

E. Harry Botterell

A Series of Papers Commemorating his Life and Contributions*

With papers by S.W. Schatz, T.P. Morley, J.F.R. Fleming, W.O. Geisler, C.H. Tator, R.R. Tasker, F. Gentili, S.L. Vandewater, and W.M. Lougheed

In November 1997 the 20th E. Harry Botterell Visiting Professorship in Neurosurgery at the University of Toronto was held for the first time without the participation of the man it had been founded to honour. Dr. Harry Botterell had died on June 23, 1997 at his home in Kingston, Ontario, at the age of 91. His active involvement in the annual lectureship despite his advancing years had prompted him to remark wryly, "Old age is not for

the faint of heart!" But Harry dealt with aging masterfully as he had the many other challenges he had encountered along his remarkable life (Figure 1).

In honour of one of neurosurgery's great figures, the 1997 Botterell lectures included appreciations given by some of Harry's former students and colleagues. Extracts of these are presented here, along with some accompanying notes.

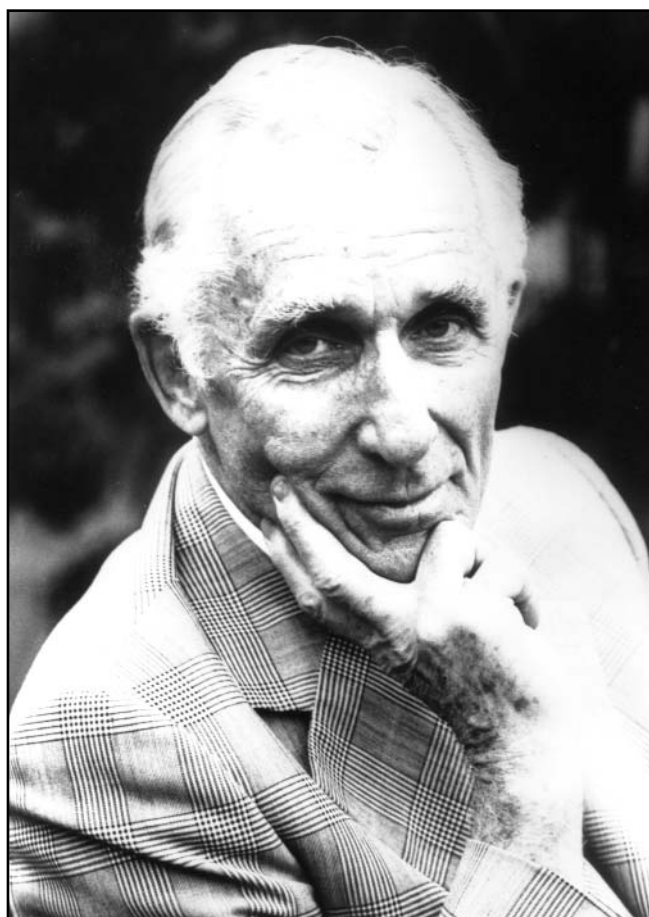


Figure 1: E. Harry Botterell in Kingston June 1976 (courtesy of Mrs. Jocelyn Allen).

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“Let us now Praise Famous Men, and Our Fathers that Begat Us” Ecclesiasticus, XLIV:1

by Stanley W. Schatz

I am as proud to participate in this In Memoriam honouring Dr. Harry Botterell to-day as I was to serve as his Junior House Surgeon exactly 44 years ago when a rotation through “D” O.R. at Toronto General Hospital was an exhilarating introduction to a man who changed my life profoundly. His obituary notice in The Toronto Globe & Mail said he touched the lives of many; we can confidently add that he shaped the academic and professional careers of several of Canada’s leading neurosurgeons. Dr. Botterell’s very significant contributions to our discipline, to Medicine, to Education will be highlighted by others but I was invited to chronicle Dr. Botterell’s life history. Since it would be next to impossible for me to think of Harry Botterell simply in terms of his curriculum vitae, I will also share with you some personal recollections illustrating how Dr. Botterell more than “touched” the lives of his Chief Residents. Many could match or embroider these reflections of a privileged residency with Harry Botterell that now return, as Charlie Drake might say, “with startling clarity” and if you accept that memory is not *retrieval* but *reconstruction* of the past, you will be more inclined to forgive any liberties I may take with the details.

Edmund Henry (Harry) Botterell was born in Vancouver, British Columbia, the oldest of the four children of John Esterbrook and Louise (Armstrong) Botterell, on February 28, 1906. His early education at Ridley College School in St. Catharines, Ontario was followed by attendance at McGill University for a year. Returning to Winnipeg, where the family now lived, to support his widowed mother after his father’s early death, he subsequently received his M.D. degree from the University of Manitoba, graduating with honours in 1930. After postgraduate training as Resident Surgeon at Winnipeg General Hospital and then as Resident Physician at Montreal General Hospital, Dr. Botterell came to the University of Toronto and the Toronto General Hospital. He had been persuaded to move eastward by William Boyd, Professor of Pathology in Winnipeg and in Toronto he served as demonstrator in anatomy with Professor J.C.B. Grant and as tutor in physiology with Professor C.H. Best. Many of us will confess how much our own Royal College Certification and surgical practice owe to the textbooks of these three illustrious authors! On December 23, 1933 Harry Botterell married Margaret Talbot Matheson, the daughter of the Most Rev. Samuel Pritchard Matheson and Alice Talbot of Winnipeg.

During 1934-35 Dr. Botterell was a Fellow at the National Hospital, Queen Square, London, England, legendary centre for neurological training in the classical tradition of careful clinical observation. At “Queen Square” he was a clerk for the great Gordon Holmes. Then, in 1935-36, he served as a research fellow in Professor John Fulton’s laboratory at Yale University, engaged in experimental neurophysiology of the primate cerebellum and in pioneering work on the physiology of tremor. He

returned to Toronto in 1936 to join Dr. Kenneth McKenzie on Canada’s primary neurosurgical service. He earned a Master of Surgery degree from the University of Toronto in 1936 and the Fellowship of the Royal College of Surgeons of Canada in 1937.

From 1940 to 1945 Dr. Botterell served with distinction overseas in the Royal Canadian Army Medical Corps where he rose to the rank of Lieutenant-Colonel and Officer in Charge of Neurosurgery at the Canadian Military Hospital (later Number One Neurological and Plastic Surgical Hospital) at Basingstoke, England. In 1945 Dr. Botterell was made an Officer of the Order of the British Empire in recognition of meritorious service in the medical corps. While in England, Dr. Botterell met Sir Geoffrey Jefferson who asked Dr. Botterell to run his neurosurgical unit in Manchester while Sir Geoffrey was away on Government Service. “Sir Geoffrey helped Canadian neurosurgeons over the hurdles of war”, Dr Botterell was to say later, and these two leaders maintained a close and rewarding relationship in the years to follow.

After the war, Dr. Botterell continued as Consulting and Chief Neurosurgeon at Toronto Military Hospital Christie Street and later Sunnybrook Hospital. With Dr. Albin Jousse he founded Lyndhurst Lodge - an institution devoted to the rehabilitation of both veteran and civilian patients with spinal cord injury and virtually the first such centre in the world. He succeeded Dr. McKenzie as Head of the Division of Neurosurgery at the Toronto General Hospital in 1952 and subsequently was named Professor of Surgery (Neurosurgery) at the University of Toronto. In 1962, in a bold lateral arabesque, he moved to become Professor of Surgical Neurology and Dean of Medicine at Queen’s University in Kingston, Ontario, becoming Vice Principal, Health Sciences in 1968, finally serving as Special Advisor to the Principal (Health Sciences) from 1971 to 1974.

Dr. Botterell’s honours and distinctions include: appointment as an Officer of the Order of Canada; D.Sc. (honoris causa) from McGill University and University of Manitoba; LL.D. (honoris causa) from Queen’s University, Dalhousie University, University of Toronto and University of Manitoba; Honorary FRCS, Edinburgh; the F.N.G. Starr Award - the most prestigious award of the Canadian Medical Association; presentation of a number of distinguished lectureships - W.E. Gallie, Norman Dott, E.C. Janes; appointments to several important commissions concerning health and manpower, correctional institutions, veterinary services. He held senior executive membership on several boards, councils and societies including The Canadian Neurological Society, The American Academy of Neurological Surgery, The World Federation of Neurosurgical Societies. He wrote many papers and reports relating to neurosurgery, medical education and health care delivery. This brief resume of Dr. Botterell’s

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career illustrates, as said Dr. Thomas Boag, Dean of the Faculty of Medicine at Queen's University in 1979, "illustrates the wide range of ways in which he has served many dimensions of our national, provincial and local community." His contribution to Queen's University was recognized by naming a superb new Medical Sciences Building "Botterell Hall" in his honour.

