S UBSPECIALITIES are woven with the threads of many sciences into the cloth of medicine as a whole with no political or geographical confinement. Most of the events that shaped neurosurgery in Manitoba are inseparable from the world-wide development of the specialty and are presented in this historical vignette with relevant chronological reference points. Neurosurgery started with trephination. Most civilizations have shared the penchant for peering into another person’s calvaria, awaiting only the development of adequate tools, be they sharpened flint or bronze. Manitoba artifacts date back 8000 years but no trephined skull has been found; the reader must judge whether this is evidence of an advanced or retarded civilization.

Medicine in Nineteenth-Century Manitoba

In the 1870s, at the same time that Gustav Fritsch and Eduard Hitzig were conducting their electrical stimulation studies on dog brains, and Sir William MacEwen was contemplating brain abscesses, a fur-trading post at the junction of the navigable Red and Assiniboine rivers was evolving into the city that would become Winnipeg, capital of the province of Manitoba. Manitoba’s earliest physicians left no record of neurological encounters; instead, they made themselves known in local political circles. John J. O’Donnell became speaker of the Legislature Council; John C. Schultz became Lieutenant Governor of Manitoba and was knighted by Queen Victoria. Early reports show that in 1879 a patient was admitted with cerebral contusions to the eight-bed ward over a store on Water Street. That same year Harvey Cushing, the father of modern neurosurgery, was born in Cleveland, Ohio and MacEwen accomplished the first successful removal of a brain tumor. In the mid 1880s, as the Winnipeg General Hospital (WGH) (Fig. 1) sewage system was ordered to be connected to city drains, the Italian surgeon, Francesco Durante, was engaged in his highly successful removal of a brain tumor.

In 1893 one patient with a brain tumor and another with spinal caries were admitted to the WGH. The outcomes of these cases are unknown but shortly thereafter, we know that five patients were admitted with depressed fractures and three for exploratory trephination. Although the indications for these cases were not preserved, we do know that all lived. This was 2 years before Wilhelm Roentgen introduced x-radiation and 8 years before Harvey Cushing first performed blood pressure monitoring during cranial surgery, a procedure soon to become standard during all forms of surgery.

The Emergence of Neurosurgery 1900 to 1949

The central wing of the newly constructed WGH was finished in 1910 and the east and west wings were completed in 1911 (Fig. 2). By this time, neurosurgery had begun to emerge as a new specialty. Surgeons from all over the world traveled to study with Cushing in Boston,
and some of his former students initiated formal training programs elsewhere. In 1919 Walter Dandy of Baltimore reported on the potential uses of air study and myelography, probably the greatest advances in any form of surgery. With these media the surgeon could accurately determine a tumor site and distinguish mass from loss of substance. By 1919, there were 20 formal training centers and sufficient neurosurgeons in North America to justify the formation of the Society of Neurological Surgeons.

In 1927 two craniotomies were performed at the WGH: one by Dr. Alexander Gibson, a former Professor of Anatomy (Fig. 3) who later became famous for his hip operation, and the other by Dr. Oliver S. Waugh, soon to become Professor of Surgery. Both patients died on the day of surgery. Undaunted by these events Gibson and, particularly, Waugh courageously continued their work and subsequently performed many craniotomies. During the same year, Egaz Moniz, noted for the prefrontal leucotomy, introduced angiography, which rapidly became a most valuable and diverse diagnostic tool.

The 1930s signaled advances in the pursuit of neurosurgical procedures at the WGH. In 1934, Winnipeg became the site of riots involving the National Communist Party. As a result of the furore, numerous party members sustained head injuries caused by police batons; apparently all were successfully treated. Cecil Clark removed an extradural clot in the latter half of the decade. In 1939, Dr. Waugh narrowed the focus of his work to neurosurgery and became Professor of Surgery at the University of Manitoba Faculty of Medicine. He was later joined by Hugh Cameron, whose interests also were restricted to neurosurgery. Both were excellent general surgeons, performing quite adequate emergency and some elective neurosurgical procedures.

In 1940 the neurosurgeons of North America introduced the American Board of Neurological Surgery Certification of Competence. By doing so neurosurgery became the second specialty to establish standards for its practitioners (ophthalmology was the first). In 1947, the neuroradiologist Arthur E. Childe (Fig. 4), a world authority on intracranial radiological localization, left the Montreal Neurological Institute to practice in Winnipeg. The relocation of such a noted specialist made Winnipeg
a most attractive location for a new and upcoming neurosurgeon. Childe was an honorary member of the Harvey Cushing Society, which has since expanded to form the American Association of Neurological Surgeons. In 1948 prefrontal lobotomies were performed at the two provincial mental hospitals in Manitoba: by Drs. Waugh and Cameron in Selkirk and by Dr. Harold Evans, a general surgeon, in Brandon.

