of Manitoba. His position has been filled by Mr. John Ives, whom we welcome most cordially to our staff.

In the Neuroanatomy Laboratory, Dr. Courville has continued his very detailed studies on somatotopic projection patterns in the cerebellum. An enormous amount of painstaking neuroanatomical work needs to be done in this field and Dr. Courville over the past two years has covered a great deal of ground in this area where the old anatomical maps are about as useful to a modern pioneer as the ancient Ptolemaic maps of the heavens would be to an astronaut. Our only sincere regret is that we will not be able to follow Dr. Courville's exploration in this field as closely in the years to come as in the past, because of his decision to transfer his activities to his old alma mater on the other side of Mount Royal. We are certain, however, that the ties of friendship and scientific collaboration which Dr. Courville has forged here at the Institute will remain strong and we wish him success and satisfaction in his new position.

One of the most important events on the research front has been the arrival of our PDP 12 computing system housed in temporary quarters on the 7th floor. Mr. Douglas Skuce deserves special praise for having done an

enormous amount of work, well beyond the call of duty, in bringing this project to fruition. The computer laboratory is under the direction of Mr. Christopher Thompson, our computing systems engineer, who recently joined our staff and who will assist us in turning this system into a powerful research tool. We welcome him most warmly to the Institute and are looking forward to many years of fruitful collaboration.

In my last year's report I emphasized the necessity for strengthening and updating our postgraduate teaching program. Much work has been done during the past year to implement the most needed policy changes and in offering a core program in the neurosciences that would respond more realistically to our needs. The new Neurosciences Seminar which has been one of the products of this rejuvenation of our postgraduate teaching program has generally been well received. We hope that in the years to come we will be able to further strengthen our teaching in the neurosciences and to continue to promote what has always been the noblest aim of this Institute: to put basic science and scientific understanding to work for the betterment of man's physical and mental well being.

NEUROLOGY

DR. PRESTON ROBB

In 1969 advances were made in many areas and we are preparing for major changes in the delivery of medical care and teaching. At the same time investigations into the nature of the nervous system and the diseases that attack it continue to be of prime concern.

Over the last year there have been 1049 admissions to the three neurology services — some 38 less than the year before. The fact that wards had to be closed during the late summer and fall was a serious problem for neurology and pointed out the need for an ambulatory investigative and care unit. The length of patient stay would be greatly reduced if preliminary investigations could be carried out on an ambulatory basis. There are many problems involved in setting up such a service, but we hope that by this time next year a start will have been made. The need for places for patients requiring long-term care continues. Many valuable beds are presently filled with patients requiring convalescent or chronic care. An arrangement has been made for rehabilitation and convalescent care of two to three months' duration at the Grace Dart Hospital — a relationship for which I am grateful and hope will flourish.

We continue to provide a consultation service for the Royal Victoria Hospital. The bulk of the work is done by a senior resident and he is supervised by a staff neurologist. With the help of Dr. Heller we are reorganizing this service and by dividing the responsibilities, we expect a much closer relationship to develop between the M.N.H. and the R.V.H.

Regular Neurology clinics continue to be held in the Royal Victoria Hospital. There were 583 new patients and 3,169 revisits. The advent of

Medicare should lead to considerable change in these clinics. As yet we have had no details as to how it will operate, however, we hope to be able to provide better care with less pressure, and more dignity. The clinics should provide opportunities for residents to have a more meaningful training experience in neurology. At the same time we plan to expand the clinical research projects, particularly in the field of epilepsy.

The provision of medication for indigent patients has been a difficult problem. With the closing of the R.V.H. pharmacy for out-patients, a new method must be found to help the low-income patient obtain drugs. Giving them cash is not the answer as the money may be spent on food and the patient does not get the needed medication. I am happy to report that our most recent Federal-Provincial grant to the Epilepsy Clinic provides \$2,500.00 for drugs. Hopefully, with time and Medicare, all drugs may be free to families with a low income.

The support which our government has given to the Epilepsy Clinic has been most helpful. Approval has been given for 1970-71 to the amount of \$45,451.00. We are grateful for this help and assure the authorities that it will be used wisely.

It has been recommended by the U.S. Public Health Committee on the Epilepsies, under the Chairmanship of Dr. Houston Merritt, that centres of excellence be established across the U.S. — the provision of service being the chief purpose. McGill has long been a centre of excellence. The contributions of Penfield, Jasper, Gloor and Rasmussen here, and the Metrakoses at the Montreal Children's Hospital, to mention only a few, are already well known. We propose to develop this centre further with Dr. Andermann heading the Clinic, Dr. Sherwin doing serum level studies of anticonvulsants and Dr. Woods working especially in E.E.G.

If these remarks seem to be centered on epilepsy, it is only because it is uppermost in my mind. A broad program in clinical neurology continues — Dr. McNaughton and Dr. Harold Mars have integrated a clinical trial program of L—Dopa therapy for Parkinsonism with the Jewish Convalescent and the Jewish General Hospitals. Dr. Cosgrove has continued to be our expert in the care of Multiple Sclerosis, and has provided leadership in the field of neuro-ophthalmology. Dr. Sean Murphy's Eye Clinics have been a most welcome addition to our training program. Dr. Lloyd-Smith has been evaluating the drug therapy for migraine. Further, Dr. Karpati and Dr. Eisen are leading a muscle team. Dr. Sherwin is the leader of a neuro-immunology team. The activities of their laboratories will be reported on by Dr. Mathieson and Dr. Gloor. Dr. Z. J. Lipowski continues to unravel the complex psychiatric problems of patients with neurological disorders at our Friday conferences.

Teaching:

A report should be made on the men who have successfully completed their training in Neurology, on the 17 doctors now in training, on the Post-Graduate courses that have been given in co-operation with the R.V.H.

Post-Graduate Board, or on the many elective students who have trained at the Institute, but time does not permit. I would mention three areas of concern.

Dr. Courville has chaired and been the leader in the course in Neurosciences given to McGill undergraduates. (We regret his imminent departure to the University of Montreal). The course has been handicapped by an impossible schedule whereby students are required to stay in this amphitheatre for the whole morning. No matter how good the presentations are, the amphitheatre is not a good place to spend four hours. Dr. McNaughton is working very hard on alternate methods of presenting the neurosciences in a more effective way, and I am sure he will come up with a satisfactory solution.

Under Dr. Sherwin's leadership and the co-operation of all staff, a two-morning Introduction to the Examination of the Nervous System was given at the end of the second year. This time period is too short and we have requested that the allotment be increased.

The major concern is the lack of Neurology in the third and fourth years. Efforts to provide an adequate block in the curriculum have failed. At best for 1970-71, third year students will have one hour per week during their nine weeks in Medicine. Fourth year students have been offered an elective six-week clinical clerkship which will be available to approximately $\frac{1}{3}$ of the class. We are not proud of the obviously inadequate exposure to clinical neurology — a subject which invades all branches of medicine and surgery. We look forward to the new curriculum.

Mr. Chairman, there are many people whom I should thank at this time for their co-operation and help, but you know better than anyone else that ours is a team effort, and to mention one and neglect another is indeed unfair. We are expecting and planning great changes. Even though some of us whose arteries are not as flexible as others will have trouble adjusting to Medicare and the new regime, it is my sincere belief that the team spirit will continue to prevail.

NEUROSURGERY

DR. WILLIAM FEINDEL

Late yesterday afternoon, if you had visited the operating rooms and x-ray department on the fifth floor you would have seen a fair bit of neurosurgical traffic. Dr. Rasmussen, Dr. Sidhu and myself were viewing a puzzling angiogram on a patient from Boston. Dr. Ethier occasionally came out of his lair, where he is writing a chapter for a neuro-radiology book, and consulted with us on the films. His associates and technicians were rushing to do an emergency angiogram for Dr. Bertrand. Dr. Garretson was getting ready to start another emergency on a patient with spinal cord compression, while Dr. LeBlanc, having just revived a patient who had developed an acute

epidural hemorrhage, was debating whether or not to operate. Dr. Hansebout had just finished some difficult surgery for a thalamic tumor. Dr. Gilbert and his staff seemed to be everywhere, putting to sleep or re-animating any number of people. Miss Murray and her operating room staff were cheerfully trying to accommodate impossible demands from everyone while the residents were coping with the situation in their usual competent fashion. The nurses on the Intensive Care Unit and the wards were anxiously awaiting the flood of patients from fifth floor.

It would be misleading to suggest that every day is that busy, that late, but this sort of minor crisis points out the remarkable co-operation and expertise for the neurosurgeons by our residents, the nursing staff, and the other departmental and staff members at the Montreal Neurological Hospital, as well as so many departments at the Royal Victoria Hospital. I therefore welcome this opportunity to express on behalf of the neurosurgeons our appreciation to all of you.

It is, of course, our concern for the patient which is the basis of these activities of the Institute and Hospital. In many ways, also, this is the main reason we are here today reporting to each other on the year's accomplishments. As Allan Gregg so eloquently put it, "It is what our patients have made of us, quite as much as what we have made of them, that forges for doctors a common bond . . . We had to meet their expectations."

As in past years, I have selected only a few of the neurosurgical highlights to emphasize. There were 700 theatre cases in the operating suite during 1969, with five post-operative infections — an incidence of 0.7%. In four of these cases, however, the infection was a complication of an unusual circumstance, such as long-term ventricular drainage or compound head injury, and in only one patient was the infection a complication of a clean craniotomy. I cannot speak too highly of the entire staff of the hospital — medical, nursing and housekeeping — as well as the continuing work of our Infection Control Committee under Dr. Garretson, in maintaining this excellent standard.

A particular note of thanks is indicated to many of the medical and nursing staff for their help with the planning of the operating room suite and the Intensive Care Unit for the new wing. There were numerous long meetings, during which the overall needs were discussed, space requirements drawn up, traffic flow pathways reviewed, and interrelationships between various department functions worked out. Within the space allotted, I believe we have now arrived at a satisfactory design which will insure much better containment of the operating suite, improvement of the emergency and radiology area, and provision of x-ray, EEG, photography, and radio-isotope services in the new operating theatres. The new neurosurgical laboratories on the sixth floor will be enlarged to accommodate research employing radio-isotopes, computer aids, and microsurgical techniques.

A pleasant highlight of the year occurred three weeks ago when Dr. Rasmussen and I and many former fellows of the Institute were

delighted to be present in Boston for the 50th anniversary meeting of the Society of Neurological Surgeons, during which the first Distinguished Service Award was given to Dr. Penfield. The presentation was made by Dr. Guy Odom in his characteristic southern style.

This cheerful note must unfortunately be tempered by one of sadness at the sudden death in February of Dr. Maitland Baldwin. As most of you know, Dr. Baldwin completed his neurosurgical training here and became the distinguished first Chief of Neurosurgery at the National Institute for Nervous Diseases and Blindness in Bethesda. A recent visit there made it quite obvious how much originality and planning he had brought to that Institute. The present acting chief of the clinical services is another MNI fellow, Dr. John van Buren.

Dr. Elvidge continues as one of our most active research fellows, reviewing the material from the extensive MNI brain tumor follow-up series. His reports continue to provide much valuable information on this unsolved neurosurgical problem.

Dr. Rasmussen was elected Chairman of the Van Wagenan Award Committee of the American Association of Neurological Surgeons and was also a delegate to the World Federation of Neurological Surgery. As past president of the Canadian Neurosurgical Society, your Neurosurgeon-in-Chief was a delegate at the World Congress of Neurological Surgery in New York in September, retiring from Chairman to member of the Liaison Committee of the Canadian Congress of Neurological Sciences. Because of the increasing size of this Congress, the Liaison Committee was set up during the past year on a more permanent basis, both to manage the Congress scientific meetings and to initiate matters of policy for the neurosciences in Canada. I also had the privilege of representing the Institute in lectures or research reports at the National Neurological Institute of Mexico and at the Center for the Study of Science and Human Affairs at Columbia University, New York, and was appointed a member of the editorial board of "Stroke — Journal of the Cerebral Circulation."

Dr. Gilles Bertrand continues his active work in stereotactic surgery and analysis of nerve cell unit recordings from the thalamus. Dr. Garretson is reviewing the pressure recordings in patients with occult hydrocephalus. Dr. LeBlanc has become interested, with Dr. Melzak, in developing methods of pain control based on some of the newer physiological theories of pain. Dr. Hansebout is setting up a project on local cooling of the spinal cord, using a device designed by the scientific staff of the National Research Council in Ottawa. Such cooling of the cord tissue has been reported in other centers as having some therapeutic effect in patients with paralysis due to spinal cord injury. Dr. Stratford completed a successful term of office as President of the Montreal Neurological Society with Dr. Garretson as his able Secretary in charge of programs.

Travel bursaries from the Cone Fund were arranged for Miss Pat Murray and Miss Kalma Devadason, of the operating room staff, to attend

a meeting of the American Association of Neurosurgical Nurses in Washington, D.C. We feel that Dr. Cone would have warmly approved of this budgetary item.

A complete review of the activities of the Cone Laboratory for Neurosurgical Research will be found elsewhere in this report. But because we have just passed the ten-year mark since its founding, I wish to acknowledge that the Cone Memorial Fund, created by some four hundred friends and patients of Dr. Cone, has been the mainstay for the support of our research program. More recently, grants from the Medical Research Council and, over the past five years, generous donations from the late Mrs. Howard Pillow and from Mr. and Mrs. A. Murray Vaughan have further aided our research efforts. We also appreciate the gifts from many patients and friends. The question of medical research funds, however, continues to be critical. It is widely appreciated, though not always in the right quarters, that too little money is now available for medical research in Canada compared to the enormous amounts being expended for hospital and medical care. We are in danger of building a great superstructure for delivery of health services, while at the same time allowing the foundation of teaching and research to go unstrengthened.

A chart of relative values presented at the Congress of Neurological Sciences in Montreal last summer by Dr. Richard Masland, former director of the National Institute of Nervous Diseases and Blindness, emphasizes that the expenditures for tobacco, alcohol, and recreation greatly outstrip those for medical research. An example of this disproportion is illustrated by noting that the funds resulting from a 25% reduction of tobacco consumption could double the amount of money now spent on medical research.

The two new techniques developed in our laboratory—fluorescein angiography for the display of the smallest blood vessels of the brain under direct vision, and the measurement of changes in blood flow by radioactive detectors placed on the surface of the brain—are now providing a new approach to clinical diagnosis and research related to disorders of the circulation to the brain. The development of these techniques has been the result of close teamwork over the past decade. Many are familiar with Mr. Hodge's elegant photographs of the cerebral blood vessels, and an exhibit which he and Dr. Yamamoto prepared of our experimental and clinical results won many favorable comments at the International Congress of Neurosurgery in New York last September. Another exhibit, which features the new miniature radiation detectors for measuring the blood flow through the brain, designed with a Montreal engineering firm, was set up for the Canadian Pavilion at Expo '70 in Osaka.

We have been pleased to secure an equipment grant from the Medical Research Council to computerize our new solid-state radiation detector system used in the measurement of brain circulation. This will allow us to set up an interphase with the large PDP-12 computer which Dr. Gloor has secured for Neurophysiology.

Among recent pleasant events at the Institute was a sixtieth birthday party for Dr. Rasmussen during which he was presented, by Dr. Penfield, with a medal of Saint Christopher to indicate the heavy burdens which the Director must carry for all of us! The Annual MNH Staff Dinner on April 3rd, instituted by Dr. Preston Robb and held again at the Windsor Hotel, was an enjoyable family evening with Japanese, Philippine, and Greek songs and dances, and other entertainment by the talented nursing, radiological and resident troupes.

ADMINISTRATION

MR. CHARLES S. GURD

As we approach 1970 and the beginning of a new decade, we look backward on an eventful year of research and service to the community, and forward to the fulfillment of our plans for an addition to the existing hospital buildings.

