

Goose Quills and Burr Holes

FRANK TURNBULL

One of the hazards of advancing age is the temptation to repeat old stories, but the worst that can happen is to forget.

"Happy moments come and go, our friends die, everything is in the end destroyed, but this could be endured if only a purer and sharper reflection were kept. If there is anything that we save and hoard up it is our memories. All the substance of our life is in them." (Brennan, 1975).

An interesting exercise in memory is to try to recall why you decided upon a career in neurology or neurosurgery. The initial decision is one of your life's great watersheds, as important as deciding to get married, or where to practice. If one happens to be the son of a doctor, a career in medicine is easy to contemplate, but there has to be a special stimulus. My father's stories about Queen Square were the stimulus for me. Before he married in 1902, he took two post-graduate trips to England and Germany. I have never been able to fathom what persuaded a doctor from a small town in Western

Ontario to attend lectures at Queen Square in the eighteen-nineties. The message that came through to me was the sheer brilliance of those London neurologists, William Gowers, Hughlings Jackson, and Risien Russell, who was the star performer from the Canadian viewpoint. Here was something that could make medicine an exciting career. I never had any reason to regret that I followed that star.

At the University of British Columbia in 1922 I chose to write my graduating thesis on "The Nature of the Nervous Impulse". There was scarcely any literature on this subject in the University of British Columbia Library, so I got my material at the Carnegie Public Library in downtown Vancouver. Fortunately for posterity I have been unable to locate a copy of that essay. I recall that I built my arguments for a biochemical mechanism around the work of Noguchi, who had demonstrated that nervous tissue required oxygen for survival. There was a report in 1921 by Gasser and Newcomer about the electrical signs that constitute the action potential of nerves, which had not come to my attention. Drs. Erlanger and Gasser of Baltimore followed this lead with a long and intensive study of the electrical signs of nervous activity, for which they received a Nobel prize.

That should have taught me to be chary of speculation, but in my final year in medical school at Toronto in 1927 I was persuaded to write an article for the University of Toronto Medical Bulletin. It was entitled "The Etiology of Pernicious Anemia" (1927). I had become intrigued with a type of anemia that was quite prevalent in northern Manitoba, which simulated pernicious anemia, and was caused by the ingestion of a

fish tapeworm called *dibothriocephalus latus*. In 1926 Minot and Murphy published their observation that a diet of food rich in complete proteins and iron, particularly liver, could bring about a prompt remission of pernicious anemia. Their subsequent work established that the essential factor in pernicious anemia was the lack of a substance that was present in liver. They also received a Nobel prize.

In 1938 I read a paper to the Harvey Cushing Society on percutaneous carotid arteriography. It was a pioneer effort, but what is noteworthy in my memory is the response of the Society to one of my slides. I showed an unusual picture that had been taken after one of my injections, and suggested that it represented an anomaly. No one recognized that we were looking at a normal vertebral angiogram. Several years earlier Professor Moniz of Lisbon had published an illustration of a vertebral arteriogram (obtained by surgical exposure of the subclavian artery) in a French journal, but the word had not yet reached American neurosurgeons. Dr. Moniz received a Nobel prize in 1938 for his introduction of cerebral angiography.

These three experiences had a conditioning effect. While I was President of the Canadian Medical Association in 1964 I sometimes wondered whether the Nobel committee for the Peace prize was looking over my shoulder, anxious to determine if I was going to be able to establish a truce between Government and Medicine.

Plans for a career in neurology were abruptly changed while I was a senior in medicine on the neurological ward at the Toronto General Hospital in 1929. Neurology appeared to me to be in the doldrums as most stimulating cases were being transferred to

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neurosurgery. After a disagreement with one of my seniors about the management of a case of subdural hematoma, I decided to switch my allegiance to neurosurgery. Up to that time Dr. Ken McKenzie had no resident, but he was thinking about the possibility. After I spoke to him he consulted with his friend, Dr. Ed. Gallie, who had just become Professor of Surgery at the University of Toronto Medical School. Dr. Gallie had well-formulated ideas about the proper training for a young surgical specialist. My whole subsequent post-graduate course was laid out with his assistance during one evening at Ken McKenzie's home.