**Reminiscences of the Author 1950 to Present**

In 1949, trained neurosurgeons were still a scarcity throughout Canada. From Winnipeg, one would have to travel 1200 miles to the northwest to Guy Morton in Edmonton. It was decided that a qualified neurosurgeon should be recruited to Winnipeg and in 1950 I arrived, well trained but naive. Drs. Waugh and Cameron were most supportive. I was verbally promised a small salary from the Veteran’s Administration Hospital and the opportunity to create a university-based neurosurgical center. On my arrival however, I was greeted by the interviewer for the Veteran’s Administration Hospital who determined that although I had served from Normandy beach to the Elbe in World War II, I had been in the wrong (that is, the United States) army, and I was ineligible to be on the staff. The neurosurgical appointment instead went to Dr. Cameron, a safe choice in that he had not served in any army.

At the time I arrived there were approximately 1000 patient beds distributed throughout the WGH and the adjoining Woman’s Pavilion and Psychiatric Hospital. There was one Physician Superintendent to cover all the units. He was paid a pathetic stipend offset by a lovely dwelling located on the parking lot, now the site of the Basic Sciences Building.

Patients’ financial responsibility was determined at the admitting office. Indigency had little effect on patient status; those unable to pay received the same care as all others but did not receive hospital or physician bills. Those forced to suffer from the costs of medical treatments were the modest income families with pride. In response to their circumstances the surgeons did their utmost to save on sutures, tape, dressings, the number of confinement days, and other items, knowing that each would be billed to the patients.

The University of Manitoba Medical School, situated next to the casket factory, had remained physically unchanged since 1922 (Fig. 5). The school’s administration was conducted by one Dean, Lennox Bell, who had no assistance other than a dedicated, efficient secretary. Bell supplemented his Dean’s income by also performing the duties of a Professor of Medicine. In those days teaching ethics was not considered necessary. The Golden Rule sufficed and malpractice insurance was $25 per year.

The WGH in 1950 was unchanged from that constructed in 1911 (Fig. 2). Some members of the senior staff still made Sunday rounds in striped trousers and formal cutaway coats. The nurses, who were dressed appropriately, were easily distinguished from the visitors and most of their 12-hour days were spent looking after patients. The nurses at the WGH made rounds with the staff physicians; one superintendent of nurses made daily ward rounds. The operating room was located between the east and west wings beneath a huge sloping glass roof that provided good illumination but unbearable heat in the summer (Fig. 2).

Daily 20-mile consultation rounds were undertaken from the WGH to St. Joseph’s Hospital (now defunct), Children’s Hospital (at that time located on the river; Fig. 6), Concordia Hospital, St. Boniface Hospital, Victoria Hospital, Misericordia Hospital, Grace Hospital, and occasionally to the municipal hospitals (where patients with infectious diseases were placed). It was evident that the
provincial population totaling approximately 1,000,000 then and now was sufficiently large and diverse to support a good training program. Concentration of specialties in one center would provide optimum training of staff and avoid the costly duplication of materials and personnel. It was proposed that, because of its proximity to the medical school and the presence of neuroradiologist Childre, the neurosurgical center should be at the WGH. This proposal met with the overwhelming approval of one hospital of eight. Each hospital wanted to exert proprietary rights: “their” patients should be operated on in “their” hospital. The neurosurgical service still wrestles with this schism; although St. Boniface Hospital and the WGH lie across the river from each other, both continue to demand and develop excellent but duplicate services and equipment.

As I began my career at WGH, I was met by the curious situations that crop up at particular hospitals. At first it was puzzling to find that cases slated for elective neurosurgery sometimes disappeared from the slate. Also noticeable was the fact that one particular senior general surgeon was always the replacement and that he also used a “John Doe” name to keep bookings available for admission. This led to a very unpleasant but necessary confrontation that solved the problem as far as the neurosurgery bookings were concerned.