During the past year the hospital provided 40,989 days of patient care resulting in an occupancy rate of 83.2%. However, this rate would have been 5.6% greater or approximately 89%, if a severe shortage of registered nurses had not existed in the Montreal area during the summer and autumn months.

The average patient stay at 19.8 days was identical to that of the preceding year. Greater availability of chronic, convalescent or rehabilitation beds in the Montreal area would significantly reduce our average patient stay.

Financial

Expenditures for the year 1969 amounted to \$3,910,025 an increase of 15.9% over the previous year, of which \$281,060 or 8.3% was for retroactive pay under the new labour contract. The Hospital's annual operating deficit for 1969, before final settlement, was \$295,139; the accumulated deficit at December 31st, 1969 with adjustments to April 27, 1970 was \$577,272. When requirements for current working capital are included, the Hospital is indebted to McGill University for \$999,677. Unfortunately, the province has not given any indication that it will assist in the retirement of this deficit.

Labour Relations

Collective labour agreements to June 30, 1971 have recently been signed with the National Syndicate of Employees of the Montreal Neurological Institute, and The United Nurses of Montreal, and to June 30, 1972 with the Association of Interns and Residents of Montreal. Our relations with these various bargaining groups remain satisfactory.

Physical Plant

Alterations to the physical plant during 1969 were of a minor nature and included changes to the computer room, ophthalmology room, along with maintenance and replacement of building services.

I am pleased to report that the Province of Quebec, through an Order-in-Council dated December 17, 1969, granted us permission to proceed with preliminary drawings for the proposed new addition to the hospital. These plans have now been completed by the architectural firm of Ellwood, Aimers and Henderson and were presented for approval to the Technical Studies Service of the Ministry of Health in Quebec City on April 16, 1970.

It is estimated that construction of the new addition and alterations to the existing building will cost approximately \$3,300,000. At this date one-half of the required financing has been received or pledged from private donors to whom we will be ever grateful. Application for the remainder has been made through the Health Resources Fund.

Regional Development

A desire to co-ordinate institutions actively engaged in the delivery of health services to the community has resulted in recent years in the grouping of hospitals with common interests into a number of regions.

At the provincial level, the Department of Health and the Association of Hospitals of the Province of Quebec are in the process of organizing hospitals along economic and geographic lines with four regions proposed for the Montreal area.

At the grass roots level, hospitals have in the past tended to organize along functional lines. As an example, the McGill Teaching Hospitals have for many years been meeting at regular intervals to co-ordinate their activities. This type of co-operation is being expanded to eliminate duplication of effort and increase the efficiency and overall economy of the group.

In the final analysis, a grouping taking into consideration both regional and common interest factors may prove to be the most beneficial.

Retirement

It is with regret that I announce the forthcoming retirement of Miss Bertha Cameron, Director of Nursing, on October 1st, 1970, after 39 years of continuous service with the Royal Victoria and Montreal Neurological Hospitals. On behalf of the hospital, I wish to thank her for the significant contribution which she has made toward the development and maintenance of this hospital's high standards of neurological nursing.

In closing, I especially wish to thank the members of the Women's Auxiliary of the Royal Victoria Hospital for their generous contributions for the purchase of much needed research equipment, and for their help in redecorating many of the patients' rooms. Their continuous assistance over the years is very much appreciated.

Statistics

	<u>1968</u>	<u>1969</u>
Admissions	2,122	2,077
Discharges	2,141	2,074
Patient Days	42,363	40,989
Occupancy Rate	84.7%	83.2%
Average Stay per patient	19.8 days	19.8 days
Operations	1,301	1,280
Deaths	89	93
Autopsy rate	81.0%	71.0%
Operating Expenditures	\$3,373,810.	\$3,910,025.
Equipment Expenditures	\$97,220.	\$83,322.
Net shareable cost per patient day	\$74.07	\$88.52
Reimbursement by Quebec Hospital		
Insurance per patient day	\$64.55	\$75.76
Difference between cost and income per patient day	\$9.42	\$12.76
Deficit on year's operation	\$223,255.	\$295,139.
Accumulated Deficit at Dec. 31 pending year end adjustment	\$632,778.	\$622,272.

NURSING DEPARTMENT

MISS BERTHA I. CAMERON

The keynote of the year 1969 has been *CHANGE*.

The co-ordination of the policies and practices of a teaching hospital is essential in an effort to perform its dual function: 1) the care of the patient and 2) the development and recognition of the individual members of all groups of nursing personnel. The up-dating of existing policies and procedures, the development of written job descriptions for all categories of nursing staff, the constant review and adjustment of programs to meet these goals — through re-education, orientation, committee approach to problem solving and participation in various Work-shops within and without the hospital — have made the year challenging and stimulating.

1969 has brought a fuller realization of the impact of the fact of Unions within professional groups. The implementation of the terms of the second Collective Agreement of the United Nurses of Montreal which was signed December 23, 1969, after a delay of eighteen critical months, has been accomplished. On behalf of the nursing staff, I would like to express our deep appreciation to all members of the Hospital Administration Department for their time, effort and patience in meeting each "deadline".)

Twenty students successfully completed the requirements for the Post Graduate Course.

One of the highlights of 1969 was a reception arranged by our Graduate Nurses' Society during the week of the 14th Quadrennial Congress of the International Council of Nurses which was held in Montreal. Over 300 guests, including former post graduate nurses, staff members and new friends visited the Institute and Hospital — representing 22 countries. (Each year, inquiries are received for information regarding our course from an ever-increasing number of countries.)

The past year also saw the beginning of the Canadian Association of Neurological and Neurosurgical Nurses at an organizational meeting held in June in Montreal in conjunction with the meeting of the Canadian Congress of Neurological Sciences. Plans for this type of National Association have been in the offing for many years. The actual formation of the Society emphasizes the important contribution which is being made by nurses who choose this particular branch of nursing.

In the light of the positive developments which have been outlined above we look forward with confidence to the year ahead.

In conclusion, may I take this opportunity to thank all members of the Institute and Hospital for their loyalty, support and co-operation.

SOCIAL SERVICE DEPARTMENT

Director MISS CYNTHIA GRIFFIN, B.A., M.S.W.

Social Workers:

MISS ANN CHANT, B.A., M.S.W.

MRS. IRENA LIEBICH, B.A., M.S.W.

MRS. SAROJ GUPTA, B.A., M.S.W.

MISS KATHLEEN MACDONALD, B.A.,
M.S.W.

MRS. PIERRETTE LETARTE, B.A., M.S.W.

MISS NOELLA VAILLANCOURT, B.A., M.S.W.

I had planned to talk in detail about two major problems which have all but stifled our ability and opportunity to do satisfactory, satisfying social work jobs. However, there are new brooms in Quebec. So, I shall just briefly note the problems.

The first problem is placement and/or home care. From reports of the Ministry of Health and of the Department of Social Welfare, I believe that 1000 is a conservative estimate of the number of patients waiting in acute care hospitals or at home for beds either in custodial care or chronic care institutions. (There is a fine line, sometimes a catheter, between these two categories of care). Also, there are almost no home care facilities for the chronically ill whose families, with a little extra help, would be physically and psychologically, but not financially, able to care for them at home.

The other major, frustrating problem beyond our immediate control is the effect of the delay — year after year, month after month — first in

the passing, and more recently in the implementation of the Social Aid Act (Bill 26). The welfare rates remain the same as five years ago while the cost of living (including the cost of medication) continues to rise.

This paragraph is headed "in admiration of and in defense of secretaries". Recently a count-study was made of what might be called "interruptions" (no matter how necessary) to the daily routines of typing, filing, accounting, etc.; on one normal work-day of 390 minutes there was an average of one "interruption" every 2½ minutes, represented by telephone calls, contacts-in-person and errands in MNH and RVH. It is not uncommon to find three telephone lines jangling at once, an anxious relative leaning over the secretary's desk talking French, and an irate patient calling from the doorway in English. It's a busy office.

The department has had the stimulating presence of two students from the McGill School of Social Work under Miss Ann Chant. Their three-fold assignment included: (1) supervised social case-work; (2) leading discussion groups (one with parents of seizure patients, the other with husbands and wives of multiple sclerosis patients); (3) collaborating with the Association of Epileptics of the Province of Quebec in a survey of the educational opportunities including specialized training for epileptic children.

Among seizure patients, who constituted at least ⅓ of our department case-load of about 1200, social workers have continued to emphasize direct service to individuals and families, ranging from one interview, perhaps for concrete help, to continuous or periodic counselling towards the highest possible degree of social functioning, really our goal in all cases regardless of medical diagnosis. In addition, in the Seizure Clinic, the follow-up of a 1962-63 questionnaire of medical and social data regarding 500 patients is about 50% completed.

Community contacts have been two-directional in two ways, first, in staff exchanges of information and ideas with a variety of governmental and voluntary organizations; second, in reaching out into the community by service on committees and on agency boards, for example, Mrs. Irena Liebich as a board member of the Centennial Celebration Children's Village, the first of its kind in Canada, and by Miss MacDonald's attendance at a 5 day institute in Maine on "Use of Self in the Change Process." The community has also reached in to us through volunteers of services and of funds. The RVH Women's Auxiliary, The Cancer Aid League, multiple sclerosis associations and service clubs such as the Kiwanis, Rotary, Dalse and In His Name Society have provided us with very much appreciated funds for urgent needs, e.g., transportation to clinic, medication and temporary home aid. Of all the invaluable services by volunteers, I would like to give one example, that of a Royal Victoria Hospital volunteer, who unfortunately is moving out of the country. Her close contact with social service regarding a chronically ill patient and her visits, telephone calls, transportation to clinic and post-cards from foreign parts during the past three years have helped maintain him during the up and down swings of his illness. We shall need to find another life-line for him and for other patients.

Finally, it is hard to know what to hope for realistically for the coming year — but if I had three wishes, I think they would be: (1) for the chronically ill, a two-pronged programme of institutional beds and home care; (2) for recipients of social welfare, an adequate allowance to provide for basic maintenance and for other necessities such as medication; (3) for all of us here, the opportunity for continuing cooperation in the interests of patients.

ANAESTHESIA

<i>Anaesthetist</i>	R. G. B. GILBERT, M.B., B.S. (Lond.), F.R.C.P. (C), F.F.A.R.C.S., F.A.C.A., C.S.P.Q.
<i>Associate Anaesthetists</i>	A. PACE-FLORIDIA, M.D. (Malta), F.R.C.P. (C), C.S.P.Q. GEORGES-HENRI SIROIS, B.A., M.D. (Montreal), F.R.C.P.(C), C.S.P.Q. DAVY TROP, M.A., M.D. (Ghent), M.Sc. (McGill)
<i>Quebec Medical Research Council Fellow</i>	NEY LOUZADA, M.D. (Catholic Univ. Brazil)
<i>Research Fellow</i>	R. CATCHLOVE, M.D. (Univ. of Sydney, Australia)*
<i>Residents:</i>	
A. BER, M.D. (McGill)*	J. P. LAMARRE, M.D. (Univ. of Montreal)*
R. CAIN, M.D. (Dalhousie Univ.)*	E. MENARD, M.D. (Univ. of Montreal)*
D. DAVID, M.D. (Christian Med. Coll., Vellore, India)*	NANCY YUE, M.D. (National Taiwan Univ., Taiwan)*

*Six months on this service.

Clinical

During the past year, the new team of anaesthetists have shown an excellent record in clinical research and teaching. 671 clinical and 582 radiological procedures were performed.

Carotid Endarterectomy:

The anaesthetic management includes a) regional cervical block; b) maintenance of blood pressure and then increasing it by 40-50 mm Hg during actual clamping of the carotid artery; c) adequate oxygenation and slight hypercarbia; d) E.E.G. — multi-channel monitoring.

Nerve Blocks: Diagnostic and therapeutic

A new long-acting local anaesthetic, Bupivacaine (Marcaine) used on a trial basis, appears to be helpful for the evaluation of pain syndromes.

Muscle Biopsy:

Most of these are now done under dissociation anaesthesia, using Ketalar, (Parke-Davis Company). With its approval by the F.D.A., we anticipate an increase in its use. Its main advantages have been: 1) stability of cardiovascular and respiratory functions, 2) maintenance of pharyngeal and laryngeal tone; 3) excellent analgesia; 4) short action.

Radiological Procedures:

Ketalar is now the anaesthetic of choice for pneumoencephalograms. Cerebral angiography is being done mainly under general endotracheal anaesthesia.

Following a few cases of hyperpyrexia, elevated transaminase enzymes and in two cases, high serum bilirubin, we became concerned about the possibility of cross-sensitization due to the administration of two halogenated agents, namely halothane and hypaque contrast medium. Early in the fall, we stopped using halothane for angiography and used instead, Innovar, Nitrous Oxide and Oxygen and curare. Biochemical studies were done pre- and post-operatively. Careful follow-up of temperature and enzyme studies was carried out by Dr. Florida. Early this year, a study was started using halothane or Innovar as the main agent. Since September 1969, we have not seen a single case similar to the ones which initiated the prospective study.

Evidence seems to indicate that in one out of 10,000 cases of halothane administration, hepatic necrosis may occur. This incidence is not larger than with other anaesthetic agents and we feel that this agent is too valuable, especially in neuro-anaesthesia, to abandon. We are now with-holding the use of halothane if a patient requires a second anaesthetic or if he had halothane in the past year.

Cardiac Arrest:

Two cardiac arrests occurred in 1969. One patient had a cardiac arrest during induction of anaesthesia for a shunt procedure. This was attributed to the use of succinylcholine in the patient who had had severe total body potassium deficit for the previous three weeks, following a hypophysectomy. This patient was successfully resuscitated without neurological deficit and had the shunt at a later date without incident.

The second patient arrested during operation for a large pituitary tumour with secondary hypo-adrenalism. Severely atrophied adrenal glands were found and it was felt that a demonstrable adrenal insufficiency was related to the patient's unresponsiveness to the usual measures to combat hypotension due to a moderate haemorrhage, in spite of what appeared to be adequate steroid coverage.

Research Problems

1) Changes in compliance and in alveolar oxygen were related to induction of anaesthesia and did not change later during the course of anaesthesia.

2) Cardiac output was decreased and there was a shunt increase in the early stage of anaesthesia but this was found not to be of significance as originally thought.

3) Alveolar arterial oxygen changes were related to the concentration of inspired oxygen.

4) Changes in alveolar carbon dioxide were related to age.

5) It was found that the lower portion of the lung is more affected by airway closure than the upper portion. This is more marked in older and obese patients.

6) Pavulon, a new relaxing agent is now being studied by Dr. Florida.

NEURORADIOLOGY

Radiologist ROMÉO ETHIER, B.A., M.D.

Associate Radiologist JEAN VÉZINA, B.A., B.M., M.D.

Assistant Radiologist DENIS MELANÇON, B.A., M.D.

Residents:

G. BABLAD, M.D. (Univ. of Bombay)

M. O'DONOVAN, M.D. (Univ. of Dublin)*

E. KARRATEEW, M.D. (Univ. of B.C.)*

R. WEE, M.D. (Univ. of Manitoba)

*Six months on this service.

Each year sets a new record and the present year is no exception. With the help and devotion of a skilful personnel, 13,133 examinations were carried out. Looking back at the statistics, the output of the department has augmented tremendously. For example, an increase of 3000 examinations has been noted over the last two years. Such an achievement provides a great deal of satisfaction. However, it is also frightening. The most important aspect of neuroradiology procedures is their quality. It should not only be maintained, but improved. The saturation point, I believe, has been attained. Additional man power will be needed very soon in order to cope with the ever-increasing responsibilities. Dr. M. Molot contributed very much to ease the load after he joined the staff and we were deeply sorry to see him leave in the middle of the year. We will not be able to replace him, unless adequate financial support is provided. We were fortunate to obtain one more radiographer and hope that our shortage of x-ray technicians is going to be corrected with further discussion and representation to the Government. Our secretarial situation has become critical and, again, requires increase of staff.