In November, 1958, at the opening ceremonies for the new neurosurgical unit at The Toronto General Hospital planned by Dr. Botterell, Sir Geoffrey Jefferson, whom Dr. Botterell regarded as "foster - father" of this new unit, referred to Dr. Botterell as Dr. McKenzie's successor "with qualities which are vibrant with energy and imagination." Dr. Wilder Penfield affirmed that Dr. Botterell brought to the leadership "a new strength and an originality that is his own." Full exposure to this energy and strength - or "drive" - was the traumatic privilege of some of us whom he chose to train as his Chief Residents.

Dr. Botterell required an annual audit of surgical procedures performed by his Resident. With a broad experience in all aspects of traumatic, general and functional neurosurgery, my own list included 67 tumours, 21 vascular lesions and, perhaps now almost an historical curiosity, 7 intra-cranial sections of the trigeminal nerve root - just about as many tic operations as Dr. Botterell's collection of variations on the spelling of "tic douloureux." Yet Dr. Botterell told me that every Resident finished his training still wanting to do "one more tic!" Is it any wonder that such experience and responsibility were the envy of Residents on every training program in North America? Dr. Botterell's own operative technique could combine masterly, in his words, "Two hands, Billy-the-Kid" manoeuvres with a touch occasionally so precise as to prompt his observation that neurosurgery is to other surgery as "cameo to sculpture."

Neurology was to him "the queen" of the clinical sciences. As we followed in his train he taught us neurology continuously, he taught us well, and he taught for profit! "For a quarter, Stanley", he would say, "the left toe will go up"; "For a quarter, Stanley the right knee jerk will be depressed"; and so on. Although acknowledging their stimulus to clinical precision, in eight years I never collected the money I thought was fairly won in these running diagnostic sweepstakes. I dared to expose this injustice publicly during a paper read to the first "E. Harry Botterell Day" organized by Ron Tasker in October, 1978. At the next coffee break in the scientific program, Harry came over to give me a quarter! I still have it. Learning curves of steep slope were generated principally during galloping ward rounds, made repeatedly - day or night. Such rounds could be interrupted, even painfully protracted, by unscheduled adversarial or diplomatic encounters; you all know some version of the story of Dr. Botterell presenting his resident with tickets for a sporting event and then making late rounds that were a command performance with that resident long after the game had actually started.

Dr. Botterell repeatedly emphasized the importance of "marrying" the disciplines of teaching and research with the best in clinical treatment but I remember him saying that "first, you are a *Doctor*." In what he termed his obsessive-compulsive understanding of patient care, he defined a concern for the protection, preservation and humane guidance of one individual patient after another. His surgical ethic surpassed that of "*primum non nocere*". For him, an operation should be undertaken only for predictable *benefit*. As has been said of Harvey Cushing's stu-

dents, Dr. Botterell's trainees were driven to excel. He has been styled "a tough taskmaster", adding to the demands of a full-time service commitment the relentless pressure for academic initiatives. Even following my residency, when I arrived in England on a travelling fellowship arranged by Dr. Botterell I was greeted by an urgent cable from him calling for completion and return of a project manuscript that same week! To the cable was added the incompatible imperative: "Happy Travelling". Perhaps this indicated that he was not entirely insensitive to the collateral damage, domestic and social, occasioned by such military discipline. Indeed, Dr. Botterell quietly provided regular, generous supplements to a resident's spartan hospital stipend.

Between the "Botterellized" survivors of those years in the training crucible were forged bonds of mutual loyalty and respect by which an elite cadre of Canadian neurosurgeons would thereafter be clearly identified. Dr. Botterell regarded his "boys" as ornaments to the profession at large. He was right of course, as always... "for a quarter!" His final seal of approval was the expression of confidence that he would be happy to have his Chief Resident operate upon him or his family. I'm sure we are all most grateful that this was never necessary. When my own trial by fire finally ended, Dr. Botterell gave me the most cherished of the number of books he had given me over the years: "Selected Papers" of Sir Geoffrey Jefferson, in which he wrote "To Stanley Schatz as a souvenir of a wonderful residency and an association I have enjoyed to the utmost". Only in retrospect could one describe those harrowing years in such terms. As a preceptor, Dr. Botterell encouraged me always to seek out the best there was in everything! He sent me then, as he sent others, with letters of introduction to the best neurosurgeons in the United Kingdom and Europe, aptly described by Ron Tasker as an "amazing constellation of neurological figures." It seemed to me poetic fulfilment when, at the Eighth International Congress of Neurosurgery in Toronto in 1985, a prominent foreign delegate asked me to identify Dr. E.H. Botterell for him - for he had come to see in person a figure he and his colleagues regarded among the best in the World!

Coming as I do from a less blase generation, to the members of which leaders and heroes were real, I have firmly believed in the importance of role models. "Example is not the best method of teaching," said Albert Schweitzer, "it is the *only* method" and Dr. Botterell has said that students learn chiefly by using their teachers as models. So, in 1964, when he referred to K.G. McKenzie as "a surgeon's neurosurgeon"... he might have been describing himself for us. On October 22nd, 1958, while on a research fellowship Dr. Botterell had negotiated for me I went to the London Hospital (now the *Royal* London Hospital) in the Mile End Road, East London - a hospital perhaps more familiar to you as that of Sir Frederick Treves's patient - the "Elephant Man". I went to hear Sir Geoffrey Jefferson deliver the first Hugh Cairns Memorial Lecture, a eulogy upon the life of the distinguished Oxonian neurosurgeon, Sir Hugh Cairns. Said Sir Geoffrey in conclusion: "The only thing I would add now to the obituary I wrote in the *Lancet* would be to say to you that 'I loved the man'." I believe that Cairns was a hero to Jefferson. Jefferson was a hero to Botterell and Botterell was a hero to me. I admired him, I respected him, I feared him but I trusted him. Indeed, as I conclude this reminiscence of a "wonderful residency" with Dr. Harry Botterell I am obliged to say that I, personally, adored the man.

E. Harry Botterell had been richly endowed for his mission in life as a doctor, teacher, researcher, innovator and particularly as a leader in whatever venture he decided to take on. Tom Morley's essay particularly examines the attributes that contributed to his leadership skills.

Botterell the Leader

by T.P. Morley

John Alfsen's portrait (1962) (Figure 2) of Harry Botterell raised eyebrows in the family in spite of Alfsen's and his fellow artists' opinions that it was the best he had ever done. But it wasn't long before Harry and Margaret found "it grows upon us" and that "we now like it very much". To me it says more about Harry than words, so unlike the secrets that lurk behind many a bland boardroom portrait. The erect stature, the intolerance of passivity; eyes which seem they could never close in sleep as they stare into the future towards the next undertaking. For he used to say ten years was about his limit. He had by then either succeeded or failed in the current venture and must move on to the next. This powerful portrait is more a likeness of the man than his face alone. Even from his boyhood years in Manitoba he took charge. His family depended on his decisions for its welfare. Restlessness and drive, the energy to triumph over projects he had set for himself or commissions accepted from others were his weapons; without them he could not have accomplished the half of his life's work.

The founding role he played in what rapidly became the orthodox management of acute and permanent spinal cord injury was more suited to his nature than his no less renowned contribution to the surgical treatment of intracranial aneurysms. For the latter he had crucial support from William M. Lougheed and other colleagues in the fields of medicine, surgery and anaesthesia. But in breaking the ground in North America for the management of spinal cord injury he was to a great extent on his own. To convince authority, first military and soon afterwards civilian, of the rightness of his views and from there to oblige those authorities to provide the means to allow him to act on them, was an exercise in which he was a master. He first identified key figures whom he would enlist as his lieutenants, from the army and the elected ministers of the crown, but more importantly their non-elected deputies who lasted longer in office but who had the ears of their ministers of the day. Add to these the senior officers of the Canadian Paraplegic Society some of whom had been his patients in the war. Thus he recruited official support for his plans, which led the way to the final step, the appointment of his professional colleagues to continue his work. The planning involved in spinal cord injury management, which had taken over his life, was by then a thing of the past. He had removed spinal cord trauma from the list of causes of death. While he continued his interest in patient care the channels he had so effectively opened were now protected and extended by those he could trust.