Soon after my arrival in Winnipeg, I was approached by senior staff members of the WGH and Children’s Hospital regarding a building fund. The plan was to join together a new Children’s Hospital with a new wing at the WGH to share facilities and reduce costs—the embryo of the future Health Sciences Center (HSC), which was incorporated in 1973. The St. Boniface Hospital across the river copied the proposal with their own building program. The amount to be pledged was based on the length of time the donor was expected to live to enjoy the facilities, hence I was assessed the largest pledge from both hospitals. Because I had no money at all it was agreed that my payments could be stretched out over 5 years. The only coercion used to obtain my pledge was the suggestion that it might be difficult for me to get patients in or out of the hospitals if I did not sign. Over the ensuing 5 years a Section of Neurosurgery was developed under the Department of Surgery, and it was concentrated at the WGH. When my ransom was paid off, however, St. Boniface brought in a succession of three well-trained, skillful neurosurgeons for their facility. Unfortunately, these surgeons were unsuccessful in their Fellowship examinations although they went on to successful practices in the United States. The Royal College Fellowship examinations differed from the American Board examinations to the extent that the former emphasized general surgery with neurosurgery as a subspecialty. Subsequent staff members were not conscripted to participate in the building fund.

Although built within a few feet of the WGH, the new Children’s Hospital refused to be connected to the WGH and consistently declined to share the facilities and services originally promised, primarily neurosurgery. Eventually the two hospitals were connected by a tunnel. Today economic realities dictate progressively greater sharing of facilities.

In 1956 Javid of Madison, Wisconsin introduced the use of urea to reduce intracranial volume, an enormous advantage in elective and trauma surgery.

During the 1950s, there existed a physician-owned and operated Manitoba medical insurance scheme, which covered a large percentage of the population. This medical plan contained an arrangement whereby one-third of the surgeon’s fee was allocated to the referring physician, provided the surgeon signed a statement that the referring physician’s presence was necessary in the operating room. If the surgeon did not sign the statement he was unlikely to obtain any more patients from that source. Although the plan was not universal, the practice was widespread and a clear case of financial inducement for referral. If the referring physician actually appeared at the operation, which was rare, he would displace a resident or intern. When I uncovered this arrangement, I protested, naively believing that there would be universal support for changing the system. (After all, many surgeons in private would matter that they would rather pay to keep the referring physician out of the operating room.) I proposed that a motion be made at the 1951 Annual Meeting of the Manitoba Medical Society to have that form of financial inducement abolished in the provinces. It was only proper that the referring physician sign his own affidavit for charges to the insurance scheme as did doctors for all other procedures. Also, any payment to the referring physician should come from the general fund rather than from the surgeon’s fee. Responses to my appeal ranged from the immediate and enthusiastic support of a few, to stalling and committee formation by the Manitoba Medical Association Section of Surgery and an official threat from the local general practitioners to run me out of town if the motion was introduced. The following year the motion was introduced and passed by a show of hands and the coercive procedure virtually ceased. Later it came to my attention that about 30 years earlier, Loyal Davis, President Ronald Reagan’s father-in-law and a prominent Chicago neurosurgeon, had encountered a similar scheme and reacted in a similar fashion resulting in identical threats.

In spite of strong opposition from some sources that the province did not need a neurologist, Dr. R. T. Ross arrived at the WGH in 1953. Well trained and dedicated, this physician’s skill and knowledge provided an enormous boost to the teaching and practice of both neurology and

**Fig. 6.** Children’s Hospital as it was in 1950 on the banks of the Red River.
neurosurgery. Dr. Rankin Hay, who arrived from Montreal in 1957, was successful in his examinations and added tremendously to the fabric of Manitoba neurosurgery, particularly with his manual on head injuries. In 1958, Norman Hill was successful in his examinations and elected to remain at the WGH as a member of the neurosurgical staff. Hill enjoys a distinction no other neurosurgeon is likely to achieve: he caught the winning touchdown pass in a Grey Cup Final, Canadian football’s Super Bowl.

The residency program at Winnipeg enjoyed continued approval from both the Royal College of Surgeons of Canada and the American Board of Neurological Surgery. The neurosurgery autopsy rate never fell below 80% and rarely below 90% at the HSC (formerly the WGH, Children’s, Maternity Pavilion, Psychiatric Hospital, Rehabilitation Hospital, Cancer Center, Medical School, and so forth). All nine residents who completed the Winnipeg program from 1958 to 1980 were successful in their examinations in either Canada or the United States or both. Several additional residents rotated through the program preparing for other specialties such as orthopedics or general surgery and others came for refresher experience or for various reasons choosing not to take the complete course. Among those residents are a university president, two medical school deans, the president of a provincial medical association, a past president of The Congress of Neurological Surgeons, and two Canadian Department of Surgery heads.

The 1960s

Early in 1960 the neurosurgical section borrowed an operating microscope from the otolaryngology department. The microscope provided us with the enormous advantages of coaxial illumination, magnification, and simultaneous viewing for the surgeon and resident.