The renovation plans are now finished and they will be submitted shortly to the Government authorities. A modern consultation and viewing room will be provided in the present storage room.

These new facilities will promote better consultation, and consequently better service to the patient.

More subjects have been added to the Neuroradiology Seminars. The program has been modified to a two year period. The first session covers the various aspects of neuroradiology as observed on plain films, while the second session is spent on special procedures.

Post-graduate teaching has also increased remarkably. For periods varying from six months to a year, four clinical fellows, namely Dr. G. Bablad, Dr. M. O'Donovan, Dr. R. Wee, and Dr. E. Karateew have rotated through the department. From the McGill Diploma Course in Radiology, Drs. R. Slatcoff, R. Rimoff, P. Cooper, W. Covert, R. Lespérance, J. Lussier and D. D'Arcy Lawrence came to us for periods of four months each. Drs. R. Hollenberg and M. Lewin from the Neurosurgical Services spent three months each in the department. In addition, Dr. G. Lavoie, from the University of Montreal, will be spending three months with us. It has been a great pleasure and, at the same time, a great challenge to teach so many people. This has been made possible by the wonderful and enthusiastic cooperation of Drs. D. Melançon and J. L. Vézina. They deserve my deepest gratitude.

I would also like to extend my most sincere thanks to the entire personnel of this department which managed to cope with the increasing demands.

Special thanks go to the Anesthesia Department and to the O.R. nurses for their extremely valuable collaboration.

Finally, I would like to express my gratitude to Mr. C. Hodge who illustrates our teaching so well.

NEUROCHEMISTRY

Consultant K. A.C. ELLIOTT, M.Sc. (S. Africa) Ph.D.,
Sc.D. (Cantab.), F.R.S.C.

*Neurochemist and Medical
Research Council Associate* LEONHARD S. WOLFE, M.Sc. (N.Z.), Ph.D.
(Cantab.), M.D.**

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

Assistant Neurochemist, Clinical IRVING H. HELLER, B.Sc., M.Sc., Ph.D.,
M.D., C.M.

*Research Associate and Medical
Research Council Scholar* CECIL PACE-ASCIAK, B.Sc., Ph.D.

Fellows:

JOHN W. CALLAHAN, B.Sc., M.Sc.,
(Windsor Univ.), Reford Fellow

JOHN W. NORRIS, M.B., Ch.B., M.R.C.P.,
(Aberdeen Univ., Scotland), Medical
Research Council Fellow*

JOE T. R. CLARKE, B.Sc., M.D.,
(Univ. of Toronto), Medical Research
Council Fellow

MARIA K. ROSTWOROWSKI, B.Sc.
(Univ. of Warsaw)

Senior Technicians:

MRS. A. KURNICKI

MRS. H. SZYLINGER

*Six months on this service.
**on Sabbatical leave.

CLINICAL LABORATORIES

The total number of procedures performed in the 7th floor Neurochemistry Laboratory on spinal fluid, blood and urine during 1969 was 16,040 (18,530). Figures for 1968 are given in parentheses. Approximately 155 litres of nupercaine solution (151) were prepared for use on the wards.

The 3rd floor Ward Laboratory performed 14,220 (15,732) separate hematological determinations and 4571 (4918) urinalyses were done. In addition, 8834 (7455) samples of blood were drawn for biochemical analysis at the R.V.H. and 12,790 (13,836) for our 7th floor Laboratory and the Provincial Laboratories. About 505 (429) stool examinations for occult blood were also made.

The results indicate a continued levelling off of the amount of work done in our laboratories—a trend that has become evident in the last two years.

Some procedures are done in co-operation with the Anesthesia Department of the M.N.H. The expansion plans have included larger laboratory space on the 7th floor and a more comprehensive range of tests that will be available.

The Neurochemistry and Ward Laboratories are administered by Dr. I. H. Heller and Dr. Hanna M. Pappius.

DONNER LABORATORY OF EXPERIMENTAL NEUROCHEMISTRY

a) *Studies on neuropilidoses.*

As a result of studies by Mr. John W. Callahan, significant advances have been made in the last year in our understanding of GM1-gangliosidosis. This disease presents as two clinical entities but the same substances accumulate in both. GM1-ganglioside is stored in the brain and glycosaminoglycans of the keratan sulfate-type accumulate in the viscera. Both types of this disease have a markedly decreased level of β -galactosidase activity in tissues. The disease can be diagnosed on the basis of low β -galactosidase activity in the leucocytes. The carrier state can also be recognized by this assay. The procedures for measuring β -galactosidase activity in the leucocytes are readily adaptable for routine assay in clinical laboratories and can be of diagnostic value for the screening of newborns and for genetic counselling of families.

Our work on the characterization of the visceral storage substances is continuing. It is now clear that in both clinical entities galactose- and glucosamine-containing polysaccharides are stored in the liver and spleen, but in varying degrees. These compounds are very heterogeneous with respect to molecular weight but are of similar chemical composition and conform to several criteria which allow their identification as keratan

sulfates. However, their sulfate content is low. It is not yet clear whether these materials are synthesized by the liver or are merely stored there. Nevertheless, their accumulation in tissues of patients with GM1-gangliosidosis can be directly attributed to the very low activity of β -galactosidase.

Fibroblast cell cultures derived from skin biopsies of patients with both types of GM1-gangliosidosis have been studied. The cultured fibroblasts from a patient with the Type II form of this disease have been shown to incorporate both ^{14}C -galactose and ^{14}C -glucosamine into polysaccharides which are similar in their chromatographic and chemical properties to the keratan sulfates of other tissues. The residual β -galactosidase activity of the Type I cells is different from that present in cells derived from Type II cells. It thus appears that the two clinical entities are manifestations of similar but distinctly separate genetic defects. The cell culture studies have been performed by Mr. John Callahan in collaboration with Dr. L. Pinsky, of the Lady David Institute, Jewish General Hospital.

We wish to thank Dr. C. R. Scriver of the Montreal Children's Hospital for his continued interest in this work. Mrs. Ania Kurnicki has provided excellent technical assistance in these studies and those of Dr. Clarke (see below).

b) *Studies on prostaglandins and fatty acid metabolism.*

The studies on the chemistry of prostaglandins have been very productive in the past year. In this work Dr. Cecil Pace-Asciak has been ably assisted by Mrs. Klara Rostworowski and Mrs. Nancy Maclean. Two new prostaglandin-like compounds were isolated in sub-milligram amounts from sheep seminal vesicles and the elucidation of their structure is in progress. Previously, another compound of unknown structure was isolated from rat stomach and its structure is now completely determined. Mass spectral evidence has been obtained for the positive identification of PGE_2 and PGF_{2a} in rat stomach. It was demonstrated that PGF_{1a} , $\text{PGF}_{1\beta}$ and PGE_1 were oxidized enzymatically by rat stomach tissue into two less polar metabolites, one having the hydroxyl group at position 15 oxidized to a keto group and the other having in addition the double bond at position 13 saturated. The recent purchase of an LKB 9000 GC-MS mass spectrometer located at the Royal Victoria Hospital (M.R.C. grant ME-3720) has greatly facilitated the chemical characterization of these and other compounds isolated in very small quantities. The metabolism of other prostaglandins including the most commonly found PGF_{2a} and PGE_2 is also being investigated in stomach and brain tissue.

Our previous work on inhibition of prostaglandin synthesis has shown that fatty acids such as oleic, linoleic and linolenic acids very strongly inhibit prostaglandin synthesis from added substrate fatty acids. As a result, hydroxy fatty acids are produced from the substrate and inhibitor fatty acids. Work to isolate and characterize these products is continuing in order to study further the mechanism of synthesis of prostaglandins.

c) *Chemical studies on vincristine myopathy*

About a year ago, cooperative studies of the myopathy occurring in rats treated with the oncolytic alkaloid, vincristine sulfate, was undertaken by Drs. Joe Clarke, George Karpati and Stirling Carpenter. These studies showed that coincident with the development of characteristic concentric lamellar inclusions in the muscle cells, an increase occurred in the concentration of muscle phospholipid. The increase was most marked in the phosphatidyl ethanolamine fraction. The mechanism by which vincristine interferes with normal metabolism of phospholipids remains to be elucidated. Using radioisotopically labelled sodium orthophosphate-³²P and sodium acetate-¹⁴C, the metabolism of the lipids was further investigated. Rather unexpectedly vincristine was shown to cause a marked increase in the rate of incorporation of acetate into free cholesterol in liver and muscle. The concentration of the cholesterol in these tissues was not affected however. These studies on the effects of vincristine on phospholipid and cholesterol metabolism are being continued.

d) *Studies of glycolipidoses*

Two patients with an unusual glycolipidosis have recently been discovered at the Royal Victoria Hospital and investigated by a collaborative study by Drs. J. Knaack, J. Crawhall and Joe Clarke. Dr. Clarke showed that these patients were excreting abnormal quantities of neutral glycolipid in their urine, of the type found in the urine of patients with classical Fabry's disease. However, these patients do not present the characteristic skin rash which is a prominent feature of the classical Fabry's syndrome. Genetic, enzyme and more detailed chemical analytical studies are in progress to determine if and how this disease differs from Fabry's disease.

e) *Studies on the effects of anoxia, hypoxia and ischaemia*

It is widely accepted that cerebral edema occurs following anoxia and hypoxia but its production experimentally has never been convincingly demonstrated. Studies completed during the last year by Drs. Hanna M. Pappius and J. W. Norris showed clearly that asphyxia and severe hypoxia with and without hypercapnia do not produce cerebral edema in the cat. The experimental procedures used caused profound neurological damage as evidenced by survival of the animals in a state of coma and with grossly abnormal EEG's. However, no significant change in percentage dry weight of the cerebral cortex and of white matter or change in cerebral electrolytes was found immediately after and for up to eight days following the anoxic or hypoxic period. A transient, small but statistically significant decrease in percentage dry weight was found in the cortex of animals killed during asphyxia. This was not related to retained intravascular blood and represents a shift of fluid into the tissue from the intravascular component which is completely reversible when normal oxygenation is re-established.

With the collaboration of Mr. C. P. Hodge of the Photography Department, Drs. Pappius and Norris began a study of cerebral water and electrolyte distribution in ischaemic areas of the brain. Focal ischaemia was produced in dogs by clipping the right middle cerebral artery. Serial fluorescent angiography was used to document the areas of ischaemia and its persistence. Preliminary results indicate that ischaemia up to 24 hours has no effect on water and electrolyte content of the affected brain. Forty-eight hours after the clip was applied, gross areas of infarction were evident macroscopically and analysis of dry weight and electrolyte content indicated necrotic changes and cerebral edema of the injury (vasogenic) type. These results are in agreement with the findings of the studies reported above that deprivation of oxygen with or without increase in carbon dioxide does not *per se* produce cerebral edema. Edema found as a consequence of ischaemia is always associated with necrotic changes in the tissue.

Throughout these studies Mrs. H. Szylinger has provided most competent technical assistance.

f) *Experimental investigation of the effects of antidiuretic hormone*

Dr. C. J. Dila has been interested for some time in the syndrome of inappropriate secretion of antidiuretic hormone. With Dr. Pappius he has begun an experimental investigation into the effects of ADH on the distribution of water and electrolytes in cerebral tissue and muscle of rat.

Dr. Wolfe has been away on sabbatical leave since July 1969. He is spending a year at the Centre de Neurochimie in Strasbourg, France working on the glycoproteins of isolated synaptosome membranes. In his absence, Dr. Pappius has had the responsibility for the Department, a task lightened considerably by the excellent cooperation of everyone in the Donner Laboratory.

Dr. Wolfe has accepted an invitation to join the Editorial Board of the Journal of Neurochemistry. He attended the 2nd International Meeting of the International Society for Neurochemistry in Milan in September 1969, at which he chaired a session on Cholinergic Mechanisms. At the same meeting, Dr. Pappius participated in a Symposium on Selected Topics in Human Chemical Neuropathology with a report on "The Chemistry and fine structure of various types of cerebral edema". In March 1970, Dr. Pappius attended the founding meeting of the American Society for Neurochemistry in Albuquerque, New Mexico. Mr. J. W. Callahan completed his work for Ph.D. degree in the Department of Biochemistry, McGill University. He has been awarded a Medical Research Council Postdoctoral Fellowship and will leave in June 1970 to take up a Postdoctoral appointment at the Department of Pediatric Neurology, School of Medicine, University of California, Los Angeles. Dr. Joe Clarke completed his work for M.Sc. degree in the Department of Biochemistry, McGill University. He remains to continue his graduate training under Dr. Wolfe's direction. Dr. J. W. Norris left in December 1969 to take up an appointment in the Department of Neurology, Sunnybrook Hospital, Toronto.

ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY

<i>Consultant</i>	HERBERT JASPER, M.D., C.M., Ph.D., D.ès Sci. F.R.C.S.
<i>Electroencephalographer and Clinical Neurophysiologist</i>	PIERRE GLOOR, M.D., Ph.D.
<i>Assistant Electroencephalographers</i>	FREDERICK ANDERMANN, M.D., B.Sc. DONALD LLOYD-SMITH, B.Sc., M.D., C.M., F.R.C.P. (C)
<i>Electromyographer and Assistant Electroencephalographer</i>	ANDREW EISEN, M.D., F.R.C.P. (C)
<i>Senior EEG Fellow:</i>	PRAKASH KHARE, M.D. (Grant Med. College, Bombay)
<i>Electromyography Fellow:</i>	OSCAR ESPINAS, M.D. (Univ. of Santo Tomaj, Philippines)*
<i>Fellows:</i>	
EMILIEN DAIGLE, M.D. (Laval)**	PATRICK MURRAY, M.D. (Univ. of Dublin, Ireland)*
OSCAR ENCINOZA, M.D. (Univ. of the Andes, Venezuela)*	CLEMENT ORIMALADE, M.D. (Univ. of London and Nigeria)*
DAVID GRIMES, M.D. (Univ. of Ottawa)*	HOWARD WEIN, M.D. (McGill)**
FERENC KEKESI, M.D. (Univ. of Pecs, Hungary)*	JOHN WOODS, M.D. (Univ. of Dublin, Ireland)
PIERRE LANGEVIN, M.D. (Laval)*	
<i>Biomedical Engineers:</i>	RALPH JELL, M.Sc. — to Nov. 1969 JOHN IVES, M.Sc. — from Jan. 1970
<i>Chief Technician:</i>	LEWIS HENDERSON

*6 months on this service.

**3 months on this service

During the past calendar year there has been further increase in our service work load. A total of 5,412 examinations were carried out, an increase of approximately 1,000 over last year's figure. Among these examinations there were 43 electrocorticograms recorded in the operating room and 678 electromyograms. About half the number of patients examined in the laboratory were hospitalized in the Montreal Neurological Hospital and about one-fifth were referred from the Royal Victoria Hospital. The remainder were referred from the outpatient clinics of the RVH, from private offices and from other hospitals.

In addition to standard techniques current in most laboratories, a large number of specialized examinations were carried out including numerous sphenoidal electrode examinations, intravenous metrazol-valium activations and intracarotid sodium amytal and metrazol activations. A new responsibility which had to be assumed was that of assisting in establishing the diagnosis of cerebral death. The technical criteria recently proposed by the American

EEG Society were very valuable in setting up our own technical standards in this regard.

Increasingly we feel the need to branch out into new techniques of EEG and clinical neurophysiological investigations and we hope that we will be able to make progress along these lines in the new year. Dr. Woods is preparing for telemetering studies of EEGs which should be very helpful in the assessment of many epileptic problems. We hope with Dr. Bertrand's help to be able to develop recording techniques with indwelling electrodes in selected epileptic patients with intractable seizure problems in whom scalp recordings are not sufficiently informative.