The second half of his career gave his talents the chance to blossom more luxuriantly than the first, the clinical period. The spinal cord triumph was a preview of his administrative skills. His experience in the army, where the cord interest all began and,



Figure 2: Portrait of E. Harry Botterell in 1962 by John Alfsen (currently hanging in the neurosurgical floor of The Toronto Hospital, Western Division)

immediately after the war, his "negotiations" with the Department of Veterans' Affairs and with the Director General of Medical Services, were proving grounds where he secured a reputation which led to many later calls by government and professional associations for his advice and service.

Harry was an indefatigable lobbyist. He said he learned the importance of lobbying from his close friend at Queen's, the distinguished cardiologist, Ford Connell. Get the yes votes in your pocket *before* you state your case and the rest is easy, he used to say.

Harry found writing a burden — who doesn't? — but in the list he drew up some years ago there are 56 articles, very few of

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which he was not the primary author. There are other contributions he neglected to record in that list, in particular one which reveals the depth of his appraisal of the place of medical practice in society: *The Primacy of the Public Interest*, published in 1971 in the Canadian Medical Association Journal. For his thesis he marshals his views on medical education, professional standards of practice, the changing attitude of the public's perception of doctors and the delivery of medical services. "Health care ... heavily subsidized ... has become largely ... a public utility." The article covers a wide array of items uppermost in his thoughts at the time including the need for new diagnostic and treatment services, new systems of data management, of communication and of funding. I look upon the paper as Harry's personal manifesto when his career was at its peak — or, rather, when it was enjoying its exceptionally prolonged plateau! This concept is supported by the fact that he became intensely involved both before and after the time of this paper in topics as varied as medical education, the Report of the Ontario Council of Health on Health Manpower, Medical Schools and the Association of Canadian Medical Colleges (he was President of the Council), career plans and family practice, the Health Care System in the Ministry of Correctional Services in Ontario (report to the Ministry), followed by two reports, a year apart, to the Commissioner of the Canadian (federal) Penitentiary Service. (The second report, much to Harry's delight, was commissioned to determine the extent to which the recommendations of the first report had been carried out.) The report of another important commission, from the Minister of Agriculture and Food in Ontario, was entitled, "Maintenance of Animal Health for Food Production". This last report, critical as it was of the agricultural establishment in Guelph, did not win him many friends there but was judged to be fair and valuable.

Expert clinicians are not notably expert in committee. Harry was an exception. His qualities of intellect, perspicacity, decision

and transparent probity underlay all his redoubtable achievements. In a word, he was generously endowed with leadership.

He was an unapologetic nationalist — a more comfortable term than patriot. He dropped his neurosurgical ties with colleagues and organizations in the United States and gave his whole attention to matters on which he held strong views that concerned his own country. Even when he was in England during the war, he strenuously argued with Sir Geoffrey Jefferson (a strong friendship had developed between them) of the equal position in all respects the commonwealth countries in the Empire held with the United Kingdom. After Harry had returned to Canada he received a letter from Jefferson which pleased him for it was written from "The Dominion of England".

In the twelve years of rapid expansion at Toronto between McKenzie's retirement and his own translation to the Deanery at Queen's, Harry bent his energies to training a strong cadre of Canadian graduates in clinical neurosurgery who were to be the nuclei for new university neurosurgical units in Toronto and across the country. Tough though life was for Harry's residents, the experience was exhilarating as well as educational. An orthopaedic trainee, on the late Ted Dewar's service, after a six month rotation through neurosurgery, collapsed in exhaustion. "It was a fantastic experience. I could have died for that man!" "My God," said Ted, "He nearly did!"

As I read Harry's letters again for the first time since they were written over many years, I recall the companionship and trust he offered me. Like Alfsen's portrait, they reveal the true man, not simply his achievements. In the letters there is an endearing undercurrent of modesty and self-doubt not apparent to the world during his vigorous life. We whom he enlisted in his grand scheme to make, as he promised, "Toronto the best damn neurosurgical centre in North America", were seldom aware of the toll he paid for his ambition, 'the glorious fault of angels and of Gods'.

— Alexander Pope

Botterell the Teacher

by J.F. Ross Fleming

Harry Botterell once wrote: “you could pay me no greater compliment than to rate me as one of your worthwhile partners in the teacher-resident relationship”. I am sure that at the time, none of the residents realized that we were partners with this man, who seemed larger than life, who was extraordinarily demanding and tough on his residents, and who could often be difficult and sometimes quite unreasonable!

What an incredible teacher he was! A role model, an exemplar, who, in his pursuit of excellence, demanded heavily of himself and therefore of his residents. His former residents Bill Lougheed, Ron Tasker and Bill Horsey have all recently told me that Harry was the best teacher they ever had. Tasker has written that Harry was “one of the finest clinical neurologists and teachers that Toronto ever had”.¹ I would echo that statement.

What was he like as a teacher, and how did he do it? Above all, he cared deeply. He was committed to providing the most excellent possible care to his patients, and to giving his residents as broad, comprehensive and an in-depth education and training in the knowledge, skills and attitudes of neurosurgery as could possibly be provided anywhere in the world. He was most effective in teaching by example, and as a role model where his strong level of caring for patients and residents alike in the teacher-patient-resident trinity provided powerfully effective teaching.

Harry once told me he believed that three areas of medicine stood apart from all the rest, General Practice, General Internal Medicine and Neurosurgery. What these specialties had in common was their breadth as well as depth, encompassing the entire human body. This view may have arisen from his prior training in Internal Medicine, and certainly resulted in emphasis on the whole patient, not just the neurological problem. For the resident, the rules of the game were always clearly stated and well known:- an emphasis on thoroughness, meticulous attention to detail and a careful systematic approach. Woe betide the resident who had not taken a complete history, performed a thorough and meticulous physical examination, formulated a comprehensive differential diagnosis and mapped out a detailed management plan.

There was a certain element of fear in the teacher-resident relationship, and I suppose it was often fear that kept the residents going, no matter how tired we were. There was no such thing as taking a night off; the Chief Resident was on call at all times. We had about 100 patients, with one chief resident, two junior residents and an intern. It behooved us to know all the details about each patient, for we never wanted to hear those dreaded words “you missed something!” Reading relevant texts and journals was usually consigned to the middle of the night. Harry would constantly challenge the residents to ask penetrating questions and then to seek answers to them, and to know even more about a subject than he did.

On teaching rounds he would stand at the head of the bed,

close to the patient, whom he had taken into his confidence, and vice versa, facing a group of residents and students. He always made the patient feel secure and comfortable, and the patient knew that Harry was on his/her side. Much of his bedside teaching was done by asking questions. Although he could embarrass or even bully a student, I do not recall his ever criticizing or disciplining anyone severely in public, (it was a different story in private!). He was a superb classical neurologist, and a master at teaching the neurological examination, often in a dramatic way that one would never forget. To this day I can picture him demonstrating the finger-nose test and rapid hand or foot tapping in a patient with a cerebellar tumour, repeating over and over again Sir Gordon Holmes’ succinct description of cerebellar ataxia and dysmetria: “errors of rate, range, direction and force”.

In the operating room too, Harry was a master teacher. He expected the resident to have made a detailed step by step plan of approach prior to entering the operating room, and he taught us how to make such a plan. Although he would allow the resident to work away on his own, and did not “take the case away from him,” he was always there, or nearby, [often in the office of Annie Pyke the division secretary], to help as needed. His goal was to train each resident to be a complete neurosurgeon by the end of the residency, fully competent to handle even the most difficult neurosurgical procedure.

I vividly remember his immense pride in telling of his daughter’s decision to embark on a career in ballet. Ballet involved total commitment, pursuit of excellence, self discipline, meticulous attention to detail, hard, hard work, high demands of oneself, high expectations, and perfectionism. It had much in common with neurosurgery!

Ron Tasker wrote “the education and training of his residents... was, I think, his greatest priority”.¹ Harry personally guided the careers of each resident, carefully tailoring their entire post-graduate training program. But his personal interest and involvement didn’t start with the beginning of residency. It had already begun before the residency, and continued long after the residency ended; he was always most supportive and encouraging.