When I started working with Ken McKenzie (Fig. 1) in 1931, the scope of neurosurgery was still rather thin. During my year on his service he treated about twenty brain tumors, a few spinal cord tumors, half-a-dozen trigeminal neuralgias, a few cases of osteomyelitis of the skull and brain abscess, and not much else. Ken was a master of the precise Cushing technique, and was always on the lookout for new technical ideas and instruments. He used to rummage around the instruments of other surgical specialities to see what might be adapted for neurosurgery. One day he returned triumphantly from a trip

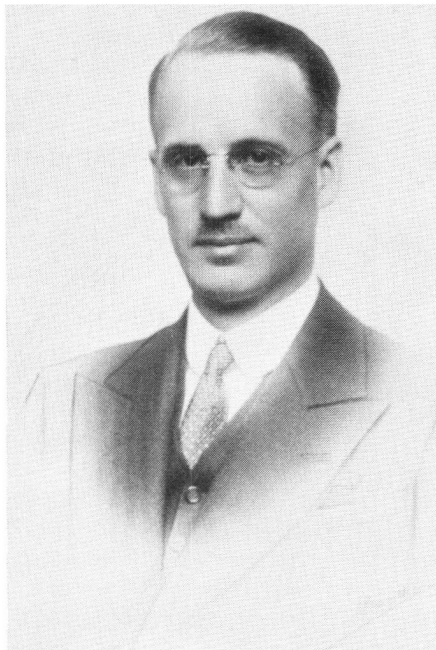


Figure 1—Dr. Kenneth McKenzie

downtown with a pair of long shears that were designed for nipping nails from shoes. This instrument was found to be ideal for cutting off spinous processes. He had designed a practical clip-holder for the Cushing silver clips, and now was trying out a special long clip for use during lobectomy for glioma. If difficult cases did not do well he was apt to disappear for a few days to refocillate his wasted spirits. I would learn from his secretary that he had gone off fishing, or up to the old homestead to console with his father, a country practitioner.

One cold wintry day with about a foot of snow on the ground he surprised me by asking if I would like to borrow his car that evening and take my wife for a little trip. This was the first and last time that he acknowledged that I was married. He told me that he had permission to obtain the brain of a former patient who had just died in Barrie, about 60 miles north of Toronto. He wanted me to drive up and remove the brain in the undertaker's parlor. So Jean and I set out for our trip to the country, with a big jar of formalin and a saw in the back trunk.

In the bottom corner of his photograph Ken has written: "good hunting, Frank". What he meant by that was: "may the fates bring you plenty of meningiomas".

In the Spring of 1932 Ken took me to a meeting of the Society of Neurological Surgeons in Boston. That provided my introduction to Dr. Harvey Cushing. During the meeting Dr. Cushing removed a convexity meningioma under local anesthesia, with the whole Society sitting in the gallery. I recall two incidents during the operation. The operating-room orderly was Adolf, an acromegalic, who carried a big wad of gauze between his teeth in place of a mask. He spied a fly, picked up a huge fly-swatter, and began to silently stalk around the room. The audience held their breath. Finally the fly lit on the back of the Resident, who was acting as instrument man. With one mighty blow the fly was exterminated. Because the operation was being conducted under local anesthesia the O.R. was very quiet. The Resident tossed a pair of forceps into a pile of

instruments, and caused a loud clang. Dr. Cushing looked up sadly and said: "The patient should never know by any sound that he is in the operating-room".

After the operation I was ushered into a tiny side-room to meet Dr. Cushing (Fig. 2). He had not taken off his gown or gloves, but was seated at a table drawing the operation. That was a practice that I followed consistently for about 20 years. I do not know why I abandoned it, because it was always a priceless addition to the surgical report.

En route to Queen Square, London, in the Fall of 1932 I stopped off in Montreal, where the Institute was under construction, to greet Dr. Wilder Penfield. Dr. Penfield gave me a letter of introduction to Professor Otfried Foerster of Breslau. Since 1930, when Dr. Foerster had served as Visiting Chief at the Brigham Hospital in Boston with Dr. Cushing, several Americans, notable Percival Baily and Wilder Penfield, had worked in Breslau with Foerster. They were all stimulated by the experience.

In London I found that my helpmate as clerk with the Gordon Holmes team of Holmes, Riddoch, and Symmonds, was Arthur Elvidge from Montreal. Arthur and I, in addition to our training in neurology, used to sit in the gallery of the operating-room to watch Sir Percy Sarjeant, a protege of Sir Victor Horsely, perform. I have seen a few very fast neurosurgeons at work in America, but the fastest man I ever witnessed in the operating-room was Sir Percy. He had to work fast because there was no blood for transfusion. After every operation his small hand-saw was sent out to Downe Bros. to be re-sharpened.