The new PDP 12 computer awarded by the Medical Research Council of Canada to the Experimental and Clinical Neurophysiological Laboratories will make it possible to revitalize our research activities by utilizing modern data analysis techniques. The institution of a fully successful long range program along these lines, however, will depend upon the recruitment of at least one additional professional staff member with a specialized research interest in clinical neurophysiology.

Active research has been going on in the quiet recesses of the 8th floor offices and in the McGill Computing Center. Mr. Skuce has continued to work on his program, HAL (Hierachal Associative Learner), the task of which is to learn to recognize events in a simplified EEG record by scanning many examples under the guidance of a human tutor. HAL is being taught to recognize only artefacts for the moment. True evaluation of the total EEG is still about five to ten years away.

Although our teaching programs for fellows and technicians have been much the same as in the preceding years, consisting of informal seminars, new developments have forced us to reevaluate our teaching activities.

The institution by the College of Physicians and Surgeons of the Province of Quebec of an examination for the attestation of competence in Electroencephalography places great teaching responsibilities upon us. More stringent training criteria for EEG technicians are being laid down throughout Canada and this will undoubtedly influence our teaching load considerably. Some improvements in this area have already been made. A new electronics course is at this time being given to our technicians by Mr. Puodziunas, our senior electronics technician.

In last year's annual report, it was mentioned that work was in progress on the translation into English of Hans Berger's original papers on the human electroencephalogram, which one may consider in some ways as the electroencephalographer's equivalent of the Book of Genesis. The work was completed last year and was published as a handsome volume by the Elsevier Publishing Company in Amsterdam, just in time for its distribution to the members of the 7th International Congress of Electroencephalography and Clinical Neurophysiology held in September 1969 in San Diego.

In closing this report it is my privilege to express our appreciation for the excellent and dedicated work carried out by our Fellows as well as by our technical and clinical staff.

EXPERIMENTAL NEUROPHYSIOLOGY

<i>Consultant</i>	HERBERT JASPER, M.D., C.M., Ph.D., D.ès Sci., F.R.C.S.
<i>Neurophysiologist</i>	PIERRE GLOOR, M.D., Ph.D.
<i>Biomedical Engineers</i>	RALPH JELL, M.Sc. to Nov. 1969 JOHN IVES, M.Sc. from Jan. 1970
<i>Fellows:</i>	
ZEEV ELAZAR, Ph.D. (Univ. of Bucharest & Weizmann Inst.)	STANISLAV PRELEVIC, M.D. (Univ. of Yugoslavia)
JYOTI MITRA, Ph.D. (Univ. of Calcuta & Cambridge)*	DOUGLAS SKUCE, B.Sc. (Univ. of Miami), Killam Scholar
STEPHEN NUTIK, M.D. (McGill MRC Fellow)	
<i>Laboratory Supervisor:</i>	MARY ROACH, A.R.R.C., R.N.
<i>Chief Electronic Technician:</i>	EDWARD PUODZIUNAS

*Six months on this service.

In 1969 research in the neurophysiological laboratories has proceeded along three main lines:

1) *Study of the physiological characteristics of anterior and posterior hypothalamic neurons concerned with thermoregulation.*

a) In collaboration with Mr. Jell, we have studied the modifications of thermosensitivity of anterior hypothalamic and preoptic neurons induced by a number of commonly used anesthetics. It was found that the percentage of thermosensitive cells in the preoptic area increased under the influence of some anesthetics such as, for instance, the barbiturates, and that the degree of thermosensitivity also showed an increase. To facilitate the analysis of the results in this and other projects dealing with the analysis of firing rates of nerve cells, Mr. Jell developed an automated data analysis system, by which the digitized temperature changes and the firing rates of neurons were recorded on punch tape, so that these data could be subjected to statistical analysis by the McGill 360 computer through our RAX terminal.

b) Dr. Nutik has been studying the activity of single neurons in the posterior hypothalamus, which has been called a shivering center, often considered to represent a "center" which organizes the organism's metabolic response to cold, but also important in many other functions. Warming and cooling of the anterior hypothalamus — an area which acts as the temperature sensor of the body thermostat — affects some of the cells in the posterior

hypothalamus. He is now testing response of posterior hypothalamic neurons to changes in anterior hypothalamic and skin temperatures to see if these inputs converge on specific neurons. Such specificity would support the concept of a "center" involved in thermoregulatory responses against cold, though this data are yet too limited to firmly support such conclusions.

c) In a third project in thermoregulatory hypothalamic physiology Dr. Mitra developed a novel technique of modifying local anterior hypothalamic temperature by perfusing the nasal cavity of cats with cold and warm water, making use of the peculiar blood supply of the cat brain which, in contrast to that of man, depends upon an arterial rete mirabile which is surrounded by the venous pterygoid plexus acting as a counter-current heat exchanger. When anterior hypothalamic temperature was modified by this technique, the anterior hypothalamic and preoptic thermosensitive neurons responded as in other studies where local warming and cooling by implanted thermodes were used. Although thermosensitive units can be found rarely in brain areas other than the anterior hypothalamus and preoptic region, consistent thermosensitive responses apparently cannot be obtained from neuron populations in these extrahypothalamic sites.

2) *Investigations on the mechanism of epileptic discharges with intracellular microelectrode recording techniques.*

This work in progress by Doctors Elazar and Prelevic aims to define the relationship of excitatory and inhibitory processes in and around an epileptic focus created artificially by local cortical stimulation. Relationships between extracellular direct current flow and epileptic discharge are also being studied.

3) *Computer analysis of neurophysiological data.*

Mr. Skuce has continued his analysis of EEG features using advanced computing techniques. His research is described in the annual report of the Electroencephalography and Clinical Neurophysiological Laboratories. In addition to pursuing his research, Mr. Skuce has generously and enthusiastically assisted with his expert advice in setting up a laboratory computing system which will be of great value for our future scientific work in both experimental and clinical neurophysiology. We were able to receive support from the Medical Research Council of Canada to acquire a PDP 12 computer with ancillary equipment which has permitted us to build a powerful computing system. We have been fortunate to recruit a computing systems engineer, Mr. Christopher Thompson, who previously worked for Atomic Energy of Canada and who will be in charge of the computer laboratory. We are looking forward to an exciting era of fruitful collaboration with him.

We regret that Mr. Ralph Jell has left Montreal in November 1969 to take a position in the Department of Physiology at the University of Manitoba in Winnipeg. We wish him success and fulfillment in his new position. Fortunately we have been able to recruit a new biomedical engineer, Mr. John Ives, a graduate of Strathclyde University, Glasgow, Scotland, to take over Mr. Jell's functions. We welcome him cordially among our staff.

Work in the laboratory has been rendered difficult because of lack of space. With the construction of the new wing which will expand our facilities in a most welcome way, these difficulties will be overcome.

We thank Miss Mary Roach, our laboratory supervisor, as well as Mr. Eddie Puodziunas and Mr. Réal Archambault, our electronics technicians, for their faithful assistance which has made it possible for all research workers to carry out their investigations efficiently and with the required high quality technical support.

NEUROPATHOLOGY

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

Associate Neuropathologist STIRLING CARPENTER, A.B., M.D.

Fellows:

GONZALO CHONG, M.D. (San Marcos
Univ., Peru)*

EMILIEN DAIGLE, M.D. (Laval)*

CARL DILA, M.D. (Wayne State Univ.)*

DEREK FEWER, M.D. (Laval)*

HARVEY GOODMAN, M.D. (B.Sc. Med.
Univ. of Manitoba)*

MOHAMED KHAN, M.D. (Univ. of Sask.)*

DAVID MERCER, M.D. (Dalhousie Univ.)*

JAMES NABWANGU, M.D. (Kenya and
John Hopkins Univ.)*

ANDREW W. SERADA, M.D. (Univ. of
Alta. and Univ. of Iowa)

Chief Technicians:

BARBARA NUTTALL, B.A., A.R.T.

JOHN GILBERT, R.T.

*Six months on this service.

During the calendar year 1969 detailed autopsy examination has been carried out on 145 brains, of which 66 were from patients dying in Montreal Neurological Hospital. Deaths during the year were 93, and the autopsy rate 71%. 462 surgical specimens were examined, there being 75 verified intracranial tumours. 67 immediate operating room diagnoses were made.

The electron microscope laboratory has been busy. Since May 1968 blocks from 63 biopsy, autopsy, and tissue culture specimens have been embedded in plastic. Electron microscopic studies from this material have been progressing. We mention in particular a case of nemaline myopathy in which it has been possible to look closely at myoneural junctions, a case of motor neuron disease in which axonal changes of anterior horn cells are being pursued, a case of chronic myopathy in which virus-like filaments have been discovered in cytoplasm and nuclei of muscle cells, and a relatively large series of cases of juvenile and late infantile lipidoses in whom electron microscopy shows a far wider involvement of cells outside the central nervous system than has previously been reported. Most of these studies have been undertaken in collaboration with Dr. George Karpati whose histochemical studies provide invaluable correlation. In addition, a study on the effects of large doses of Vincristin on skeletal muscle by Dr. Karpati and Dr.

Clarke of the Department of Neurochemistry has provided interesting experimental material for electron microscopy.

A study on the nature and origin of Rosenthal fibres has been completed in collaboration with Drs. Herndon and Rubinstein.

Despite administrative delays in formal recognition of the Department for Residency Training leading to the F.R.C.P.(C) in Neuropathology by the Royal College, training of career neuropathologists, an important aspect of our function in the Institute, continues. During the academic year, Dr. Montpetit who is now establishing his laboratory in the University of Ottawa, completed his training in Neuropathology here and qualified F.R.C.P.(C). Currently Dr. Andrew Sereda is pursuing his studies towards this qualification. The proliferation of qualifications in subspecialties arouses mixed feelings in many people, and seems to go hand in hand with increasing bureaucratization of medicine. Nonetheless there is no doubt that in the past the uncertain status of neuropathologists has been an impediment to adequate recruitment into the subject, an impediment now removed by its recognition by the College and the small but steady stream of candidates achieving qualification.

The attending staff in Neuropathology have undertaken an increasingly heavy work load in the teaching of general and systematic pathology to the second year medical students. Although time-consuming, this helps strengthen the links with the Department of Pathology and provides extensive student contact, so that they may come to think of neuropathology as an important, and not necessarily esoteric member of the general family of medicine.

NEURO-ISOTOPE LABORATORIES

<i>Director</i>	WILLIAM H. FEINDEL, B.A., M.Sc., D. Phil. (Oxon.), M.D., C.M., D.Sc. (Acadia), F.R.C.S. (C), F.A.C.S.
<i>Assistant Professors of Neurosurgery</i>	HENRY GARRETSON, B.S., M.D., (Harvard), Ph.D. LUCAS YAMAMOTO, M.D., Ph.D. (Hokkaido)
<i>Research Fellows</i>	MORTIMER LECHTER, B.Sc., M.D. (Queens). HENRY LAURELLI, M.D. (Jefferson Med. Coll.). HIROH KATO, M.D. (Kyoto).
<i>Research Assistant</i>	KATHRYNE PHILLIPS, B.Sc. (Acadia).
<i>Brain Scan Technicians</i>	DAVID FITZPATRICK RONALD MILLER
<i>Electronic Technician</i>	GEORGE LOOTUS

1. *Brain Scanning and Cerebral Circulation Laboratory.*

During 1969, there were 2,549 brain scans on 1,306 patients as compared to 2,298 scans on 1,238 patients in 1968. There were also 142 radio-isotopic circulation studies carried out in special cases. Forty-five per cent of all these examinations were on patients referred by Neurological or Neurosurgical consultants, from outside hospitals or from the Royal Victoria Hospital.

In 1960, we reported the introduction of the first automatic brain scanning device in Quebec. We now have the newest device of this kind, the Picker Dynacamera which has been put through preliminary tests and has been in operation since the latter part of 1969. This is based on 19 multiple amplifier units recording from a single large scintillation crystal so that the entire head can be scanned at one view. Two hundred and ninety-six examinations were performed with this new device and after an additional few months' operation we will be in a position to assess its value for special diagnostic study, both in brain scanning and in quantitative cerebral circulation studies using radioactive Xenon¹³³. We are grateful to the Picker X-ray Company, and to Mr. Decarie and Mr. Goyke for their co-operation in getting this apparatus into action.

A summary of the results of contour brain scanning and intravenous circulation transit time curves for the differentiation of cerebrovascular lesions in brain tumours was made by Dr. Yamamoto and Dr. Feindel and appeared in a multi-author book on brain tumour scanning edited by Dr. Bakay and Dr. Lee at the University of Buffalo. Dr. Lechter has reviewed the patients with occlusive cerebrovascular lesions which we have investigated in the laboratory over the past five years. This technique of intravenous injection of a radioactive tracer allows us to measure the curve over either cerebral hemisphere and then to relate this curve to the X-ray angiographic findings before and after surgery. This simple test has certain usefulness in the selection and in the follow-up of these rather complex vascular problems.

Special scans using subarachnoid injection of radio-active tracers have continued to be useful in the detection of the presence of obstructive hydrocephalus. Dr. Henry Garretson has continued studies on the cerebrospinal fluid pressure in these patients and will present the results at the Canadian Congress of Neurological Sciences in June. Dr. Lechter, Dr. Laurelli and our two technicians, Mr. Fitzpatrick and Mr. Miller, have been extremely busy in the supervision and interpretation of brain scanning. We are grateful to Miss Pamela Bottomley for her expert organization of the scanning timetable for many patients and supervising of the clinical records.

2. *The William Cone Laboratory for Neurosurgical Research.*

In 1959, some 400 friends and admirers of Dr. William Cone created the Cone Memorial Research Fund to be used under the direction of the Cone Professor of Neurosurgery. A portion of the former Fellows' Laboratory as well as Dr. Cone's office-laboratory on sixth floor were set aside for research space. In the decade since then, some 60 research reports have been published on the work completed. Now an active program is under way concerned particularly with cerebral fluorescein angiography which we introduced as an

original technique for studying the cerebral circulation in animals and man. Associated with this are a number of quantitative radio-isotopic techniques for measuring the blood flow to the brain. In this connection the design and use of new miniature solid state radiation detectors had also been developed in our laboratory. The combination of these two techniques has provided means of obtaining precise information on the anatomical changes in cerebral ischemia, in angiomas, brain tumours and epileptic lesions in patients undergoing surgery. We have recently been given a grant by the Medical Research Council to purchase a computer interface which will be co-ordinated with the new PDP-12 computer in Neurophysiology. This will provide a method for rapid calculation of multiple blood flow curves with the new solid state detector system.

The studies on the cerebral circulation continue to be supported by a grant in aid from the Medical Research Council supplemented by generous donations from the late Mrs. Howard Pillow and Mr. and Mrs. A. Murray Vaughan as well as from a number of our patients.

As mentioned in the report on Neurosurgery, exhibits of our work were presented at the International Congress of Neurosurgery in September in New York and a smaller exhibit was prepared by us in collaboration with Simtec, Limited, for view at the Canadian Pavilion in Osaka, Japan, at Expo' '70.

Dr. Hiroh Katoh has recently joined our team from the University of Kyoto, where she has completed post-doctoral research in anaesthesiology. She and Dr. Henry Laurelli will be combining their efforts to study the effects of altered blood pressure and carbon dioxide levels on our experimental model of focal cerebral ischemia produced by temporary clipping of a surface artery in the dog brain.

Continuation of the project under the M.R.C. Grant has shown conclusively that increasing the carbon dioxide levels in the arterial blood gave an improvement of blood flow through such an experimental ischemic area. Conversely, reducing the carbon dioxide levels by hyperventilation of the animal impaired the flow through the ischemic area. These findings are directly relevant to the therapeutic management of brain "strokes" and the various parameters associated with changing the ischemic area by collateral circulation will be further examined during the coming year. Dr. L. Yamamoto and Miss Kathryne Phillips have continued this project with the expert photographic collaboration of Mr. Charles Hodge and Mr. Cyril Hatter.