Working with Harry was exhausting, exhilarating, at times extremely frustrating, but always rewarding. It was easy to have a love-hate relationship with him, as I believe most residents did, happily the love was much more than the hate. No matter how exasperated or angry one was with him, it was rare indeed to remain so at the end of the day.

One evening, shortly after I started work at the Western Hospital, my wife Pat told me that Harry had called her.

From the Department of Surgery (Neurosurgery), University of Toronto and The Toronto Hospital

Somehow he had heard that I had clipped my first aneurysm as a staff man that day, and he wanted to let her know how pleased and proud he was. That was typical of Harry. Typical too was his thoughtfulness in arranging an intimate dinner, with our wives, in order to personally tell of his decision to accept the position of Dean of Medicine at Queens University, and to explain his reasons for this courageous decision.

Harry Botterell was a kind, thoughtful and generous man. He was a role model for those he taught and trained. He exemplified integrity, high moral and intellectual standards, uncompromising pursuit of excellence, a strong sense of scholarly inquiry, and abundant warmth and compassion, all tempered with a nice sense of humour. Imbuing his residents with these qualities by his own example was his most effective teaching tool. Harry's influence as a teacher and colleague lives on in those whom he trained, and, through them in successive generations of neurosurgeons.

Let me now quote the entire letter with which I began this tribute. Harry had taken part in the opening ceremonies for the new neurosurgical facility in the Fraser Fell Wing of the Toronto Western Hospital in November 1990 on which occasion I paid tribute and gave thanks to my former teachers who had made it

all possible for me. Shortly afterwards, the following letter arrived in Harry's firm handwriting.

"Dear Ross: Please accept my very appreciative thanks for your most generous remarks at the opening of your new neurosurgical unit. I myself have to endlessly thank William Boyd, W.E.Gallie whose resident I was, Campbell Howard of the Montreal General, and Gordon Holmes at Queen Square who was a magnificent teacher. Campbell Howard had been Osler's resident at Hopkins. His father, Palmer Howard was one of Osler's three great teachers. You could pay me no greater compliment than to rate me as one of your worthwhile partners in the teacher-resident relationship. I cannot escape telling you how much I appreciate being, as resident, the lineal descendant of my teachers, and how proud I am of you" (clearly referring to all his residents) "and your part in the development of neurosurgery, and as great lineal descendants of the Cushing, McKenzie, and Botterell line. This letter brings warm sincere personal wishes. Yours ever, Harry Botterell."

REFERENCE

1. Tasker, RR. E. Harry Botterell. *Surg Neurol* 1984; 21:215-217.

Thus far we have reviewed E. Harry Botterell's life story, and his leadership and teaching skills. But most people knew him for his contributions to clinical neurosurgery. Although these were many, covering diverse fields, the following accounts will direct attention to one of his contributions, the care of the spinal cord injured where he started off standing alone and in the end accomplished so much. W.O. Geisler will first relate these developments from the point-of-view of a rehabilitationist.

The Dream That Became Lyndhurst Hospital

by William O. Geisler, MD, FRCP(C)

I was recruited by Doctor Botterell in 1952 to join Lyndhurst Lodge Hospital and to share with the late Doctor A.T. Jousse in the care of the spinal cord injured. I am grateful for the resulting life-long friendship with Harry Botterell and for all that I learned from him.

Unconsciousness of arms and legs with loss of control over the urine was described almost five thousand years ago and recorded in the Edwin Smith Papyrus. The warrior had a dislocated neck and it was suggested he not be treated. In 400 B.C., Hippocrates described the constipation, dysuria, oedematous legs and decubiti of paraplegia and attempted reducing the spine by manipulation of the patient while prostrate; he was not successful. The ancient Hebrews recognized the condition as permanent, offering no cure, condemning the victim to a life of degradation. In about 1210, Rolland de Parma, Professor of Surgery at Salerno, applied treatment by traction. In 1564, Ambrose Paré attempted to hold the reduced spine immobile with lead splints. In 1805, when Lord Nelson was felled at the Battle of Trafalgar, he called the ship's surgeon Mr. Beatty to say that "all over, the power of motion and feeling was gone below my chest." Mr. Beatty replied - "My Lord, unhappily for our country nothing can be done for you"; he died within a few hours. On July 2nd, 1881, President Garfield was shot by a disappointed office seeker. Garfield complained of heaviness and pain in his legs and loss of bladder and bowel control. His condition was not recognized and he died within two months of fevers, chills and pressure sores. At post-mortem, he was found to have a fractured lumbar vertebra and a ruptured splenic artery aneurysm. In 1927, Harvey Cushing vividly described battle casualties and their treatment during the 1st World War. "Eighty per cent died within two weeks. Rehabilitation was not possible. Only 20% of those suffering spinal cord injury reached the U.S.A. alive and only 10% survived longer than a year; the view generally held by the medical profession was that the sooner these patients died, the better.

Rehabilitation of the disabled was what was missing, a simple concept very difficult to execute. Rehabilitation is an educational process, presupposing intact cognitive and perceptual abilities and aimed at restoring function at a sufficient level to permit a patient to live a reasonably useful and satisfying life the success of which process is to a great degree determined by what we choose to call motivation, - that circumstance of an individual's character permitting him to overcome adversity. As we shall soon see, Harry Botterell was a master at studying the personality of the patient and encouraging and motivating him making possible his unique contribution to the field of rehabilitation.

The first rehabilitation plan in Canadian history should be accredited to Madam Youville of the Grey Nuns in Montreal where, in 1756, a hospital ward was opened for prisoners-of-war. She organized vocational programmes for them and put them to work as tailors, carpenters, masons and bootmakers.

In 1892, Robert Tait McKenzie, a Scots Canadian, graduated in Medicine from McGill. He took an interest in physical exercise, became Director of Physical Education at McGill, and wrote many papers on therapeutic exercises to restore the disabled with spinal deformities. After returning from Britain at the end of World War I, he published an outstanding work - *Reclaiming the Maimed*.

It was at this stage that Harry Botterell entered upon the scene, a time when the lot of the spinal cord injured was little different to that remarked upon by Cushing during WWI. But in the late 1930s, a most significant event took place. Doctor K.G. McKenzie, Chief of Neurosurgery at the Toronto General Hospital involved Doctor Botterell in the care of a paraplegic patient who suffered from an unreduced fracture-dislocation of the lumbar spine and who also suffered from urological sepsis. Botterell took on the task of single-handedly rehabilitating this patient, who otherwise was destined to die, and took on the issue of paraplegic care as a life endeavour with great energy and thoughtfulness. He reported his conclusions in a movie made in 1939 which was presented to the Canadian Medical Association. Those conclusions, valid in 1939, remain inescapable today and his leadership changed the lot of the spinal cord injured forever.

When Harry returned to Canada from Basingstoke and the Second World War he brought with him a blueprint for the long-term care and comprehensive rehabilitation of cord-injured soldiers. Once in Canada, he re-established a relationship with an early casualty of Dieppe, a paraplegic patient whom he had met in Basingstoke, Mr. John Counsell and enlisted the support of a great Canadian philanthropist and civic-minded entrepreneur L.M. Wood who knew his way in the corridors of power. The result of their collaboration brought Lyndhurst Hospital into being. The success of Lyndhurst was guaranteed by the outstanding doctoring of A.T. Jousse, a wise and brilliant humanist and rehabilitationist, whom Botterell had recruited on the advice of K.G. McKenzie in 1944, and who became Lyndhurst's Medical Director in 1945. Botterell continued to make regular

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Ward Rounds at Lyndhurst until the mid-1950s and over the years seconded many of his residents to six-twelve months' appointments there.

Within ten years of its opening, Lyndhurst, under Botterell and Jousse, had become pre-eminent in the world in its special role and remains so today, success that came about by the introduction of a multi-dimensional attention to the cord-injured patient. In the last fifty years, a significant decline in the early mortality of these patients leading to a reasonably good life expectancy has occurred resulting from adherence to the precepts laid down by the late Doctor Donald Munro of Boston. Munro introduced the concept of rehabilitation through comprehensive, careful, ongoing, management and follow-up by surgeons, physicians, nurses, therapists, social workers and other health care professionals alike. It was a plan endorsed and followed by Botterell and Jousse. Collaborators and co-workers were recruited and served with dedication - orthopaedic, plastic and urological surgeons, psychiatrists, neurologists, obstetricians, internists, anaesthetists and radiologists. Neurosurgeons, some of whom are with us today, were especially trained and took ongoing interest in the field, carrying the word across the country and abroad:- Joe Cluff, Stanley Schatz, Ross Fleming, Bill Horsey, Charles Tator, Bill Loughheed, and Harold Hoffman; all were Harry's men.