In conjunction with Dr. Childs and the Picker X-Ray Company, we described stereoscopic anteroposterior and lateral serial angiography with a single injection. This procedure reduced angiogram morbidity and increased the diagnostic value of the study.

In 1962, thanks to the excellent cooperation of the Department of Pathology under Dr. Don Penner, who allowed me access to many cadavers, I presented the detailed anatomy of the cavernous sinus, explaining how some fistulae persist even though trapped (unpublished data). Shortly thereafter, with circulatory bypass procedures and arrest under hypothermia at 12°C provided by a team consisting of Walter Syslak, Lawrence Whytehead, and Allan Downs, we were able to close several trapped but persistent fistulae. After this, the first carotid cavernous fistula was repaired with preservation of the carotid.

Canadian Medicare (universal coverage for all Canadians) was introduced in 1969. The HSC agreed that part of the money from nonreferred surgical patients would be allocated to a fund for the library, residents’ trips to meetings, and stipends for visiting professors. For years following this decision, the fund brought world-renowned neurosurgeons from three countries: Guy Odom, Robert Rand, Bob McLaurin, Edwin Foltz, Don Long, Hans Pia, Ayub Ommaya, Louis Bakay, Brian Jennett, and Don Becker. Resident rounds were expanded and their educational benefits increased, as they were attended each week by a neuropathologist, neuroradiologist, and neuroradiologist, and by some of the nurses. When joined annually by a visiting professor a 3-day program was accredited for continuing medical education. (Surreptitiously, some surgeons began shifting nonreferred patients to referred status, thus making themselves eligible for the entire fee. This fraudulent activity became gradually accepted as the norm and for the past 10 years or so there have been no visiting professors of neurosurgery.)

The 1970s

Serinenko of Moscow, in 1970, demonstrated his ability to guide a balloon-tipped catheter through the circle of Willis.

By 1970 the desirability and feasibility of organ transplantation was becoming increasingly apparent. Canadian law forbade removal of organs from living persons yet there was general agreement that it was humane, ethical, and directed toward the greatest good to remove organs for transplant once the brain was past the point of no return. This agreement was based on the provision that the next of kin was informed and agreed to keeping the patient’s circulation and respiration active by artificial means until the organs could be retrieved, after which the patient would be allowed to die. It seemed a logical advance to change the law to accommodate this reality. Instead, the definition of death was changed. The concept of “brain death” became a reality. This characterization was vigorously opposed by several neurosurgeons, particularly Lars Leksell (personal correspondence, 1983) who not only disliked the semantic distortion and the debasing of science, but feared the lawsuits that might ensue if there were more than one category of death; even two times of death for the same individual in some instances. With no neurosurgical consultation, Manitoba became the first and possibly the only province or state in which after consultation with two or three neurologists, a time of death could be stipulated on a death certificate before organs were removed. By law, the patient was dead as of that moment. Organ removal and “real death” might take place many hours later but were not recorded on the death certificate.

In 1970 at the height of the dispute concerning the safety of disease (chymopapain) in the treatment of protruded discs, I was approached by representatives of the United States Food and Drug Administration, Baxter Laboratories, and organized medicine in the United States to run a control series to examine the safety of this drug. It was found that the catastrophes that had occurred were attributable to improper usage or inadequate handling of anaphylactic responses. The benefits remained debatable but dramatic in some selected cases.

For some time the Royal College of Canada had been embarrassed by the double standard of qualification, Fellowship versus certification. Certification was originally granted to all physicians who declared themselves specialists and restricted their practice accordingly; certification could thereafter be obtained by lesser examination or a lesser grade on the Fellowship examination. Neurosurgery in Canada dropped the lower standard certificate early in the 1950s arguing that there was no place for second-rate neurosurgery. Certificants could continue

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with whatever privileges they had or take the Fellowship examination. In 1972 the Royal College of Surgeons solved this embarrassment by offering the Fellowship Degree to those currently holding a certificate for $500 and a supporting statement guaranteeing that the recipient was of good character and the like; following this the certification examination was discontinued.

From that time on there was to be but one standard, the Fellowship. This proposed degree sale was strongly opposed by myself and many other specialists but was nevertheless implemented. The sale option was accepted by virtually 100% of the certificate holders, considerably enriching the coffers of the Royal College.