Recently, we have taken up again the use of fluorescein angiography to study the cardiac coronary circulation which we did in a preliminary fashion three years ago. In conjunction with Dr. Arthur Vineberg and his associates, Dr. Long and Dr. Valena, we have started experiments defining the coronary circulation by fluorescein angiography to assess the collateral flow established by Dr. Vineberg's intramuscular arterial transplant technique.

During the past year and a half the laboratory staff has been much involved in working over space requirements for the proposed new wing. Dr. Yamamoto has been particularly helpful with Miss Phillips and Mr. Lootus in producing multiple series of preliminary plans at these discussions.

NEUROLOGICAL RESEARCH

(a) *Section of Immunochemical Research and the Anticonvulsant Drug Laboratory.*

<i>Director</i>	ALLAN L. SHERWIN, M.D., Ph.D., F.R.C.P. (C)
<i>Medical Research Council Fellow</i>	JOHN B. ARMSTRONG, M.D.
<i>Medical Student Elective Fellow</i>	GEORGE BOCK, B.Sc. (Chem.)
<i>Technician</i>	CHRISTINE SOKOLOWSKI, B.Sc. (Chem.)

The enzyme creatine phosphokinase (CPK) has been of special interest to neurologists because abnormal levels are present in some patients with neurological disorders, such as muscular dystrophy. The enzyme can exist in different molecular forms or isoenzymes in brain, nerve and muscle. In the developing fetus the isoenzymes of skeletal muscle gradually change from the "brain" type to the adult "muscle" pattern. Our laboratory has employed specific antibodies to identify enzymes. This immuno-enzymological approach permits the detection of enzymes with impaired or absent catalytic activity which may be present in certain diseases. Dr. Sherwin and Dr. Karpati studied biopsies from 52 patients with neuromuscular disease. The CPK was localized in individual muscle fibers by an immunofluorescent technique, developed in our laboratory, while total enzyme activity was also determined. The results included the finding that in early stages of Duchenne dystrophy, the CPK content of muscles is not significantly reduced despite high serum levels.

Dr. John Armstrong has developed techniques to extract and purify brain CPK by column chromatography and plans to use antibodies to study developing nerve and muscle. The techniques will later be applied to patients. Dr. Bulcke was awarded a M.Sc. for his immunochemical studies of CPK isoenzymes.

A promising new development was the establishment of a laboratory to measure the blood levels of various anticonvulsant drugs administered to patients for the medical treatment of the epilepsies. This was made possible by the gift of a gas chromatogram by the Women's Auxiliary of the Royal Victoria Hospital. The blood levels of Zarontin are being correlated with the degree of seizure control in patients with *absence* attacks under study by Dr. Robb with the assistance of Dr. Lechter.

Mr. George Bock is investigating the variations in plasma protein binding of Dilantin in patients with the hope of improving the treatment of major seizures.

Dr. Sherwin presented a paper at the Second Meeting of the International Society for Neurochemistry which was held in Milan in September 1969.

(b) *Section on Neuromuscular Research.*

Director GEORGE KARPATI, M.D., F.R.C.P. (C)
Killam Scholar

Technician R. STANFORD

Research in human myopathies included a study of a chronic myopathy with phospholipid accumulations and possibly a "slow" virus infection of skeletal muscles. The role of disturbance of innervation of muscle in childhood nemaline myopathy is being investigated. The application of our new immunofluorescent technique for the cellular localization of creatine kinase to pathological human muscle yielded interesting results. A survey of skeletal muscles and peripheral nerves of patients with various forms of cerebral lipidosis is expected to reveal useful information. The study of experimental vincristine myopathy in rats showed that it may be used as an important model to study impaired function of the sarcoplasmic reticulum.

We have followed a multi-disciplinary approach to the study of skeletal muscle in these projects with the co-operation of Doctors Carpenter, Clarke, Wolfe, and Sherwin.

Papers from this laboratory were presented at the International Congress of Muscle Diseases, Milan, 1969; Canadian Society for Clinical Investigation; and the Thirty-fourth Annual Meeting of the Royal College of Physicians and Surgeons of Canada. Dr. Karpati was guest lecturer at the Institute of Muscle Biology, University of Wisconsin in Madison, Wisconsin.

NEUROPSYCHOLOGY

*Neuropsychologist and
Medical Research Council Associate* BRENDA MILNER, Ph.D.
Assistant Neuropsychologist LAUGHLIN B. TAYLOR, B.Ed., M.Sc.
Research and Clinical Assistant ALICE DAVID, L.Ps. (Paris)
*Graduate Students and Clinical
Assistants* PHILIP CORSI, M.A.
..... FRED GENESEE, B.A. (Western Ontario)

The department continues to play a dual role. Although the main emphasis is on research into human cortical function, we are constantly applying our earlier findings to the assessment and screening of new patients

with cerebral seizures who are being considered for surgical therapy. In this clinical work, Mr. Taylor and Mme David have been assisted by Philip Corsi and Fred Genesee, and also, during the summer, by Richard Surwit, a graduate student from the McGill Clinical Psychology programme. In addition, some clinical training was provided for two psychologists from Chile, Eugenia and Mara Calderon, who hope to set up a neuropsychology unit in Dr. Cristian Vera's department.

The research programme has benefited considerably from the two visits of Dr. Valeria Cavazzuti, an experimental psychologist from the University of Bologna. Dr. Cavazzuti has devised special methods for studying short-term verbal memory, these methods being particularly suitable for studying the effects of lesions bordering on Broca's area, in the left frontal or left central region. Her work complements Philip Corsi's current research on frontal-lobe function and the contrasting effects of left and right-hemisphere lesions.

We continue to collaborate actively with other departments, and this year Dr. Milner and Mr. Taylor were again indebted to Dr. R. W. Sperry of the California Institute of Technology for the opportunity of testing perception and memory in 8 patients of Dr. P. J. Vogel, who had undergone section of the corpus callosum and other main interhemispheric commissures for the treatment of epilepsy. This work provided direct evidence of the dominant role of the right hemisphere in the perception of complex forms that cannot readily be named or otherwise coded in words. These results were reported by Dr. Milner at the International Neurological Congress in New York City.

In taking stock of the year's work, we wish to thank particularly the many former patients who have returned, some of them from distant places, to take part in several days of intensive follow-up testing. Without their collaboration, our research efforts would have been far less productive.

NEUROANATOMY

<i>Neuroanatomist and Medical Research Council Scholar</i>	JACQUES COURVILLE, B.A., M.D., M.Sc., dr. med.
<i>Teaching Assistant</i>	ALLAN MORTON, M.D., C.M., Ph.D.
<i>Visiting Scientist</i>	PROFESSOR ALF BRODAL, M.D.
<i>Medical Research Council Fellow</i>	BRIAN FLUMERFELT, B.Sc., M.Sc., Ph.D.
<i>Killam Scholar</i>	LUIS APPELTAUER, M.D.
<i>M.Sc. Student</i>	NATHALIE DIAKIW, B.Sc., L.D.M.
<i>Summer Students</i>	BERNARD BRESSLER, BERNARD LEVANDOWSKI
<i>Technicians</i>	HÉLÈNE TREMBLAY GIOVANNI GAGGI GIOVANNI FILOSI

A most important event for our group last year was the two month stay of Prof. Alf Brodal, of the Anatomical Institute, University of Oslo, as a Visiting Scientist invited by the Canadian Research Council. Dr. Brodal delivered a series of lectures on the vestibular nuclei, the cerebro-cerebellar relationships, some anatomical aspects of the motor systems and participated in a good number of formal and corridor discussions. There were opportunities for all in the institute to meet him and appreciate his qualities as a person and as a teacher. Dr. Brodal was also invited to speak in Quebec, Ottawa and Toronto. Despite this hectic schedule, he found time to work on the connections of the cerebellar hemispherical cortex to the dentate nucleus in the cat.

Other research work now in progress include: a study of the projection of the nuclei interpositus anterior and lateralis (emboliform and dentate) to the red nucleus in the macaque, and an analysis on the projection of the ansiform lobule of the cerebellar cortex to the dentate nucleus in the macaque. Dr. Luis Appeltauer has studied the connections between the dorsal and the ventral tegmental nuclei and the mammillary nuclei. The latter work and a communication of the project in collaboration with Dr. Brodal were presented at the annual meeting of the American Association of Anatomists.

Teaching at the undergraduate level has been done in collaboration with other members of the institute and with Professors in the Departments of Physiology and Psychology. In spite of the inevitable contestations, it is felt that our integrated course on neurological sciences is on the whole very well received by the students. A number of fellows participated as demonstrators in the course and proved to be competent and enthusiastic teachers. As part of the graduate studies program of the Institute, three lectures were given. Two were on the anatomy and physiology of the cerebellum and the other was entitled "Cholinesterase Histochemistry as a Neuroanatomical Tool".

The Annual Neuroanatomical Lecture was delivered this year by Dr. Jan Cammermeyer of the National Institutes of Health, Bethesda and was entitled "The Life History of the Microglial Cell Based on Light Microscopic Observations".

NEUROPHOTOGRAPHY

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

This department has had another interesting, successful and busy year. This report will only touch on a few of the highlights.

Television is now well entrenched in the Institute and we are recording more on television tape than we have, in the past, on movies. The use of "lip-synch-sound" with T.V., which was not possible with movies with our equipment, is a great advantage. We have approximately 30 hours of recorded material on tape. Many of these tapes have been incorporated into the teaching programs for both nurses and medical students.

The department completed several super-8 single concept teaching films during the past year. These convenient cassettes have been of great assistance in teaching small groups.

During the summer an exhibit on epicerebral circulation was built by the department for display at the Fourth World Congress of Neurosurgery in New York. This exhibit utilized three slide projectors and one movie projector, all controlled from a tape recording by Dr. Feindel explaining fluorescein angiography and radio-isotopes in the study of cerebral circulation. This was the first major exhibit built by this department and it was well received at the meeting. It was also displayed at Cornell Medical Center, the University of Ottawa and Rochester Institute of Technology.

We completed a 10 minute sound teaching movie on fluorescein cerebral angiography that was shown for the first time at the Fourth World Congress of Neurology and Neurosurgery. This was well received and copies of this film have been requested from other Universities.

The department was visited this year by many medical photographers from Canada and the United States and two Churchill Scholarship winners (Medical Photography), one from England and one from Australia.

In August, just before the annual meeting of the Biological Photographic Association, I gave a three-day course on the photography of small objects at the Mayo Clinic. In November I was awarded the William V. Gordon Memorial Award. This will be presented each year to a Canadian Photographer and I was very pleased, on behalf of the department, to be the first recipient of this honour.

TUMOUR REGISTRY

DR. ARTHUR R. ELVIDGE

The records of 210 patients with tumour or suspected tumour of the Nervous System were processed through the Tumour Registry during 1969. This figure is similar to that for 1968. 88 were new cases and 122 re-admissions. 78 of the new cases and 27 recurrences were verified by pathological study for a total of 105 verified cases.

The number of operations performed on new cases was 67 and for re-admissions, 19, a total of 86. These represent 12% of all theatre cases. The number treated by roentgenotherapy is 61, 44 new cases and 17 re-admissions. New cases treated with operation and roentgenotherapy number 28, and with radiation only, 16, for a total of 44. There were 34 mortalities. Autopsy was obtained on 16 of these. Visits to clinic numbered 182.

The Tumour Registry of the Montreal Neurological Hospital, established in 1950, is a branch of the Central Tumour Registry of the Royal Victoria Hospital, which is under the supervision of Dr. E. J. Tabah. Annual returns are made by the Royal Victoria Hospital to the Central Tumour Registry of the Province of Quebec, which was established in 1961. They have published reports annually since 1962. This will be a source of valuable basic data with regard to annual tumour statistics, which are obtained from all hospitals of the Province of Quebec.

The main function of the Tumour Registry is to record follow-up data on patients treated at the Montreal Neurological Hospital for tumour of the Nervous System. Information is obtained from outdoor clinics, private

offices, referring doctors and, when necessary, from the Department of Demography of the Province concerned. Patients are reminded to return for follow-up examination and treatment and many are contacted by letter each year. Many have also written letters to Mrs. Guthro, Secretary of the Tumour Registry in appreciation for help and service and interest shown. These records serve as source material for evaluation of treatment under various conditions, and are complete from 1950, though in follow-up studies information goes back to 1928.

We wish to thank Mrs. G. Guthro, for most efficient and conscientious service. Dr. Nabwangu succeeded Dr. Needham as Fellow of The Tumour Registry in January 1969, and he was succeeded by Dr. C. Dila, who took over in January 1970. Doctors Nabwangu, Dila and Fewer are working on research problems.

FELLOW'S LIBRARY

DR. G. MATHIESON

Chairman, Library Committee

The Fellows' Library had a busy year, with increased circulation and constant demand for reference, inter-library loans and Xeroxing. Requests for interlibrary loans in the field of neurology came from many points along with the demand from Montreal universities and hospitals.

118 new books have been added to the collection, of which 84 were purchases and 34 gifts from Staff members and other friends of the Library. The Library Committee (Dr. G. Mathieson, chairman, Drs. J. Armstrong, J. Courville, G. Karpati, F. LeBlanc and the Librarian) began the task of reviewing the whole collection and withdrawing outdated material.

A new bookcase against the South wall of the Journal Reading Room, and a new periodicals' rack were added.

Mrs. Marina Boski became Librarian in December, when Miss Sandra Duchow resigned to become Librarian of the Royal Victoria Hospital. Miss Beryl Hill became full-time library assistant.

At the request of Associate Dean R. N. MacDonald the Library Committee has extended borrowing privileges to students of the McGill Faculty of Medicine.

Our financial resources have not kept pace with the information explosion in medicine and neurology. One-half of our budget is taken up by journal subscriptions — from the other half come the costs of binding and library supplies. Whatever is left is devoted to the purchase of books.

This Library is an unusual specialized neurological collection serving an institution with a world-wide reputation. It must be kept up to the standards of the Hospital and the Institute.

MONTREAL NEUROLOGICAL SOCIETY

<i>President</i>	DR. JOSEPH STRATFORD
<i>Vice-President</i>	DR. RAYMOND LAFONTAINE
<i>Secretary-Treasurer</i>	DR. HENRY GARRETSON

The Society officers for the 1970-71 year are: President, Dr. Raymond Lafontaine; Vice-President, Dr. Gordon Mathieson; Secretary-Treasurer, Dr. George Karpati.

Twenty-one meetings of the Section of Neurology of the Montreal Medico-Chirurgical Society were held from October 8th, 1969 to May 6th, 1970.

Clinical meetings were held at l'Hôpital Notre-Dame, l'Hôpital Maison-neuve, l'Hôpital Ste-Justine, l'Hôpital Hôtel-Dieu, the Montreal Children's Hospital, the Montreal General Hospital, the Jewish General Hospital and the Montreal Neurological Institute.

Papers read before the Society by distinguished visitors and local colleagues were as follows:

PROFESSOR RICHARD JUNG, Neurologische Universitätsklinik, Freiburg-im-Breisgau, Germany: "Motion detection, visual attention and optokinetic nystagmus".

DR. T. O. DADA, Senior Lecturer in Medicine, University of Lagos Medical School, Nigeria: "The Nigerian Neurological Profile".

DR. LUCJAN STEPIEN, Neurosurgical Clinic, Warsaw Academy of Medicine, Warsaw, Poland: "Clinical and Pathophysiological Analysis of Aphasia".

DR. MANNIE M. SCHECTER, Professor of Radiology, Albert Einstein College of Medicine, New York, N.Y.: "Truths and Untruths in the Evaluation of Extracerebral Hemorrhage".