He could complete a pituitary operation by frontal flap in ½ hour. One day, as his hand-saw was flashing across the skull he happened to look up and spy Arthur and myself in the gallery. He stopped for a moment and said: "There, you Yanks, that puts the late lamented Professor Gigli into a cocked hat". Sir Percy Sarjeant died from pneumonia in January, 1933. During the interval before I left for Breslau at the end of March, no patients survived the trip to the Queen



Figure 2 – Dr. Harvey Cushing

Square operating room. Sir Percy's technique was not successful for slower surgeons.

One wintry day we noticed the hall porter at Queen Square struggling out the front door with the bust of Hughlings Jackson in his arms. Wilder Penfield was outside holding a taxi for the bust, which he intended to have duplicated so that a replica could repose in the amphitheatre of the Neurological Institute in Montreal. In later years I always forgot to ask Wilder whether it was his custom to genuflect, or whether he just gave a knowing wink as he passed the Jackson effigy each morning.

Everyone who had the privilege of working with Professor Foerster (Fig. 3), even for a few months, came away with a new feeling about neurosurgery. He had amazing energy and zeal for his job, able to work not only all day in the operating-room, his laboratory, and the wards, but also able to sit up half of the night in animated conversation. This was combined with an unusual capacity for extracting scientific data from clinical observations.

All diseases of the nervous system, and operations thereon, seemed to be regarded by him as physiological experiments.

My wife and I arrived in Breslau in troubled times when Hitler had just come into power. A new Neurological Institute was being constructed in Breslau on the same sort of Rockefeller arrangement as the Institute in Montreal. Foerster's first assistant was Dr. Ludwig Guttmann. A special research suite was being constructed for him in the new Institute. But the week that I arrived poor Ludwig, a Jew, received official notice to move out. It was a loss for Germany, and a gain for the world. As many of you know, Sir Ludwig Guttmann retired last year as Chief of the Stoke-Mandeville Spinal Injuries Centre, the unquestioned world authority on paraplegia.

On our way back to Canada we stopped off for a few days in Paris, and I had the good fortune of seeing both Thierry DeMartel and Clovis Vincent operate. The Society of British Neurological Surgeons was meeting in Paris, and DeMartel demonstrated his pioneer method of operating for cerebellar tumor with the patient sitting up. I was not close enough to size up all of the details of his special table, but from where I sat it looked like a converted dental chair. After my return to Vancouver a month later, it did not take long to find an abandoned

dental chair. By erecting a post from the foot-piece we had an elegant apparatus that served its purpose for about 15 years. I was interested to meet Clovis Vincent because his career had been so parallel to that of Otfried Foerster.

He had served as a distinguished neurologist during World War I, then switched to neurosurgery in civilian practice, and had a short visit to the U.S.A. to visit Dr. Max Peet at Ann Arbor. During World War II Colonel Harry Botterell and I paid a brief visit to the American Army Neurosurgical H.Q. in Paris, shortly after the liberation. Colonel Eddie Kahn took Harry and myself for a visit with Clovis Vincent. He looked old and tired. Throughout the war he had lived in his hospital and had done heroic work for the underground. In honor of our visit he performed an operation for trigeminal neuralgia, following Max Peet's technique. The Germans had allowed him to continue civilian neurosurgery, but had stripped the hospital. There were no more than a half-dozen instruments on the stand, and the drapes consisted of three tiny face-towels.

There was no committee of welcome on hand at the Vancouver General Hospital in the summer of 1933. My predecessor was a competent general surgeon. During the year that I spent

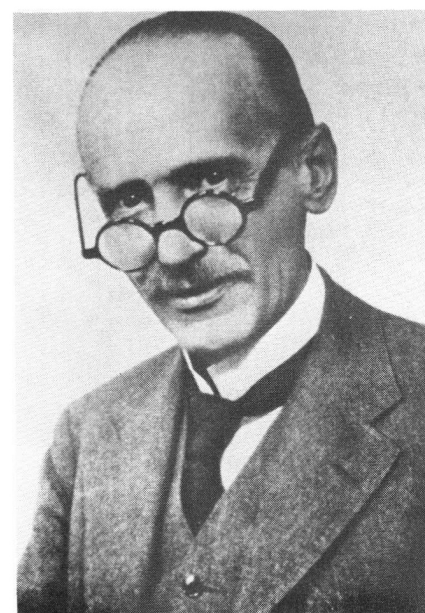


Figure 3 – Dr. Otfried Foerster

abroad he prepared himself for neurosurgery by a two-week visit to the newly opened Montreal Neurological Institute. Shortly after I arrived he proposed that we should work as a team. I explained that I had been taught to operate without expert assistance. He consulted with his colleagues, and was advised to sit back and watch Act I unfold. We remained good friends.