An important event for the WGH was the arrival of Derek Fewer, who coauthored a book on gliomas with Charles Wilson, in 1973. Fewer brought with him his expertise in transphenoidal surgery.1

In the mid 1970s resident recruitment to neurosurgery was suspended without warning, explanation, or enlightenment, causing deleterious results to the training program. Eventually it was discovered that the cause for this fiasco was the department’s annual report, considered too brief (approximately two pages) by some assistant or associate dean of medicine (of which there were now several). It was suggested that the Department of Psychiatry’s report of 30 or so pages should serve as a model. A Mayo Clinic report of just under two pages was submitted as a possible model but to no avail. Only receipt of a well-padded 20-page report was finally acceptable.

In 1976 I was given a part-time secretary and an office in the Medical School. Prior to that time all correspondence for the Section of Neurosurgery was handled and paid for by my private office. That year we developed a simple technique of intraoperative serial angiography, providing immediate angiographic evaluation without disturbing the operative field, an enormous aid in cases of fistula, bypass, arteriovenous malformation, and even saccular aneurysm.7

The 1980s

After the operating privileges of a very young Manitoba Professor and Chief of Surgery had been revoked in 1981, a few surgeons discussed the advisability of having competence replace age as the regulatory criterion for continued hospital privileges. As I was approaching mandatory retirement age and was thought to be quite competent it was decided I should challenge this University and Hospital regulation. The challenge was contested all the way to the Canadian Supreme Court with no medical staff present at any of the trials. Third-hand reports indicate that the hospital administration argued that a regulation governing mandatory retirement age was the only safeguard they had to protect the public from incompetent physicians. The Court apparently paused and asked that the argument be repeated. After another pause the judges asked if the administration meant that an incompetent at 45 years of age would be allowed to continue until age 65. The argument carried little weight (several Supreme Court judges were over 70) and the battle was won. The victory allowed me the opportunity to continue earning, an important option because there were no pension provisions at that time. However, the administration won the war by removing me from the call rotation (the source of approximately 50% of my income) and restricting me to one-half operating day per month. Despite this setback, I am happy to say that competence is now scrutinized more keenly and age is less of a consideration.

In the late 1980s a careful study by one of our residents indicated that observing the head-injured patient might be just as reliable as studying the pressure recordings. In spite of this many local physicians insisted that “their” head injuries, even obviously mild ones, should have scrupulous monitoring, often arranging transfer to another hospital where this would be done. The Professor of Surgery, Allan Downs, put a stop to these transfers from the HSC. Today the use of intracranial pressure monitoring increases and decreases in direct proportion to the neurosurgery available.

The Surgeons’ Lounge off the operating rooms was a place in which a surgeon could safely and comfortably discuss his problems. A quote made to me by Leonard Malis is most appropriate: “Never join the staff of a hospital that does not have a separate doctor’s dining room” (L. Malis, personal communication, 1988). Both lounge and dining room fell victims to the discrimination scourge in the late 1980s.

An Extended Look Backward

Over the years our neurosurgery service has been exceedingly fortunate with a series of dedicated, highly intelligent, and capable operating room nurses starting with Dolly Gemby, through the Grabowski sisters, to the present Misses Brock and Brosniak. Cooperation and support from all departments and sections has been outstanding.

Of the students who rotated through the neurosurgical unit, ten elected BSc. Med. neurosurgical projects, two went on to obtain doctoral degrees, one, Michael West, later joined the staff bringing with him considerable research expertise and the other, Marc Del Bigio, recently changed his interest to neuropathology.

Numerous informal visitors—neurosurgeons, anesthetists, and radiologists—toured the HSC to observe our work in arteriovenous malformation, intraoperative angiography, and cavernous sinus surgery. Exposure to these visitors as well as to invited visiting professors provided our residents with opportunities for rich interchanges of ideas and contacts that would benefit them throughout their careers.

Speaking invitations and visiting professorships over the years have come in increasing profusion from many states and countries as Manitoba has taken its place in the tapestry of world neurosurgery. Millions of dollars have been spent in building new facilities at the HSC complex, reportedly the largest health-care amalgamation in Canada.3 Hundreds of new beds have been added but somehow the total number in the complex has remained at or just below the original 1000. The number of administrators and hospital offices, on the other hand, has increased by an unknown factor. (Somebody’s law.) Basic science, laboratory, and research space has increased greatly. The adoption of imaging scanners has enormously advanced the science and volume of the Section of
Neurosurgery, but the declining use of angiography has had a few negative features; the occasional missed traumatic aneurysm for instance.

Dr. Rankin Hay took over as acting Chief of Neurosurgery in 1983 as I reached the age of 65. With the presence of Dr. Garnette Sutherland and his research, meritorious citations and the constant interchange of visiting scientists and visits to other centers will continue.

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