DR. JAN CAMMERMEYER, Laboratory of Neuropathology, National Institute for Neurological Diseases and Stroke, Bethesda, Maryland: Annual Neuroanatomical Lecture — "The Life History of the Microglial Cell based on Light Microscopic Observations".

DR. ALF BRODAL, Anatomical Institute, University of Oslo, Oslo, Norway: "Descending pathways to the motor apparatus of the spinal cord. Where is the extrapyramidal system?"

DR. ANDRÉ BARBEAU, Institut de Recherches Clinique, Montreal: "Dopa in extrapyramidal disorders".

DR. DAVID POSKANZER, Department of Neurology, Massachusetts General Hospital, Boston, Massachusetts: "The Treatment of Stroke".

DR. F. P. MOSS, Research Fellow, Department of Anatomy, McGill University: "Satellite Cells of Skeletal Muscles".

DR. MARGARET WADDINGTON, Attending Neurologist, Rutland Hospital, Rutland, Vermont: "Angiographic Changes in Focal Motor Epilepsy".

DR. CHARLES POSER, Professor and Chairman, Department of Neurology, The University of Vermont, Burlington, Vermont: "Clinical and Pathologic Reactions in the Nervous System in Hyperergic Diseases".

DR. DAVID HUBEL, Professor of Physiology, Harvard Medical School, Boston, Massachusetts: "Organization of the Monkey Striate Cortex".

DR. CHARLES DRAKE, Department of Neurosurgery, University of Western Ontario, London, Ontario: "The Philosophy of the Surgery of Aneurysms".

SYMPOSIUM: Congestive Heart Failure in the New-Born, and the Neurosurgeon. Drs. L. Stern, G. Collins, W. Alexander and J. Blundell.

PROF. H. HOUSTON MERRITT, Vice-President-in-Charge of Medical Affairs and Moses Professor of Neurology, College of Physicians and Surgeons, Columbia University: Annual Hughlings Jackson Lecture of the Montreal Neurological Institute. "Pathophysiology of Parkinson's Disease and the Response of Symptoms to Treatment by Levo-dopa".

The Annual Dinner of the Society was held on June 25th, 1970 at the Montreal Museum of Fine Arts.

FELLOWS' SOCIETY

President JOHN B. ARMSTRONG, M.D.

Vice-President DEREK FEWER, M.D.

Secretary-Treasurer S. T. MYLES, M.D.

The Fellows' Society has enjoyed an active year and is looking forward to the Annual Fellows' Day Lecture and Banquet in June. This year's guest will be Dr. Donald Tower, Chief of Neurochemistry at the National Institutes of Neurological Diseases and Stroke.

The Fellows in Neurosurgery have established a comprehensive series of seminars which have been highly successful. Other academic events have included two special lectures, one by Dr. Emeric Gordon of the Karolinska Institute and the other by Dr. Charles Poser of the University of Vermont.

As a result of a dispute between the Provincial Government and the Interns and Residents of Quebec, which had gone on for seven months, the year was marred by a withdrawal of services at night and on the weekends by the House Staffs of all Quebec hospitals. The Fellows were most appreciative of the support shown by the Attending Staff. Final agreement was reached including about 90% wage parity with Ontario.

Socially, the Fellows have enjoyed the traditional Nurses' Skating Party where we were again soundly beaten in the hockey game by an exceptionally adept Nurses' team showing smooth skating, precision passing and overpowering numbers.

We have also spent several evenings with the Staffmen at the Fellows' Residence which we hope will become a traditional activity of the Fellows' Society. The highlight of these was an evening with Dr. Penfield when he discussed the history of the Institute.

The Fellows' Society again acknowledges with gratitude the several donations received this year from former Fellows.

MONTREAL NEUROLOGICAL INSTITUTE WOMEN'S SOCIETY 1969-1970

The theme for the M.N.I. Women's Society for the 1969-70 season has been greater participation and better acquaintance. We introduced Interest Groups to replace the monthly general meetings, and included the Book Discussion Group — Urve Ford; the Gourmet Group — Barbara Armstrong; the Volunteer Group — Leshia Clarke and the Information Service Group — Letha Woods whose main production this year has been the very popular Femini — a M.N.I. Women's Society Newsletter.

Welcoming functions for the new residents, wives and families were a cocktail party in July hosted by Cathy Eisen and her husband Andy, and a pool party in August at the R.V.H. pool.

The general business meetings were held in the homes of Mrs. Preston Robb and Mrs. Donald Lloyd-Smith. The entertainment program again accented the use of talent and hobbies from within the society. At one meeting a demonstration of esthetiques and visagisme was given by Erica Pace-Florida, and at another a demonstration on methods of handling ceramics with commentary by Urve Ford. The finale for the year will again be the ever popular potluck supper hosted by Mrs. Theodore Rasmussen.

Facilities were also provided for get-togethers for skiing, an evening at the races, a museum tour, and a dinner dance.

Officers for 70-71 are:

PATTY CHONG	<i>President</i>	SANDY TUTT	<i>Vice-President</i>
JUNE MERCER	<i>Secretary</i>	MARILYN SEREDA	<i>Treasurer</i>

CLINICAL TRAINING OPPORTUNITIES

NEUROLOGY

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

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

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

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

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

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

Other Departmental Laboratories will accept Fellows for graduate training by individual arrangement. Residents and Fellows may attend the graduate courses listed below by individual arrangement. The Diploma in Neurology offered by McGill requires at least four years of training, including periods of investigative work, and Psychiatry. (See the McGill Faculty of Medicine Calendar).

A limited number of training stipends are provided by the Quebec Hospital Insurance Service and from Institute funds, and, for United States citizens, from a U.S. Public Health Training Grant.

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

Applications for all the above appointments should be made to the Director, Montreal Neurological Institute, 3801 University Street, Montreal 112, P.Q.

NEUROSURGERY

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

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

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

The various Departmental Laboratories will accept Fellows for graduate training by individual arrangement. Residents and Fellows may attend the graduate courses listed below by individual arrangement. The Diploma in Neurosurgery offered by McGill requires at least four years of training including periods of investigative work (See the McGill Faculty of Medicine Calendar).

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

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

Applications for all the above appointments should be made to the Director, Montreal Neurological Institute, 3801 University Street, Montreal 112, P.Q.

COURSES OF INSTRUCTIONS

UNDERGRADUATE

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

GRADUATE

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

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

NEUROSCIENCES SEMINAR

600. This is a course of weekly seminars, given during the academic year, designed to present over a 2-year period. A concise, up-to-date review of the basic neurologic disciplines. Mondays, 4:30 — 6:00 p.m.

Professors Gloor, Wolfe, Feindel, Sherwin and other members
of the Departments of Neurology and Neurosurgery,
and related McGill Departments

NEUROPHYSIOLOGY

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

611. Seminars and group discussions correlated with Course 600.

Professor Gloor

NEUROANATOMY

620. Advanced Neuroanatomy for selected group, by special arrangement.

621. Seminars and group discussions correlated with Course 600.

Professors McNaughton and Staff

CLINICAL CONFERENCES

630. Colloquium in clinical and basic aspects of the nervous system. Wednesdays 5:00 — 6:00 p.m. Staff and Visiting Lecturers

631. Seizure and EEG conference — alternate Thursdays 4:30 — 5:30 p.m. Professors Robb, Andermann, Rasmussen, Gloor, Milner and Ethier

NEUROCHEMISTRY

640. Instruction in Neurochemistry in addition to that provided in Course 600. By special arrangement.

Professors Wolfe and Pappius

NEUROPATHOLOGY

650. Six or twelve months laboratory work in Neuropathology.

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

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

Professors Mathieson and Carpenter

NEURORADIOLOGY

- 660. Practical instruction in techniques and interpretation.
- 661. Lecture demonstrations (3 months in the fall), Mondays 4:30 — 5:30 p.m.

Professors Ethier, Vézina and Melançon

ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY

- 670. Laboratory work in Electroencephalography (minimum 6 months with active participation, seminars and clinical conferences).
- 671. Seminars and group discussions correlated with Course 600.

Professor Gloor

NEUROPSYCHOLOGY

- 680. Training and research methods for selected graduate students.

Professors Milner and Taylor

MONTREAL NEUROLOGICAL INSTITUTE
and
MONTREAL NEUROLOGICAL HOSPITAL

List of Publications

1969—1970

- ANDERMANN, F. (ANDERMANN, E., METRAKOS, J. D., ANDERMANN, F. and CARPENTE S.): Spongy degeneration of the central nervous system in infancy. Clinical genetic and electron-microscopic observations. In: *Progress in Neurogenetic Proceedings of the Second International Congress of Neuro-Genetics and Neuro Ophthalmology*, A. Barbeau and J.R. Brunette, eds. Amsterdam, Excerpt Medica, 1969.
- BERTRAND, G. and ASHBY, G.: The dynamics of hydromyelia, a radiological and clinical demonstration. *Annals of the Royal College of Physicians and Surgeons of Canada* v. 3: 42, 1970.
- BERTRAND, G., JASPER, H., WONG, A. and MATHEWS, G.: Microelectrode recording during stereotactic surgery. *Clinical Neurosurgery*, v. 16, 1969, pp. 328-355.
- BROUGHTON, R., MEIER-EWART, K. and EBE, M.: Evoked visual, somato-sensory and retinal potentials in photosensitive epilepsy. *Electroencephalography and Clinical Neurophysiology*, v. 27, 1969, pp. 373-386.
- BULCKE, J. A. and SHERWIN, A. L.: Organ specificity of creatine phosphokinase muscle isoenzyme. *Immunochemistry*, v. 6, 1969, pp. 681-687.
- CALLAHAN, J. W. and WOLFE, L. S.: G_{M1}-gangliosidosis: β galactosidase deficiency disease. *Proceedings of the Canadian Federation of Biological Societies*, v. 12, 1969, p. 30.
- COCEANI, F., DREIFUSS, J. J., PUGLISI, L. and WOLFE, L. S.: Prostaglandins and membrane function. In: *Prostaglandins, Peptides and Amines*, P. Mantegazza and E.W. Horton, eds. New York and London, Academic Press, 1968.
- EBE, M., MEIER-EWART, K. and BROUGHTON, R.: Effects of intravenous diazepam (Valium) upon evoked potentials of photosensitive epileptic and normal subjects. *Electroencephalography and Clinical Neurophysiology*, v. 27, 1969, pp. 429-435.
- ELLIOTT, K. A. C.: Introduction to session on brain spaces. *Progress in Brain Research*, v. 29, 1967, pp. 451-454.
- ELLIOTT, K. A. C.: The use of brain slices. In: *Handbook of Neurochemistry*. New York, Plenum Press, 1969.
- ELLIOTT, K.A.C. (DEFEUDIS, F.V. and ELLIOTT, K.A.C.): Convulsions and the γ -aminobutyric acid content of rat brain. *Canadian Journal of Physiology and Pharmacology*, v. 46, 1968, pp. 803-804.
- ELLIOTT, K. A. C. (YOSHINO, Y., DEFEUDIS, F. V. and ELLIOTT, K. A. C. Omega-amino acids in rat brain. *Canadian Journal of Biochemistry*, v. 48, 1970, pp. 147-148.

- FEINDEL, W.: Cortical stimulation in patients with right-sided or bilateral speech representation. *Excerpta Medical International Congress Series*, No. 193, 1969, p. 51.
- FEINDEL, W.: "Fenny Poppers": A quaint celebration for Dr. Thomas Willis. *Canadian Medical Association Journal*, v. 101, 1969, pp. 447-449.
- FEINDEL, W.: Reviews, *Journal of the History of Medicine*, v. 24, 1969, pp. 486-487; *Journal of the History of Medicine*, v. 24, 1969, pp. 487-488; *Journal of the History of Medicine*, v. 25, 1970, pp. 100-101; *Journal of Neurosurgery*, v. 32, 1970, p. 378.
- FEINDEL, W. (SYMONDS, Sir C. and FEINDEL, W.): Birthplace of Thomas Willis. *British Medical Journal*, v. 3, 1969, pp. 648-649.
- FEINDEL, W., YAMAMOTO, L. and HODGE, C.: Fluorescein angiography of the cerebral microcirculation. *Excerpta Medica International Congress Series*, No. 193, 1969, p. 90.
- FEINDEL, W., YAMAMOTO, L. and HODGE, C.: Transit time and microflow measured by fluorescein angiography and radioisotopes in brain tumor with red veins. In: *Cerebral Blood Flow. Clinical and Experimental Results*, M. Brock, C. Fieschi, D. H. Ingvar, N. A. Lassen and K. Schürmann, eds. Berlin, Heidelberg, New York, Springer-Verlag, 1969.
- GARRETSON, H., RASMUSSEN, T. and GLOOR, P.: Role of the carotid amytal-metrazol EEG test in selection for seizure surgery. *Excerpta Medica International Congress Series*, No. 193, 1969, p. 127.
- GLOOR, P.: Epileptogenic action of penicillin. *Annals of the New York Academy of Sciences*, 166, 1969, 350-360.
- GLOOR, P. (Tr. and Ed.): Hans Berger — On the Electroencephalogram of Man. The Fourteen Original Reports on the Human Electroencephalogram. Amsterdam, Elsevier Publishing Company, 1969.
- GLOOR, P.: Neurophysiological bases of generalized seizures, termed "centrencephalic". In: *The Physiopathogenesis of the Epilepsies*, H. Gastaut, H. Jasper, J. Bancaud and A. Waltregny, eds. Springfield, Ill., Charles C. Thomas, 1969.
- GLOOR, P.: The work of Hans Berger. *Electroencephalography and Clinical Neurophysiology*, v. 27, 1969, p. 649.
- GLOOR, P., JACOB, J. C., ELWAN, O. H., DOSSETOR, J. B. and PATERAS, V. R. The electroencephalogram in chronic renal failure. In: *The Physiopathogenesis of the Epilepsies*, H. Gastaut, H. Jasper, J. Bancaud and A. Waltregny, eds. Springfield, Ill., Charles C. Thomas, 1969.
- GLOOR, P., MURPHY, J. T. and DREIFUSS, J. J.: Electrophysiological studies of amygdalo-hypothalamic connections. *Annals of the New York Academy of Sciences*, v. 157, 1969, pp. 629-641.
- JASPER, H.: Part V. Conclusions. In: *The Physiopathogenesis of the Epilepsies*, H. Gastaut, H. Jasper, J. Bancaud and A. Waltregny, eds. Springfield, Ill., Charles C. Thomas, 1969.