It was a widespread impression among medical men that brain tumors were a rarity and that operation for brain tumor offered little chance for survival. It was difficult to understand at first why so few brain tumors were brought to my attention, but when I consulted the Provincial Vital Statistics the chief reason became apparent.

The actual frequency of brain tumors in a large population was a well-known figure — 1.34%. When this percentage was applied to the total mortality in British Columbia for 1933, it was evident that 253 people had died in the province that year with a tumor of the brain but the cause of death was attributed to brain tumor in only 64. It appeared that in many cases the possibility of brain tumor was not entertained after weeks or months of observation, or even when the tumor caused death. That observation was published in the local *Medical Bulletin* in 1935, along with a discourse about the early diagnosis of brain tumors. I suppose that young neurosurgeons all over America were doing the same. It was of no avail to be prepared to operate for tumor if your colleagues never suspected their presence. A partial index of success may have been evident in a report about the mortality rate in operation for brain tumors at the Vancouver General Hospital in the year 1940 (Turnbull, 1941). In that year there were 33 verified brain tumors, of which 25 were treated by major operation. It was still necessary to point out that the proportion of patients who were admitted as a forlorn hope in the terminal stages was almost as large as it had been seven years previously.

In those years there was another trap-door through which patients slipped away. Vancouver was not a medical Mecca in the early thirties.

The only stream of patients that reached the city from outside was a continuing flow of injured loggers who came by ship from up the coast. There was a constant trickle of neurosurgical patients from Victoria to Seattle, and from the Okanagan and Kootenay valleys down to Portland and Spokane. From the viewpoint of a young neurosurgeon, British Columbia was a leaky sieve. The neurosurgeon in Seattle had published an article about epilepsy in 1932 (Swift, 1932). He thought that venous congestion arising from obstruction of the longitudinal sinus was a primary cause, and advised that surgical decompression of the torcular herophili would be of benefit in 20%. I could not accept his hypothesis but realized that my colleague across the 49th parallel was a formidable rival. For a number of years I continued to hear about patients who were being treated for trigeminal neuralgia by a wonderful doctor in Portland. His therapy consisted of strict bed-rest and enemas twice daily for two weeks. Much later I learned that the enemas contained arsenic, because he believed that all patients with trigeminal neuralgia had syphilis. This belief was never disclosed to his patients. The treatments did provide some short-term relief, and grateful patients often returned for another course.

During my early career, posterior root section for trigeminal neuralgia provided by far the highest proportion of grateful patients. Nowadays, a small electrolytic lesion is the vogue, and neurosurgeons no longer enjoy the gratification that a well-conducted posterior root section could afford. It could also offer some thrilling moments. The weakest link in the technique that I was taught was the lighted retractor.

On one occasion I was working in a pitch dark room with the lighted retractor, and had just severed the middle meningeal artery after plugging the foramen spinosum. As I then proceeded with the next step of pushing dura off the ganglion, I dislodged my plug in the foramen spinosum. There was an immediate fountain of arterial blood. I suppose that I made an exclamation which caused someone behind me to jump,

and the wall-plug of my lighted retractor was pulled out. When the lights eventually came on I made a surprising discovery. My index finger which I had insinuated into the hole in the dark, was just long enough to reach the foramen spinosum and occlude the artery, like the little Dutch boy with his finger in the dyke. I never had occasion to test the length of my index finger again.

Before the advent of chemotherapy and antibiotics there was always a case of brain abscess in hospital to worry about. The subject of brain abscess was a perennial on the agenda of the Harvey Cushing Society. Everyone was facing the same problem. Drainage was the rule, a procedure that could be frustrating and tedious.

In 1936 I was visiting the late Dr. Rupert Raney in Los Angeles, a neurosurgeon of outstanding ability. I asked him if he had any new tip about brain abscess, and he said: "Have you tried a goose-quill drain. It's perfect". After I returned to Vancouver I had a little trouble locating a goose, but no difficulty finding a patient with a brain abscess.

A goose-quill is an exquisite plastic tool. You pull out a tiny filament that is inside the quill and make a hole at the end just large enough to allow your brain-needle to emerge from inside at the tip. Then you insert it into the abscess, withdraw the brain needle, and leave the quill as a drain. If the proximal end has been softened with hot water you can cut the quill with scissors and make flaps to stitch to the scalp.