What has happened over time in rehabilitation? It is an act of faith that well-being can be immensely supported or restored through exercise. Resistance exercises develop power, repetitive exercises endurance. There has been no change over time in this principle other than in the use of fancy chrome-plated pulleys, wheels and levers which have replaced weights bandaged to a limb supported on a therapist's knee.

Spasticity is often very troublesome and when it cannot be controlled by passive mobilization and a variety of antispasmodics, function is impeded. Rhizotomies, alcohol blocks, tenotomies and myelotomies are rarely done today. The baclofen pump, introduced in North America by my good friend and colleague Doctor Richard Penn of Chicago has been a Godsend. Now, after ten years of struggle, we are close to having the method available here in Toronto; it is long overdue.

Urological sepsis continues to be a major risk and accounts for much morbidity and mortality but its incidence has been lowered by intermittent catheterization. Urinary obstruction and high intravesical pressure still require bladder neck resections, but sphincterotomies are rare. The Urolome is gaining more and more acceptance. Augmentation cystoplasties, short of ileal conduits, are worthwhile in selected instances.

The dreadfulness of deafferentation pain is known to all of you. Elegant surgical approaches, pioneered by Doctor Ron Tasker and its continuing application by Doctor Andres Lozano in Toronto are vital in a small number of cases. However, further in-depth studies in the underlying mechanisms and treatment of this form of pain are essential.

Decubiti still happen in the best of centres. Sensate myocutaneous flaps are proving very helpful.

Useful walking, apart from standing and pivoting is still not possible after complete lesions above T11-12, even with braces, except in very special instances.

Electromuscular stimulation techniques popularized by Doctor Petrofsky have not yet met enthusiastic acceptance.

Electrically controlled wheelchairs using voice activation and infrared beams are proving useful for very high quads and phrenic nerve pacing emancipate patients from ventilators as long as nerve continuity persists. Voice-activated electronic units, "electronic butlers" - a refined environmental control system - have reduced dependency for some.

Currently, the exciting work of Doctor Cary S. Goodman, in mechanisms controlling the guidance of growth cones gives hope for functional restoration. (Gairdner Foundation Award Presentation, Toronto, November 1997)

Spinal cord injury happens in a moment but lasts a lifetime. It must be prevented at all costs but when it occurs the Botterell principles must be applied. Day-to-day counselling of the patients, answering questions and allaying fears in a compassionate manner, is the singlemost important role of the rehabilitationist. This is what Harry Botterell, by example, did and taught best.

Harry Botterell initiated the general principles for the care of the spinal-cord injured resulting in the establishment of Lyndhurst Hospital as amongst the very first to espouse the cause of rehabilitation of these patients, and its development into international leadership in the field. The same services were planted across the continent for patients who could obviously not come to Lyndhurst. But what Botterell must also have been very proud of was the development of a world class neurosurgical research facility in Toronto, founded by Charles Tator, to advance understanding of spinal cord injury. In the following essay Charles reviews the Botterell contributions to the care of the spinal cord injured from the neurosurgeon's point-of-view.

The Stimulus for an Acute Spinal Cord Injury Unit

by Charles H. Tator

Great people can be measured by their legacy of good works. Is the world a better place because of this person? Harry Botterell's legacy in the field of spinal cord injury is evidence of his greatness. I will show you the evidence through his writings and those of his many colleagues and students.

His interest in spinal cord injury grew from exposure to excellent teachers in Toronto who created an environment of innovation, concern and compassion for spinal cord injured patients. For example, W.E. Gallie the Chief of Surgery and Ken McKenzie the Chief of Neurosurgery during Botterell's training, made important contributions to this field. McKenzie was one of the pioneers in the management of spinal cord injury and recorded his experience in a paper entitled "*Fracture, Dislocation and Fracture-Dislocation of the Spine*" published in 1935 in the Canadian Medical Association Journal.¹ Gallie wrote two excellent papers on skeletal traction published in 1937 and 1939.^{2,3} Thus, when Harry Botterell came to Toronto in 1932, he was exposed to the teachings of these great practitioners in the field of spinal cord injury. Findlay chronicled these events in his two articles entitled "*Neurosurgery at the Toronto General Hospital, 1924-1990*" Parts 1 & 2 published in 1994 in the Canadian Journal of Neurological Sciences.^{4,5} Part 1 contains a bibliography of Botterell's papers. In 1932, Botterell was a demonstrator in Anatomy under the great J.C.B. Grant and then in 1933-34 he was Gallie's resident. After studying elsewhere, as arranged by Ken McKenzie, he returned to Toronto in 1936 to become Toronto General Hospital's second neurosurgeon. From 1936-37, he was essentially McKenzie's senior resident.⁶ Findlay wrote "Professor Gallie, a generous man dedicated to supporting his young staff with new practices, made a point of sending to Botterell any of his spinal fracture patients who had associated spinal cord injuries. One of the first was a young man paralysed from a football injury. Botterell took on this patient, who had only a trace of cord function left, and was able to prevent bladder infection by carefully employing Munro's (a Boston neurosurgeon) new system of "tidal irrigation" of the bladder, and to prevent the development of pressure sores. The result was dramatic. At a time when such patients usually died from sepsis, this patient made a remarkable recovery. The same principles were applied successfully in two more successive patients, kindling Botterell's career-long interest in improving the care of paraplegic patients."

His next contribution to spinal cord injury came as a result of

his war efforts. He enlisted in the Royal Canadian Army Medical Corps, and went overseas in 1940. He was stationed at the Canadian No. 1 Neurological Hospital which later became the Neurological and Plastic Surgery Hospital and which was set up in Basingstoke, England. Here he served from 1940-1945 rising to the rank of lieutenant-colonel and to the position of Officer-In-Charge, Neurosurgery. His years there and his relationship to spinal cord injury are best chronicled by Frank Turnbull, one of Harry's contemporaries who preceded him as "the first official entrant to Toronto's surgical 'Gallie Course' and who spent a year with McKenzie in 1931-32".⁴ Turnbull published a wonderful book in 1995 entitled "*Operating on the Frontier. Memoirs of a Pioneer Canadian Neurosurgeon*",⁷ and provided the following account of Botterell. "The Canadian Neurological and Plastic Surgery Hospital was my base in England. Lt.Col. Harry Botterell, Chief of Neurosurgery, was a former associate of Ken McKenzie in Toronto. He ran a tight ship with a hand-picked crew, so standards of care in the hospital were admirably high. A small cadre of officers from the hospital under Major Bill Keith of Toronto, organized No. 1 Canadian Mobile Neurosurgical Unit. They crossed over to Northern France in July 1943, first before the battle of Caen." In early 1944, Botterell and Turnbull travelled together to Belgium and France to tour the Canadian Hospitals which had been set up on the continent very near the front lines. They were sent to Europe by the Canadian Military High Command to assess current neurosurgical practice. In Antwerp, they were met by Majors Bill Keith and Allan Walters. In Paris, they met with the American neurosurgeon Lt.Col Edgar Kahn who was operating on 25-30% of the spinal injury cases he saw. This concerned the Basingstoke staff who were operating on a much lower percentage, especially in the case of thoracic cord injuries. Kahn's arguments were not convincing. "He told us half-heartedly about a few instances of doubtful return of some physical function on the day after operation and explained the high percentage of operations by telling us that the relatives of American soldiers would demand surgical treatment if anyone said that it offered the tiniest fraction of hope. Harry and I continued to believe there was no reasonable argument for operation in cases of acute total thoracic injuries of the spinal cord, apart

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from emergency cleanup of the wound, and no indication to alter the Canadian policy. There was really no controversy nor any occasion for concern. The end results were the same. The Americans and Canadians just had different philosophies about the indications for neurosurgical intervention." While in England, Botterell had a first hand view of Ludwig Guttmann's efforts in providing acute care and rehabilitation to the soldiers with spinal cord injuries. He was impressed with Guttmann's emphasis on total care of the patient, the need to prevent medical complications and the lifelong follow-up they required.

Findlay has written "When Botterell returned from overseas in 1945 he found, in his own words, many of the spinal cord injury patients from the war, some who had gone through his service at Basingstoke 'lying around rotting' at the Christie Street Department of Veterans' Affairs Hospital in Toronto.