- JASPER, H.: Mechanisms of propagation: Extracellular studies. In: *Basic Mechanism of the Epilepsies*, H. Jasper, A. A. Ward and A. Pope, eds. Boston, Little, Brown and Company, 1969.
- JASPER, H.: Neurophysiological basis of generalized epilepsies. In: *The Physiopathogenesis of the Epilepsies*, H. Gastaut, H. Jasper, J. Bancaud and A. Waltregny eds. Springfield, Ill., Charles C. Thomas, 1969.
- JASPER, H. (GASTAUT, H. JASPER, H., BANCAUD, J. and WALTREGNY, A., eds.): *The Physiopathogenesis of the Epilepsies*. Springfield, Ill., Charles C. Thomas, 1969.
- JASPER, H. and KOYAMA, I.: Rate of release of amino acids from the cerebral cortex in the cat as affected by brain stem and thalamic stimulation. *Canadian Journal of Physiology and Pharmacology*, v. 47, 1969, pp. 889-905.
- JASPER, H. (WARD, A. A., JASPER, H. and POPE, A.): Clinical and experimental challenges of the epilepsies. In: *Basic Mechanisms of the Epilepsies*, H. Jasper, A. A. Ward and A. Pope, eds. Boston, Little, Brown and Company, 1969.
- JASPER, H., WARD, A. A. and POPE, A. (Editors): *Basic Mechanisms of the Epilepsies*. Boston, Little, Brown and Company, 1969.
- JOUBERT, M., EISENRING, J. J., ROBB, J. P. and ANDERMANN, F.: Familial agenesis of the cerebellar vermis. A syndrome of episodic hyperpnea, abnormal eye movements, ataxia, and retardation. *Neurology*, v. 19, 1969, pp. 813-825.
- KARPATI, G., CARPENTER, S. and NELSON, R. F.: Type I muscle fiber atrophy and central nuclei — A rare familial neuromuscular disease. *Excerpta Medica International Congress Series*, No. 186, 1969, p. 33.
- KARPATI, G. (KLASSEN, G. A., ARONOFF, A. and KARPATI, G.): Forearm metabolism in patients with chronic liver disease. *Clinical Science*, v.37, 1969, pp. 455-470.
- KARPATI, G. (ROBBINS, N., KARPATI, G. and ENGEL, W.K.): Histochemical and contractile properties in the cross-innervated guinea pig soleus muscle. *Archives of Neurology*, v. 20, 1969, pp. 318-329.
- LEBLANC, F. E. and CORDEAU, J. P.: Modulation of pyramidal tract cell activity by ventrolateral thalamic regions. Its possible role in tremorogenic mechanisms. *Brain Research*, v. 14, 1969, 255-270.
- LLOYD-SMITH, D. L.: The electroencephalogram as a diagnostic aid in neurosurgery: A review. *Clinical Neurosurgery*, v. 16, 1969, pp. 251-268.
- LLJYD-SMITH, D. L. and SACHDEV, K. K.: A long-term low-dosage study of carbamazepine in trigeminal neuralgia. *Headache*, v. 9, 1969, pp. 64-71.
- MCKEE, B. W., ETHIER, R., VÉZINA, J. L., and MÉLANÇON, D.: The disappearance of a large intracranial deposit of pantopaque twenty years after myelography. *The American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, v. 107, 1969, pp. 612-615.
- MCNAUGHTON, F. L.: Future research in migraine. *Hemicrania*, v. 1, no. 2, 1969, pp. 4-6.

- MCNAUGHTON, F. L.: Neurological aspects of shoulder lesions. In: *Shoulder Lesions* H. F. Moseley, ed. Edinburgh and London, E. & S. Livingstone, 1969.
- MATHEWS, G., BERTRAND, G. and BROUGHTON, R.: Thalamic somatosensory evoked potentials in Parkinsonian patients — Correlation with unit responses and thalamic stimulation. *Electroencephalography and Clinical Neurophysiology*, v. 28, 1970 pp. 98-99.
- MILNER, B.: Pathologie de la mémoire. In: *La Mémoire*, Genève, L'Association de Psychologie Scientifique de Langue Française, 1968.
- MILNER, B.: Residual intellectual and memory deficits after head injury. In: *The Late Effects of Head Injury*, A. E. Walker, W. F. Caveness and M. Critchley, eds Springfield, Ill., Charles C. Thomas, 1969.
- MORTON, A.: A quantitative analysis of the normal neuron population of the hypothalamic magnocellular nuclei in man and of their projections to the neurohypophysis. *Journal of Comparative Neurology*, v. 136, 1969, pp. 143-158.
- NORRIS, J. W., EISEN, A. A. and BRANCH, C. L.: Problems in cerebellar hemorrhage and infarction. *Neurology*, v. 19, 1969, pp. 1043-1050.
- PACE-FLORIDIA, A. and GALINDO, A.: Cardiac arrhythmia induced by negative phase in artificial ventilation. *Anesthesiology*, v. 29, 1968, pp. 382-383.
- PAPPIUS, H. M.: Water spaces. In: *Handbook of Neurochemistry*, v. 2, A. Lajtha, ed New York and London, Plenum Press, 1969.
- PENFIELD, W.: Brain mechanisms related to consciousness — Epilepsy points the way *Japanese Journal of Brain Physiology*, no. 106, September 1969, pp. 1-18.
- PENFIELD, W.: Consciousness, memory and man's conditioned reflexes. In: *On the Biology of Learning*, K. Pribram, ed. New York, San Francisco, Chicago Atlanta, Harcourt, Brace & World, 1969.
- PENFIELD, W.: Epilepsy, neurophysiology, and some brain mechanisms related to consciousness. In: *Basic Mechanisms of the Epilepsies*, H. Jasper, A. A. Waroc and A. Pope, eds. Boston, Little, Brown and Company, 1969.
- PENFIELD, W.: Foreword. In: *Pain and the neurosurgeon. A Forty-year Experience* by J. C. White and W. H. Sweet. Springfield, Ill., Charles C. Thomas, 1969.
- PENFIELD, W.: Halsted of Johns Hopkins. The man and his problem as described in the secret records of William Osler. *Journal of the American Medical Association*, v. 210, 1969, pp. 2214-2218.
- PENFIELD, W.: Science, the arts, and the spirit. *Transactions of the Royal Society of Canada, Series IV* v. 7: 73-83, 1969.
- PEROT, P. and MUNRO, D. D.: Transthoracic removal of midline thoracic disc protrusion causing spinal cord compression. *Journal of Neurosurgery*, v. 31, 1969, 452-458
- RASMUSSEN, T.: The neurosurgical treatment of focal epilepsy. *Epilepsy. Modern Problems of Pharmacopsychiatry* v. 4: 306-325, 1970.

- RASMUSSEN, T.: Results of cortical excision for focal epilepsy *Excerpta Medica International Congress Series*, No. 193, 1969, p. 8.
- RASMUSSEN, T.: The role of surgery in the treatment of focal epilepsy. *Clinical Neurosurgery*, v. 16, 1969, pp. 288-314.
- RASMUSSEN, T.: Surgical aspects of post-traumatic epilepsy. In: *Late Effects of Head Injury*, W.F. Caveness and A.E. Walker, eds., Springfield, Ill., Charles C. Thomas, 1969.
- RENAUD, L. P. and COURVILLE, J.: Projections of nuclei interpositus anterior and lateralis to the red nucleus and thalamus in the cat. *Anatomical Record*, v. 163, 1969, p. 249.
- RENAUD, L. P. and COURVILLE, J.: Projections of the nuclei lateralis and interpositus anterior to the red nucleus and thalamus in the cat. *Proceedings of the Canadian Federation of Biological Societies*, v. 12, 1969, p. 77.
- ROBB, P. J.: Clinical diagnosis in epilepsy. *Wisconsin Medical Journal*, v. 68, 1969, pp. 292-296.
- ROBB, P. J.: Epilepsy: A challenge today. *Developmental Medicine and Child Neurology*, v. 11, 1969, pp. 135-136.
- SHERWIN, A. L., KARPATI, G. and BULCKE, J. A.: Immunohisto-chemical localization of creatine phosphokinase in skeletal muscle. *Proceedings of the National Academy of Sciences of the United States of America*, v. 64, 1969, pp. 171-175.
- SHERWIN, A. L., NORRIS, J. W. and BULCKE, J. A.: Spinal fluid creatine kinase in neurologic disease. *Neurology*, v. 19, 1969, pp. 993-999.
- STRAJA, A., MUNRO, D. D. and GILBERT, R. G. B.: Bronchoscopy with the aid of diazepam. *Canadian Anaesthetists' Society Journal*, v. 16, 1969, pp. 241-248.
- TAYLOR, L. B.: Localisation of cerebral lesions by psychological testing. *Clinical Neurosurgery*, v. 16, 1969, pp. 269-287.
- TJADEN, R. J., ETHIER, R., GILBERT, R. G. B. and STRAJA, A.: The use of C1-581 (Ketalar) in pediatric pneumoencephalography. *Journal of the Canadian Association of Radiologists*, v. 20, 1969, pp. 155-157.
- TJADEN, R. J., ETHIER, R., VÉZINA, J. L. and MÉLANÇON, D.: Iodoventriculography in hydromyelia. *Journal of the Canadian Association of Radiologists*, v. 20, 1969, pp. 265-268.
- TROP, D. (VAN DE WOESTIJNE, K. P., TROP, D. and CLEMENT, J.): La compliance pulmonaire statique. Influence de la position corporelle et du volume d'air dans le ballonnet oesophagien. *Journal de Physiologie (Paris)*, v. 61, 1969, p. 183.
- WOLFE, L. S.: Features of chemical structure of synaptic membranes. In: *Basic Mechanisms of the Epilepsies*, H. Jasper, A. A. Ward and A. Pope, eds. Boston, Little, Brown and Company, 1969.
- WOLFE, L. S., CALLAHAN, J., ANDERMANN, F., SCRIVER, C. R., FAWCETT, J. S. and PINSKY, L.: Systemic late infantile lipidosis: β -galactosidase deficiency with cerebral G_{M1}-gangliosidosis and accumulation and excretion of a keratan sulfate. *Neurology*, v. 19, 1969, p. 304.

- WOLFE, L. S., CALLAHAN, J., FAWCETT, J. S., ANDERMANN, F. and SCRIVER, C.R.: GM1-gangliosidosis without chondrodystrophy or visceromegaly β -galactosidase deficiency with gangliosidosis and the excessive excretion of a keratan sulfate. *Neurology*, v. 20, 1970, pp. 23-44.
- YAMAMOTO, L. and FEINDEL, W.: Contour brain scanning and radioisotopic circulation studies for differentiating cerebrovascular lesions and tumors. In: *Brain Tumor Scanning with Isotopes*, L. Bakay and D. M. Klein, eds. Springfield, Ill., Charles C. Thomas, 1969.
- YAMAMOTO, L., HODGE, C. and FEINDEL, W.: Studies of the epicerebral circulation using fluorescein angiography and radio-active tracers. *Excerpta Medica International Congress Series*, No. 193, 1969, p. 110.
- YAMAMOTO, L., HODGE, C., PHILIPS, K. M. and FEINDEL, W.: Microflow patterns after experimental occlusion of middle cerebral artery demonstrated by fluorescein angiography and ¹³³Xenon clearance. In: *Cerebral Blood Flow. Clinical and Experimental Results*, M. Brock, C. Fieschi, D.H. Ingvar, N.A. Lassen and K. Schurmann, eds. Berlin, Heidelberg, New York, Springer-Verlag, 1969.

MONTREAL NEUROLOGICAL HOSPITAL
(Incorporated by Private Act under the laws of the Province of Quebec)
BALANCE SHEET AS AT DECEMBER 31, 1969
GENERAL FUND

ASSETS

Cash	\$ 3,836
Accounts receivable — less provision for doubtful accounts	220,632
Grant receivable — Government of Quebec	90,000
Inventory of supplies at cost	64,883
	<u>\$379,351</u>

PLANT FUND

ASSETS

Cash	\$ 241
Due from Quebec Hospital Insurance Service	50,946
Fixed Assets: at cost	
Equipment	\$1,333,860
Less: Accumulated depreciation	<u>(701,124)</u>
	<u>632,736</u>
	<u>\$683,923</u>

LIABILITIES AND CAPITAL
GENERAL FUND

LIABILITIES

Accounts payable	\$ 1,946
Due to Royal Institution for the Advancement of Learning	
Current account	377,405
Advances to cover deficit	622,272
DEFICIT — NOTE	(622,272)
	<u>\$379,351</u>

PLANT FUND

LIABILITIES

Due to Royal Institution for the Advancement of Learning	\$ 51,187
CAPITAL	
	<u>632,736</u>
	<u>\$683,923</u>

AUDITORS' REPORT

To the Board of Management,
Montreal Neurological Hospital.

We have examined the balance sheet of the Montreal Neurological Hospital as at December 31, 1969 and the statements of operations, general fund deficit and plant fund capital for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

Except that payments to the Hospital under the Hospital Insurance Act are subject to adjustments arising from a subsequent review by the Minister of Health, as described in the Note to the financial statements, in our opinion these financial statements present fairly the financial position of the Hospital as at December 31, 1969 and the results of its operations for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

TOUCHE ROSS & CO.
Chartered Accountants.

MONTREAL NEUROLOGICAL HOSPITAL
STATEMENT OF GENERAL FUND DEFICIT
FOR THE YEAR ENDED DECEMBER 31, 1969

	1969
BALANCE AT BEGINNING OF THE YEAR	\$ 632,778
Deduct: Settlement from Quebec Hospital	
Insurance Service on account of 1966	23,505
1967	124,378
Advances from Quebec Hospital Insurance	
Service on account of 1968	291,229
Adjustment of prior year's deficit	1,234
	192,432
Add: Adjustment for 1968 retroactive salaries	134,701
Deficit for the year	295,139
BALANCE AT END OF THE YEAR (NOTE)	\$ 622,272

STATEMENT OF PLANT FUND CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 1969

BALANCE AT BEGINNING OF THE YEAR	\$ 632,780
Increase in plant capital	83,322
	716,102
Less: Depreciation on equipment	83,366
BALANCE AT END OF THE YEAR	\$ 632,736

STATEMENT OF OPERATIONS
FOR THE YEAR ENDED DECEMBER 31, 1969

INCOME:	
Revenue from Quebec Hospital Insurance Service (Note)	\$2,430,062
Revenue from patients	1,015,433
Grants — Government of Quebec	90,000
(City of Montreal)	67,500
Other income	11,891
	3,614,886
EXPENSE:	
Salaries and wages	2,861,484
Drugs, medical and surgical supplies	202,128
Services and supplies	846,413
	3,910,025
DEFICIT FOR THE YEAR	\$ 295,139

MONTREAL NEUROLOGICAL HOSPITAL

NOTE TO THE FINANCIAL STATEMENTS, DECEMBER 31, 1969

Revenue under the Hospital Insurance Act is based on the 1969 budget of expenditures and offset income as approved by the Department of Health. The Act provides that the Minister of Health shall review the actual expenditures of the Hospital to determine the amount by which actual expenditures for insured services is greater or less than the interim payments received from the Service in respect of that year. Revenue as shown in the financial statements of the year is subject to adjustments arising from such review and determination. Adjustment of deficit for the year 1968 is still under discussion with the Quebec Department of Health and the Hospital is preparing a claim in respect of the year 1969.