When this technique was used for the first time at the Vancouver General Hospital the word had somehow got around. One of the student nurses was on hand with a camera (Fig. 4). This picture of the occasion was lost for 42 years. It just came to light in an old filing case a few months ago. The gentleman on the left is the late Dr. Dave Freeze, our chief anesthetist. I presume that he removed his mask when he saw the camera. Note the nonchalance of the young neurosurgeon on the right, who is about to insert the goose-quill. The nurse in the background who is peering over her mask is Miss K. Sewell, our head operating-room nurse at that time.

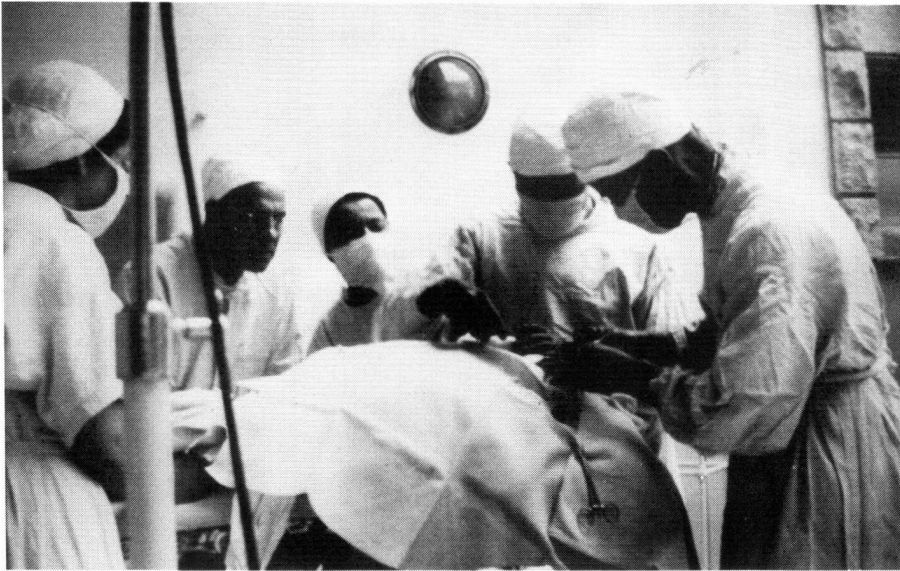


Figure 4 The goose-quill scene

Miss Sewell is retired now, but still a very active lady. The patient was a twelve year old girl, who is now a grandmother.

After a lifetime of neurosurgery you are left with a gallery of patients in your mind's eye. When you stroll around the gallery, recalling triumphs and defeats, the feature of each case which makes the picture vivid is not the diagnosis or the surgical technique, but the patient as a person.

I will close this rambling story with an account of an unique personality, a boy named Duane. He arrived at the hospital in 1938, an 8 year old, with a broken arm and a minor head-injury. Neurological examination was negative. An x-ray picture of his skull showed a calcified mass about the size and shape of a golf ball, in his right parietal lobe. The tumor was removed and proved to be an ependymoma. He made an uneventful recovery, but two years later he returned with a headache. The calcified mass had recurred and was a little larger this time. Once more it was removed and again he recovered without any trouble. There was some calcium left

in the wall of the ventricle, and I was beginning to have some concern about his future. In 1942, at the age of 12, Duane returned for the third time. The calcified mass was back again, now about the size of a Japanese orange. He had choked discs and some weakness of his left side. For the third time the tumor was removed. Post-operative x-rays showed that there was still irregular calcification around the site of the tumor. He was given a course of radiation therapy. His mother, a fine intelligent woman, was told that he had a doubtful prognosis. I had never seen Duane's father, because he was serving time in penitentiary. In 1944, two years later, I expected to hear about him again, but there was no word. Dr. Peter Lehmann had arrived in Vancouver to commence neurosurgery. I was about to go overseas. Before I left, I gave the boy's name to Peter and asked him to be certain to obtain a post-mortem examination if the worst should happen. A few years after the War, Duane turned up with a slight residual weakness of his left leg, having suffered a solitary seizure.

Then he disappeared, but over the years I knew that he must be alive because every Christmas a card arrived with greetings from my friend Duane. This past Christmas the envelope with the card had a return address, a town in the Fraser Valley. It was 40 years since I took out the first tumor. I wrote and asked him to come in and let me see him.

He arrived, a genial man of powerful build, obviously living a contented life. A recheck x-ray of his skull was taken. It looked much the same as in 1942, with the same irregular calcification. He is now running a boy's club, and is a teacher of weight-lifting. He was only prevented from getting on the Canadian team for the last Olympic Games as a weight-lifter, because he tends to stagger a bit with his left leg when he makes the Military Press and stands up. I will leave the moral of that story to my readers.

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