He decided to remain in the army long enough to better the plight of these pitiable patients and to straighten out in particular the problems of the young veteran paraplegic patients. To assist him in this task at Christie Street Hospital and the affiliated Lyndhurst Lodge, at McKenzie's suggestion, he recruited Albin Jousse. "In 1945, Jousse was appointed Medical Director of the first hospital dedicated to the rehabilitation of spinal cord injured patients in North America, Lyndhurst Lodge."⁴ Drs. Jousse and Botterell became very close colleagues and together made an enormous contribution to the rehabilitation and return to productivity of a very large number of veterans. As time passed the same facilities were extended to civilians with spinal cord injury.

During his career, Dr. Botterell wrote many excellent papers on spinal cord injury and related topics. There were two papers on intervertebral disc herniations, one with Ken McKenzie⁸ and the other with Bill Keith.⁹ He chronicled his war efforts in spinal cord injury in a paper published in 1946.¹⁰ He wrote papers on pain in paraplegia in 1954,¹¹ respiration in paraplegic patients in 1955,¹² and fracture-dislocations of the thoraco-lumbar spine in 1956.¹³ In 1959 and 1963 there were papers related to spinal cord tumours.^{14,15} Dr. Botterell was the second-named author in Henry Barnett's seminal paper on post-traumatic syringomyelia in 1966.¹⁶ His final and perhaps most important contribution to the field of spinal cord injury came in the early 1970s when he conducted a detailed analysis for the Ontario Ministry of Health of all the spinal cord injuries which occurred in Ontario in the years 1969 and 1970. This study was the subject of Dr. Botterell's W.E. Gallie Memorial Lecture delivered at the 44th Annual Meeting of the Royal College of Physicians and Surgeons of Canada on January 24, 1975, and later published in the Royal College Annals¹⁷ and elsewhere^{18,19} entitled "A Model for the Future Care of Acute Spinal Cord Injuries". He led a team of investigators which carefully analysed the first aid, emergency management, transport, acute care, and rehabilitation of 224 patients with acute spinal cord injury in Ontario.

Dr. Botterell wrote "Fundamental conclusions valid in 1939 (when he presented a film on "Recovery Following Severe Injury to Spinal Cord and Cauda Equina" to the Annual Meeting of the Canadian Medical Association") remain inescapable today:

- (1) Careful transportation in and outside the hospital may save the cord.
- (2) No matter how severe the acute spinal cord injury, if any spinal cord function remains, astonishing recovery is possible.

- (3) Pressure sores are preventable.
- (4) The incidence of genito-urinary sepsis can be kept low.
- (5) From the moment of injury, every acute cord injury patient, complete and incomplete, must be treated as having the potential for recovery."¹⁷

He made very specific recommendations to the Ministry of Health, Ontario which were subsequently adopted in Ontario and many other parts of Canada: "Only regional acute cord injury centres, relating to geographical and population needs specially equipped and staffed, should accept the responsibility for definitive care of acute quadriplegic and paraplegic patients (complete or incomplete), unless the emergency nature of the patients' multiple injuries or general condition dictate otherwise".¹⁷

I shall always be grateful to Dr. Botterell for accepting me into neurosurgical training at the University of Toronto. I believe I was the last resident he accepted into the program. This was in 1961, a few months before he left, in 1962, to be Dean of Medicine at Queen's University in Kingston, Ontario. He remained deeply interested in my career, and I think he was pleased that I devoted the major part of my academic activities to spinal cord injury. I received several letters from him related to these activities. One that was very gratifying involved my work in the development of the first Acute Spinal Cord Injury Unit in Canada at Sunnybrook Hospital, in 1974. Dr. Botterell played an important role in this project when he helped convince the hospital and the Ministry of Health to support the project. In this August 5, 1979 letter, he was very complimentary: "Dear Charles, It seems to me it is hard to overestimate the significance of your Spinal Cord Injury Unit, as a model which other regional units will emulate."

Thank you, Dr. Botterell, on behalf of myself, on behalf of the patients with spinal cord injury whom you personally treated, and on behalf of the thousands of other spinal cord injury patients whose lives you touched because of your wisdom, innovation, concern and compassion.

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“The Second Ice Age”

by Ronald R. Tasker

My association with Dr. Botterell began in 1955, after the spinal cord injury era of his career, and it continued until 1962 when he departed for Queen's one year after I joined the neurosurgical staff at the Toronto General Hospital (TGH). The accounts of others leave untold two important facets of Harry's life - the warm home life his wife Margaret made for him in the brief hours he could be there to enjoy it and one of his other great neurosurgical contributions - the direct clipping of berry aneurysms.

Margaret provided the home base from which Harry emerged to make his contributions and which was the platform on which he depended. With her warmth, charm, sense of humour and interest in the arts and nature, a visit to the Botterell home, their cottage at Foote's Bay on Lake Joseph in Muskoka, or their weekend cabin at Maple just north of Toronto (which we rented from them after their departure to Queen's and which has sadly long since disappeared into the Keele Valley landfill site), was a rejuvenating experience.

The main focus of Harry's neurosurgical activities during my training days at the TGH, other than the planning for the new Neurosurgical Unit, which opened in 1958, was the development of a technique for the clipping of ruptured berry aneurysms of the brain. This was a collaborative effort involving Harry, William M. Lougheed who preceded me on the neurosurgical service, Stuart Vandewater and other members of the anaesthesia staff, and John Scott, neurologist, electroencephalographer (EEG'er as Harry would say) and neurophysiologist, to mention those with whom I was most involved.

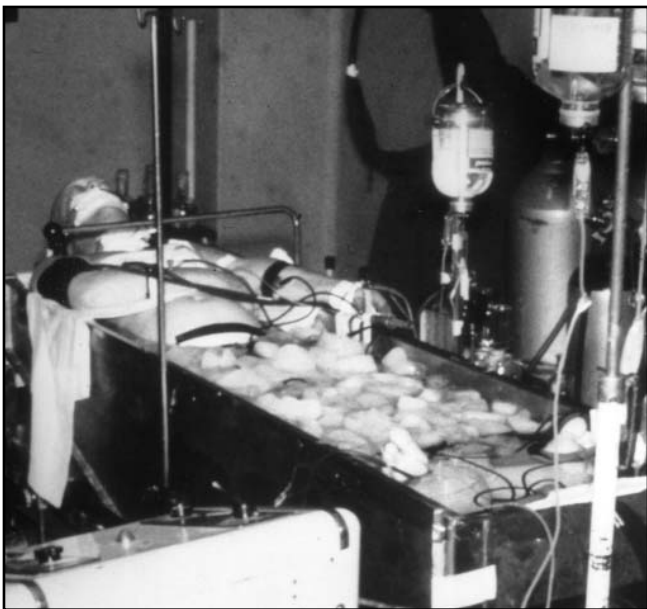


Figure 3: Patient in hypothermia tank filled with ice water in “D” operating room, basement, College Wing, Toronto General Hospital, September 1955. The surgeon was E.H. Botterell, assistant R.F. Hetherington, observer T.P. Morley, anaesthetist S.L. Vandewater and the scrub nurse was Helen Hill. The patient was breathing spontaneously with oesophageal temperature and direct radial artery pressure monitoring. In some instances hypotension was deliberately induced.

In those days patients with subarachnoid hemorrhage could not be offered reliable definitive treatment. What was needed was a technique by which the ruptured aneurysm could be identified and then occluded at craniotomy preventing further rupture and bleeding, without damage to the brain or the arteries from which it grew. Imaging was accomplished with arteriography, first done by cut-down on the carotid and vertebral arteries, later by direct arterial puncture in the neck. Separate dye injections had then to be made for anterior-posterior, oblique and lateral views with little protection for patient or staff from the concomitant and (by today's standards) heavy dosage of X-irradiation. But operating on the aneurysm was another matter. For if, as often happened, the aneurysm ruptured during the exposure, it was very difficult, in the days before magnification and its associated lighting, to complete the operation effectively.