MONTREAL NEUROLOGICAL INSTITUTE

RESEARCH AND TEACHING EXPENDITURE SUMMARY FOR THE YEAR ENDING DECEMBER 31, 1969

M.N.I. — Endowment Funds	384,127.9
M.N.I. — Special Funds and Donations	196,298.5
General University Funds	18,140.0
Research and Fellowship Grants	289,191.7
TOTAL EXPENDITURE	\$887,758.2

ENDOWMENTS

- 1934 — Rockefeller Endowment
- 1951 — Donner Canadian Foundation Grant
- 1954 — Lily Griffith McConnell Endowment
- 1957 — Hobart Anderdon Springle Memorial Endowment
- 1958 — Rupert Bruce Memorial Endowment
- 1959 — Percy R. Walters Memorial Endowment
- 1960 — William Cone Memorial Endowment
- 1963 — Walter Chamblet Adams Memorial Endowment
- 1964 — MNI Research Endowment Fund
- 1966 — Izaak Walton Killam Memorial Endowment
- 1969 — Sophie M. C. Letang Memorial Endowment

FELLOWSHIP ENDOWMENTS

- 1948 — Duggan Fellowship
- 1950 — Lewis L. Reford Fellowship
- 1956 — Dr. and Mrs. Charles F. Martin Fellowship
- 1966 — Izaak Walton Killam Memorial Fund for Advance Studies

GRANTS FOR SPECIAL PROJECTS

- Federal Provincial Health Grants — Dr. Rasmussen
Dr. Robb
- U.S. Public Health Neurological Training Grant — Dr. Robb
- Medical Research Council of Canada Grants — Dr. Carpenter
— Dr. Courville
— Dr. Feindel
— Dr. Gloor
— Dr. Hansebout
— Dr. Milner
— Dr. Pappius
— Dr. Sherwin
— Dr. Wolfe
- Medical Research Council of Canada Associateships — Dr. Milner
— Dr. Wolfe
- Medical Research Council of Canada Scholarships — Dr. Courville
— Dr. Pace-Asciak
- Muscular Dystrophy Association Research Grant — Dr. Karpati

DONATIONS TO SPECIAL FUNDS — 1969-70

ANAESTHESIA RESEARCH FUND:	
Anonymous	\$15,000.00
BRAIN RESEARCH FUND:	
Mr. A. Murray Vaughan	1,000.00
Mrs. A. Murray Vaughan	4,000.00
CANCER CLINICAL RELIEF FUND:	
WILLIAM CONE MEMORIAL RESEARCH FUND:	
Dr. David Berger	25.00
Mr. Jacques Boulais	200.00
Mr. Thomas Cairns	500.00
Crabtree Foundation	1,000.00
Mrs. Edith Dawson (In Memory of the Late Miss Gail Budd)	20.00
Earl-Beth Foundation	500.00
Dr. Donald W. Hughes	10.00
Colonel K. B. Jenckes	150.00
Mr. John Langdon	500.00
Oaklawn Foundation	1,000.00
Mrs. H. Y. Russel	5.00
Mr. Hugh Seybold	50.00
COSGROVE RESEARCH FUND:	
Mr. J. A. de Lalanne	200.00
Mrs. Aline Lesco	100.00
Mrs. Treva Troutman	25.00
DICK EPILEPSY FUND:	
GORDON LIBRARY FUND:	
HARVEY CUSHING CLINICAL RELIEF FUND:	
Women's Auxiliary of the Royal Victoria Hospital	3,000.00
Mrs. M. McAlary	10.00
Miss Suzann F. Cohen (In Memory of the Late Mr. George W. Cohen)	5.00
In His Name Society	27.00
Mrs. Janet L. Shapiro	10.00
Mr. Elliott Ward	25.00
HOSPITAL EQUIPMENT FUND:	
Dr. William Feindel	100.00
MARY MASSABKY FOUNDATION RESEARCH FUND:	
MISCELLANEOUS SPECIAL FUNDS:	
In Memory of the Late Stephen Osman	162.00
The Stephen Osman Memorial Donation, Haganah Chapter, B'nai B'rith Youth Organization	750.00
In Memory of the Late Mrs. Miriam Chalfin	3.00
In Memory of the Late Mr. J. W. Fleming	55.00
In Memory of the Late Mrs. M. Eleanor Fyles	5.00
In Memory of the Late Mr. James I. Gartrell	219.42
In Memory of the Late Mr. G. Greenberg	2.00
In Memory of the Late Mr. Richard H. Hurlburt	310.15
In Memory of the Late Mrs. Anna Kert	10.00
In Memory of the Late Miss Ghislaine Perreault	5.00
In Memory of the Late Mrs. Evelyn Russel	175.00
In Memory of the Late Mother of Mrs. Francis Schwartz	2.00
In Memory of the Late Mr. Benjamin Weston	2.00
M.N.I. NEUROLOGICAL RESEARCH FUND:	
M.N.I. PARKINSON'S DISEASE FUND:	
Mr. A. F. Bull	100.00
Mrs. A. E. Cone	250.00

Mr. Hyman Copelovitch	100.0
Dr. A. R. Elvidge	700.0
Mrs. K. Fraser	300.0
Mrs. Charlotte Moret	500.0
Mrs. Clayton McCormick	500.0
Dr. Francis McNaughton	972.0
Mr. William Obront	50.0
Dr. Preston Robb	140.0
Mr. M. R. Van Loon	200.0
Mr. L. Waxman	60.0
M.N.I. STAFF LOAN FUND:	
MULTIPLE SCLEROSIS CLINICAL RELIEF FUND:	
Multiple Sclerosis Golf League	1,150.00
MULTIPLE SCLEROSIS RESEARCH FUND:	
MCNAUGHTON NEUROANATOMY RESEARCH FUND:	
Mrs. Ruth Reitman	500.00
Mr. E. Gordon Gowling	500.00
FRANCIS MCNAUGHTON NEUROLOGICAL RESEARCH FUND:	
Anonymous	400.00
Mrs. Olive Prichard Clark	200.00
Mr. Sam Halperin	500.00
Mrs. Sam Reitman	500.00
Dr. Preston Robb	209.00
Mr. Maurice D. Schouela (In Memory of the Late Mrs. Sam Reitman)	100.00
Mr. J. Clare Wilcox	100.00
NEUROLOGICAL RESEARCH FUND:	
Estate of the Late Miss May Ellen Clayton	1,574.89
Mr. Sam Halperin	50.00
Mrs. Betty Josephs	5.00
Mrs. Peter M. Laing	3,000.00
Mrs. C. F. Morison Trust	7,273.13
J. W. McConnell Foundation	3,000.00
Mr. Barnard Skolnick	12.00
NEUROPHYSIOLOGY RESEARCH FUND:	
NEURORADIOLOGY RESEARCH AND TEACHING FUND:	
NURSING FUNDS:	
EILEEN C. FLANAGAN NURSING BURSARY FUND:	
Mrs. R. Hampson	100.00
School for Graduate Nurses, McGill University	50.00
M.N.I. NURSING EDUCATION FUND:	
Mrs. Samuel Reitman	500.00
OAKLAWN FOUNDATION FELLOWSHIP FUND:	
Oaklawn Foundation	2,000.00
PENFIELD AWARD FUND:	
PENFIELD RESEARCH FUND:	
REUBEN RABINOVITCH MEMORIAL FUND OF THE CANCER RESEARCH SOCIETY:	
REUBEN RABINOVITCH MEMORIAL LIBRARY FUND:	
REUBEN RABINOVITCH MEMORIAL TRIBUTE FUND:	
LEWIS REFORD FELLOWS' FUND:	
R.V.H. WOMEN'S AUXILIARY FUND:	
For neurological research equipment	8,300.00
For redecoration of patients' rooms	3,700.00
For patients and other services	1,000.00

Donations to the Montreal Neurological Institute may be made to any of the above funds or for other purposes as specified by the donor. Receipts for such contributions are valid for income tax purposes in Canada. Donations from the United States will also qualify for income tax purposes if cheques are made out to the *Friends of McGill University, Inc.*, and sent to the *Secretary, Mrs. Ernest Rossiter, Jr., Box 533, Hempsted, N.Y.*, with the notation that they are for the Montreal Neurological Institute.

SUGGESTED FORMS OF BEQUESTS

UNRESTRICTED

I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, both the principal and income to be derived therefrom to be used in such manner as the Board of Governors of the said University shall from time to time determine.

RESTRICTED ONLY AS TO PRINCIPAL

I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, to constitute part of its general endowment funds, the income to be derived therefrom to be used in such manner as the Board of Governors of the said University shall from time to time determine.

RESTRICTED AS TO PURPOSE

I give and bequeath the sum of _____ dollars to the Montreal Neurological Institute, McGill University, both the principal and the income to be derived therefrom to be used for the purpose of (stating purpose) in such manner as the Board of Governors of the said University shall from time to time determine.

FOR FOUNDING FELLOWSHIPS AND STUDENT AID

I give and bequeath the sum of _____ dollars (or designated property or portion of estate) to the Montreal Neurological Institute, McGill University, for the purpose of founding in the said University one or more fellowships or bursaries to be known as “_____ Fellowship or Bursary”, the net annual income from this fund to be awarded annually in such amounts, under such conditions and to such recipients as may be determined from time to time in accordance with the directions of the Board of Governors of the said University.

For information and suggestions, address

The Director
Montreal Neurological Institute
3801 University St.
Montreal 112, P.Q.

STATISTICS

CLASSIFICATION OF DISEASES

Nervous System Generally:

Multiple Sclerosis	94
Motor Neurone Disease	9
Friedreich's Ataxia	4
Tuberous Sclerosis	3
Demyelinating Disease	4
Miscellaneous	6
	120

Meninges:

Meningocele and Myelomeningocele	7
Acute Purulent Meningitis	4
Vertigo	8
Subdural Hygroma	2
Subdural Haematoma	19
Extradural Haematoma	7
Intratemporal Haemorrhage	3
Subarachnoid Haemorrhage	34
Intracerebral Haematoma	9
Intracerebral Haemorrhage	10
Adhesive Arachnoiditis	4
Haemorrhagic Leucoencephalitis	2
Mononucleosis	1
Bronchopneumonia	1
Miscellaneous	5
	116

Brain:

Congenital anomalies	6
Hydrocephalus	22
Abscess	2
Syncope	11
Contusion, Laceration, Traumatic Encephalopathy	68
Concussion	59
Epilepsy	359
Arteriovenous Malformation	6
Headache	45
Migraine	39
Parkinsonism	31
Thrombosis, encephalopathy due to arteriosclerosis	164
Cysts	5
Aneurysm	22
Encephalitis	10
Athetosis	2
Narcolepsy	2
Miscellaneous	14
	867

Tumours:

Meningeal Fibroblastoma	17
Craniopharyngioma	2
Neurinoma	8

Gliomas	11
Glioblastoma Multiforme	18
Astrocytoma	18
Ependymoma	2
Oligodendroglioma	4
Chromophobe Adenoma Pituitary	13
Sarcoma	4
Metastatic Carcinoma	30
Bronchogenic Carcinoma	8
Carcinoma of Breast	5
Carcinoma of Rectum	1
Carcinoma of Cervix	8
Hodgkin's Disease	3
Brain Tumour Suspected	18
Teratoma	2
Hemangioblastoma	3
Papilloedema	3
Von Recklinghausen's disease	2
Myeloma	2
Chordoma	7
Schwannoma 8th Nerve	4
Miscellaneous Tumours	14
	<hr/> 207

Spinal Cord:

Contusion of Spinal Cord	11
Compression of Spinal Cord	14
Guillain-Barre Syndrome	10
Myelopathy	16
Syringomyelia	8
Cervical Spondylosis	14
Radiculopathy	5
Spondylolisthesis	1
Spina Bifida	1
Hydromyelia	2
Anterior Horn Cell disease	3
Diastematomyelia	2
C7 Root irritation traumatic	2
Osteomyelitis	3
Paresthesia	9
Miscellaneous	6
	<hr/> 107

Cranial & Peripheral Nerves:

Optic Neuritis	4
Trigeminal Neuralgia	19
Meniere's Syndrome	6
Compression Ulnar Nerve	2
Carpal Tunnel Syndrome	9
Bell's Palsy	2
Hemianopsia Homonymous	2
Nerve Deafness	9
Other Neuralgias	5
Optic Atrophy	2
Peripheral Neuropathy	23
Miscellaneous	7
	<hr/> 90

Muscles:

Myasthenia Gravis	4
Muscular Atrophy	10
Muscular Dystrophy	12
Myopathy	4
Spasmodic Torticollis	2
Dystonia Musculorum Deformans	2
Charcot-Marie-Tooth Peroneal Muscular Atrophy	3
Sydenham's Chorea	3
Paravertebral Muscle Spasm	3
Tremor Spasm	3
Familial Tremor	4
Miscellaneous	2
	<hr/> 52

Mental Disease:

Mental Retardation	14
Depression	12
Anxiety State	9
Conversion Hysteria	7
Alzheimer's Disease	17
Schizophrenia	4
Drug Intoxication	2
Miscellaneous	1
	<hr/> 66

Other Systems:

Protrusion Disc — Lumbar	197
Cervical	50
Fracture and/or Dislocation Vertebral Column	49
Fracture Skull	54
Low Back Pain	39
Pain Miscellaneous	11
Traumatic Lesions & Infections	11
Diabetes Mellitus	6
Gunshot Wounds	5
Rheumatoid Arthritis	2
Hypertension	3
Hypotension	2
Coronary Insufficiency	2
Miscellaneous	21
	<hr/> 452
	2077

CLASSIFICATION OF OPERATIONS

Craniotomy and Craniectomy:

and Biopsy	8
and Decompression	15
and Drainage of Abscess	1
and Drainage of Sub-dural Haematoma	11
and Drainage of Intracerebral Haematoma	9
and Drainage of Extradural Haematoma	6
and Elevation Depressed Skull Fracture	9
and Excision of Epileptogenic Focus (Lobectomy)	38
and Excision, Clipping or Wrapping of Aneurysm	21
and Exploration	1

and Hypophysectomy for Pituitary or Intracellular Tumour	6	
and Incision, Drainage or Removal of Cyst	2	
and Plastic Repair of Dura (CSF, Rhinorrhea or Fistula)	2	
and Plastic Repair of Skull Defect (Plate, Bone or Plastic)	3	
and Removal of Adhesions	1	
and Removal of Arteriovenous Malformation	3	
and Removal of Cerebral Tumour	47	
and Removal of Posterior Fossa Tumour	19	
and Removal of Tumour of Skull	4	
and Trigeminal Massage of Decompression	1	
and Trigeminal Rhizotomy	10	
and Ventriculocisternostomy (Torkildsen's)	1	218

Trepanation:

and Aspiration of Cyst	1	
and Biopsy	1	
and Drainage of Subdural Space	15	
and Exploration	1	
and Ventricular Puncture	2	
and Ventriculography	9	29

Shunt Procedure:

and Lumbar Subarachnoid-Peritoneal	1	
and Ventricular Caval	40	
and Ventricular Peritoneal	1	42

Stereotaxic Procedure:

and Ventriculography	1	
and Second Stage	28	29

<i>Percutaneous Cordotomy:</i>	2	2
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Laminectomy and Hemilaminectomy:

Anterolateral Cordotomy — Cervical	4
Anterolateral Cordotomy — Thoracic	13
Biopsy	1
Decompression or Exploration of Spinal Cord for Spondylosis (Dentate Ligament Section)	5
Decompression or Exploration of Spinal Cord (Trauma)	3
Decompression or Exploration of Spinal Cord Tumor or Vascular Malformation	3
Discoidectomy — Lumbar	99
Discoidectomy — Cervical	5
Incision and Drainage of Intramedullary Cyst (Syringomyelia)	2
Removal of adhesions	2
Removal of Tumor — Intramedullary	7
Removal of Tumor — Extramedullary, Intradural	12
Removal of Extradural Tumor — Metastatic, Bone, etc.	12
Rhizotomy	55
Spinal Fusion with Bone Graft — Autogenous or Bone Bank	9
Spinal Fusion with Wire of Plate	1
Spinal Fusion — Cervical-Occipital	

Discoideotomy — Anterior Approach — Cervical	7	
Incision of Scalp and Application of Tongs for Traction	1	
Plastic Repair of Spina Bifida	1	224

Sympathectomy:

Sympathetic Ganglioneurectomy — Dorsal	1	1
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Nerve Explorations:

Avulsion or Section	7	
Neurolysis, Transplantation or Decompression	25	

Artery Exploration:

Endarterectomy (Patch-graft)	9	
Ligation	2	
Progressive Occlusion (Selverstone Clamp)	4	
Temporary Occlusion	1	49

Wound Re-Opening:

Evacuation of Haematoma	5	
Exploration	1	
Further Removal of Brain Tissue	1	

Miscellaneous:

Diagnostic Spinal Anaesthesia	4	
Miscellaneous	11	
Nerve Blocks	53*	
Plaster Casts	1*	
Tracheostomy	21	
Muscle Biopsy	41	84

Radiological Procedures

Cerebral Angiography:		
— Percutaneous, Carotid, Vertebral or Subclavian	388	
— Catheterization — Brachial, Femoral or Carotid	128	
Pneumograms under Anaesthesia	66	582

*Not included in final count.

CAUSES OF DEATH

Head Injury (concussion, contusion, haematomata, etc.)	23
Intracranial aneurysm (haemorrhage & haematomata due to aneurysm)	19
Cerebrovascular disease (thrombosis, infarction, haemorrhage)	18
Intracranial tumour, primary	15
Intracranial tumour, metastatic	10
Coronary Occlusion	2
Other Systems	6
TOTAL	93