The concept, brought to the neurosurgery service by Bill Lougheed after his exposure, arranged by Harry, to Bill Bigelow on the nascent cardiovascular surgery service of the TGH, was to cool the patient's body core temperature to 30°C allowing the surgeon an effective time frame (rather than the 2-3 minutes that was safe at normal body temperature) during which carotid and vertebral arteries could be occluded providing a clear field for exposure and clipping of the aneurysm protecting against the dangers of massive hemorrhage from possible rupture and allowing sufficient visualization of the operative field to avoid inadvertent occlusion of a parent artery along with the aneurysm. The carotid and vertebral arteries had first to be exposed in the neck and secured with tapes allowing an assistant to pull on the tapes sufficiently to occlude bloodflow at the necessary moment but taking care not to damage the arteries. Hypothermia was accomplished by immersing the anaesthetized patient in a vast stainless steel tank of ice water (Figure 3) until suitable body temperature was achieved at which point the surgery would commence. It was a nice judgment call to gauge, based on the rate of cooling, when to start the craniotomy so as to achieve a 30°C core temperature when the aneurysm was ready for exposure.

As international interest in the new technique developed, subarachnoid hemorrhage patients started pouring in; all were operated on as emergencies upon arrival. This was the era Harry alluded to in one of his lectures as the Second Ice Age; the first referred to the glorious hills of the Oak Ridges Moraine, a remnant of the Wisconsin glaciation on a southern tongue of which his Maple cabin was situated. Ironically, after I completed my residency in 1959, Harry arranged a post-doctoral fellowship for me in Wisconsin of glaciation fame during 1960 at the Laboratory of Neurophysiology under Clinton Woolsey which was responsible for directing the rest of my career.

I have summarized the recollections of a resident during the Second Ice Age. However this important era needs more scientific treatment provided by Fred Gentili.

From the Department of Surgery (Neurosurgery), University of Toronto and The Toronto Hospital

E.H. Botterell's Contributions to Cerebrovascular Surgery

by F. Gentili

Let us go back in time to the year 1952 when Dr. Botterell succeeded K.G. McKenzie as the Chief of the Neurological Service at the Toronto General Hospital. What diagnostic tests were available? Pneumoencephalography, ventriculography, myelography, lumbar puncture, rectilinear scans (with radioactive arsenic), and direct puncture arteriography. Urea, steroids and mannitol for the reduction of cerebral oedema were not yet available. There were 4 house staff to look after 100 patients. A typical day in the operating room might include 3-4 diagnostic ventriculograms, a craniotomy for brain tumour and a procedure for the removal of a lumbar disc or for tic douloureux. Cerebrovascular surgery was in its infancy. If we look at the table of contents of the *Journal of Neurosurgery* for 1952 one notes a distinct paucity of publications on the subject but there were a few papers dealing with angiography which was becoming more popular and on its complications which were not insignificant. There was one paper on subdural haematoma from ruptured aneurysm and a case report. There were few textbooks on neurosurgery and one published in that year by Gurdjian and Webster on *Operative Neurosurgery* had only 6 of its 422 pages devoted to cerebral vascular disease, one page to aneurysms and arteriovenous malformations. Although by this time the clinical presentation of subarachnoid hemorrhage (SAH) had been well described and the diagnosis was easily made, the natural history was poorly known and the decision as to what to do with the patient was another matter. The authors commented that aneurysms were a "serious problem" and that their management by conservative or operative means was still a matter for debate. Surgical treatment usually consisted of indirect methods such as proximal carotid occlusion in the neck although more direct methods were being reported such as intracranial proximal occlusion and trapping; direct clipping of the neck of the aneurysm was an uncommon procedure.

Most of the patients presenting with SAH at the TGH at this time were routinely admitted to the medical wards to be treated conservatively. Although there had been a few reports in the literature of surgical treatment of aneurysms by Dott, Kraysenbühl and Dandy, with sporadic success, the overall surgical results were, to say the least, quite discouraging. One review concluded:- "The clinical material that is reported ... does not support the view that presently available surgical means of intervention offer any improvement over the current conservative approach."

Dr. Botterell had shown an early interest in cerebral aneurysms fortunately shared by the TGH neurologists of the time, Drs. H. Hyland and J.C. Richardson. He fostered a productive relationship with his medical colleagues and used his well-known ability for friendly persuasion to encourage referral of more of the patients with SAH to the neurosurgical service. Nevertheless few patients underwent direct surgery despite the fact that he believed that direct neck clipping was going to become the optimal method of treatment. If we look at Dr.

Botterell's personal series of aneurysm patients undergoing direct surgical treatment up to 1953, the results were discouraging with 58% of patients suffering a bad result or dying because of:-

- (1) Poor anaesthetic techniques which often, instead of being helpful to the surgeon, added to his difficulties.
- (2) Lack of agents with which to relax the brain.
- (3) Technical problems such as lack of proper visualization, magnification and of effective clips with which to occlude the aneurysm neck. McKenzie silver clips were often used but they could not be removed if repositioning was needed, offering only one chance at clipping. Furthermore their sharp edges would often shear an aneurysm from its parent vessel with disastrous consequences.
- (4) Little understanding of the role of vasospasm.

Botterell's initial negative experience did not discourage him and, as with other neurosurgical pioneers, he firmly believed that better results could be achieved. He persuaded young bright anaesthetists Drs. Stuart Vandewater and Brian Marshall to take an interest in neuroanaesthesia and he recruited Del Wollin in neuroradiology to develop the techniques to image aneurysms. He also understood the importance of good nursing care, enticing a bright young nurse, Jessie Young, to take charge of that field by the boast that he was going to develop the best (damn) neurosurgical unit in the world. She later admitted, however, that it was his promise to send her on a paid tour of all the outstanding neurosurgical centres in North America and abroad that won her over. He also knew that there would have to be improvements in the surgical techniques to be used including the development of methods to protect the brain from ischaemic and anoxic injury. For he felt such an injury was a significant contributing factor to the poor outcome of aneurysm surgery.

At that time Bill Lougheed was Harry's resident. During his general surgical training he had worked with Drs. Gordon Murray and Bill Bigelow, pioneers in vascular and cardiac surgery at the TGH. Bigelow exposed Lougheed to the concept of hypothermia and whetted his interest in vascular disease. Botterell encouraged him to pursue this interest in Boston under Bill Sweet, where he established a method of hypothermic protection of the brain and reversible cerebral circulatory arrest for use in neurosurgery.

In 1955, Botterell, Lougheed, Scott and Vandewater reported their results in 22 patients who had undergone direct surgical clipping of ruptured aneurysms under the protection of hypothermia in a paper that exemplifies Dr. Botterell's meticulous attention to detail in reporting results. For every case was summarized with thoughtful, honest comments as to why things might or

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might not have gone well. This paper was also a landmark for another reason:- it proposed the first grading system for SAH which came to enjoy widespread use and to be known as the Botterell Grading Scale. This paper was among the first to stress that any outcome assessment had to take into account not only the size and site of the aneurysm and the timing of the surgery but also the clinical state of the patient (Botterell Scale) at the time of the surgery. Dr. Botterell was keenly aware that only by careful and honest analysis, taking into account all these variables, could one compare accurately surgical and medical treatments. In this pioneering study of 22 patients there were 16 excellent and good, 2 bad outcomes and 4 deaths.

The timing of this paper was very important because, coming at a time when there was hesitancy and uncertainty in aneurysm surgery, it encouraged others to be more aggressive and to operate directly on aneurysms with or without hypothermia. Following this publication referrals came from all over North America and established Botterell as a major force in cerebrovascular surgery. In 1958 Botterell and Lougheed reported their results in 73 patients with a total mortality of 23% (4 deaths were delayed in chronic care facilities so that the actual operative mortality was only 18%).

With continual advances in technique, results improved and experience grew. After Botterell's departure in 1962 to become Dean of Medicine at Queen's University, the field of cerebrovascular surgery set in motion by Botterell, Lougheed, and

their associates prospered so that, by 1965, Lougheed and his colleagues could report a series of 377 aneurysm patients. Lougheed recognized early the advantages of the operative microscope reporting, in 1969, 40 patients with aneurysms operated upon microsurgically, one of the largest series at the time.

Botterell's philosophy of life was aptly summarized in his remarks at the time of the convocation at which he received the LLD degree (*honoris causa*) from the University of Toronto. "In my thoughts the word care with regard to patients has a very specific meaning. By care I mean the feeling of concern with the view to protection, preservation and humane guidance ... my own neurosurgical practice was interrupted once for a long time and terminated prematurely (referring to the war and his departure from neurosurgery in 1962 at 56 years of age). Each time I greatly missed working with patients. One important and rewarding part of life had vanished. Practice and patient care were work not labour; according to Ruskin work must be differentiated from labour. A man is a labourer if the job society offers him is of no interest to himself but he is compelled to take it by the necessity of earning his living ... a man is a worker if he enjoys and is personally interested in the job which society pays him to do ... that people may be happy in their work, they must have a sense of success in it - a sure sense or rather a knowledge, that so much work has been done well, and fruitfully done ... that a man may be happy, it is necessary that he should be a good (and honest) judge of his work."

Much to the dismay of many of us, E. Harry Botterell accepted the challenge of the Deanship of Queen's University Medical School and moved to Kingston in 1962. This ended his direct involvement in neurosurgery though he retained a very active life - interest in the field, in neurosurgeons, and particularly in the neurosurgeons he had trained. One of the individuals with whom he had worked closely in the aneurysm study at the TGH was Stuart Vandewater who had moved to Queen's University in 1960 and who, with Bill Lougheed, recounts his recollection of Harry Botterell.

The Queen of Deans

by Stuart L. Vandewater and William M. Lougheed

In 1962, Dr. Harry Botterell faced probably his greatest challenge, when he accepted Principal Alex Corry's invitation to become the full-time Dean of Medicine, Queen's University at Kingston, a post he held until 1970. The medical school, now over 100 years old, had slipped, failing to keep up with new developments, and was in a perilous state; a charismatic and strong leader was needed. Dr. Botterell had strong views on future directions for medical education, emphasizing the need to prepare students to think rationally and logically, encouraging problem solving, and promoting life-long self-education. Postgraduate training was becoming as important as the MD program and he saw the two as a continuum of more or less equal parts.

Over the next eight years, following his arrival at Queen's, Dr. Botterell cajoled, convinced and otherwise persuaded his faculty, the university and affiliated teaching hospitals to accept major innovations such as closed hospital teaching units, hard income ceilings for clinicians, cross appointments to promote integrated teaching and research, expansion of residency pro-

grams and finally the establishment of family medicine as an independent department. These were trying times, complicated by the introduction of medicare. Nevertheless there is now a solid partnership of the Kingston hospitals and Queen's Faculty of Health Sciences, forming the South Eastern Ontario Health Sciences Centre - Dr. Botterell's ultimate vision - and again attracting national and indeed international attention and praise. Queen's honoured Harry by naming Botterell Hall in his honour and he continued to serve Queen's as Vice-Principal Health Sciences from 1968 until 1971.

During the 1970s, E. Harry Botterell carried out two government sponsored studies. One was of health care for prison inmates, at the request of both Ontario's and Canada's Correctional Services. The other was an enquiry into Veterinarian and Animal Health Services in Ontario. This latter study done in 1974 drew attention to the widespread and indiscriminate use of antibiotics in livestock and the potential for the development of antibiotic resistant bacteria.

EDMUND HENRY (“HARRY”) BOTTERELL

OC OBE MD MS FRCS(C) FRCS(Edin) LLD DSc

Neurosurgeon, scientist, teacher, medical school dean, healthcare consultant
Born February 28, 1906, died peacefully and with dignity
June 23, 1997, at home in Kingston, Ontario

Whether we were a patient, a student, a colleague, a friend or even an adversary, those who came in contact with Dr. Harry Botterell, a.k.a. “EHB”, we were invariably taken (and disarmed) by his warm presence and smile, that exuded a sense of caring and understanding. He was gentle and sure of mind as well as hand, astute in realism and predictions, persuasive in personality, and relentless when challenged.

Harry was the oldest of the four children of John Esterbrook and Louise (Armstrong) Botterell. Although born in Vancouver, home was Winnipeg where he received his early education. Following Ridley College in St. Catharines, Ontario, he went to McGill for a year, but had to return home to work in order to help support his now widowed mother. In due course he entered Medicine at the University of Manitoba, graduating with honours in 1930. Facing the depression and an uncertain future, EHB completed what can only be described as six years of “exemplary” postgraduate training. With strong recommendations from his Manitoba teachers including William Boyd in pathology, he obtained residency and fellowship appointments in Winnipeg, Montreal, Toronto, Yale and London, England under leading clinicians and scientists of the day; Campbell Howard, W.E. Gallie, K.G. McKenzie, John Fulton, Frederick Banting, Geoffrey Jefferson and others before joining McKenzie (the founder of neurosurgery in Canada) on the staff of the Toronto General Hospital in 1936.

During World War II, EHB served overseas from 1940 to 1945, becoming Chief of Neurosurgery at No. 1 Canadian Neurological and Plastic Surgical Hospital, Basingstoke England. Of his many contributions, two are of some current interest. He drew to the attention of the Minister of Defense that the steel helmets worn by Canadians (WW I surplus) were totally inadequate for head protection as compared to that used by the German and American armies. Secondly, he opposed the introduction of nurse anesthetists as used in US military (and civilian) hospitals.

On returning home in 1945 with the rank of Lt. Colonel and the OBE for distinguished service, EHB and Albin Jousse championed the active rehabilitation of not only veterans, but also civilians who were paraplegic (paralysed from waist down) from spinal cord injuries. This led to the formation of Lyndhurst Lodge in Toronto, a world class rehabilitation centre.

EHB succeeded McKenzie in 1952 as Head of the Division, and this marked the beginning of a daring project ie, direct cerebral vascular surgery supported by new technology for certain cases of stroke (subarachnoid hemorrhage), which up to then carried a high mortality rate. Strange things began to happen down in the bowels of TGH, in the dark and dingy “D” operating room (“D”OR). With improved x-ray definition, brain protection by lowered body temperature by 10 degrees Celsius (induced hypothermia), and blood pressure by 50% (induced hypotension), a new era of neurosurgery was initiated. In retrospect the procedures were crude, and possibly ethically questionable, but nevertheless the results were remarkably good, and drew international attention and accolades to EHB and his team.

In 1962, EHB faced probably his greatest challenge, when he accepted Principal Alex Corry’s invitation to become the full-time Dean of Medicine, Queen’s University at Kingston. The medical school now over 100 years old, had not kept up to new developments, was in a perilous state, and a charismatic and strong leader was needed. EHB had clear views on future directions for medical education in preparing students to think rationally and logically, and in encouraging problem solving, and self/life-long learning. Postgraduate training was becoming equally important as the MD program and he saw the two phases as a continuum.

Over the next eight years, EHB cajoled, convinced and otherwise persuaded his faculty, the university and affiliated teaching hospitals to accept major innovations such as closed hospital teaching units, hard income ceilings for clinicians, cross appointments to promote integrated teaching and research, expansion of residency programs and finally the establishment of family medicine as an independent discipline. These were trying times, complicated by the introduction of medicare. Nevertheless there is now a solid partnership of the Kingston hospitals and Queen’s Faculty of Health Sciences, forming the South Eastern Ontario Health Sciences Centre - EHB’s ultimate vision - and again attracting national and indeed international attention and praise.

During his “deaning” days, EHB was instrumental in establishment of the policy of the Royal College of Physicians and Surgeons of Canada, that approval of specialist training programs required university sponsorship and oversight. He also played a leading role in changing specialist training from a dual to a single pathway.

In the 1970s, EHB carried out two government sponsored studies - health care for prison inmates, for Correctional Services both provincial (Ontario) and federal, and lastly an enquiry into the Veterinarian and Animal Health Services (Ontario). This latter study drew attention to the widespread and indiscriminate use of antibiotics in livestock and the potential for development of antibiotic resistant bacteria (1974).

On December 23, 1935 Harry Botterell married Margaret Talbot Matheson, the daughter of Most Rev. Archbishop Samuel Pritchard Matheson and Alice Talbot of Winnipeg. Harry is survived by Margaret (of Kingston) and their two daughters, Daphne (Mrs. Malcolm Payne of Hamilton) and Jocelyn (Mrs. Peter Allen of Toronto) seven grandchildren, and sister Jocelyn Staton of Atlanta GA.

Editorial Comment

Harry Botterell was an exemplary doctor, university teacher, neurosurgeon, scientist, dean and vice-principal and we have very briefly mentioned his achievements. But most of all he was an exemplary human being who will be immortalized by those he has taught and influenced who, in their turn, will see that his principles are perpetuated. He is survived by his wife Margaret, daughters Daphne Payne and Jocelyn Allen and his grand- and great-grandchildren, as well as his sister Jocelyn Staton of Atlanta. His brothers Hugh and John had predeceased him.