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NEW ENGLAND, NEUROSURGERY AND THE NEUROSURGEON*

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BOSTON

MANY authors have written of the beginnings of medicine in New England, and through their writings we find something of the foundation on which medicine in this corner of the United States was built. We read of the minister-physician and the barber-surgeon in the early days of our colony. The minister-physicians were among the leading men of their respective communities. Theirs was no easy job. They had souls to save as well as lives. Let us not cavil if their theology breathed of hell-fire and brimstone and if the purge was the most frequently employed form of medication. What if they did "breathe a vein" for almost any ailment, and what if the barber-surgeon did use all sorts of curious and revolting things for dressings? Those were the days of angleworm oil, of nanny tea and other archaic medicaments. Some benighted peoples still use curious forms of treatment. Bear's gall bladders, not many years ago, had a ready sale to the Chinese doctors of the Pacific Coast. We can say, "Oh, yes, the Chinese"—but we had quaint customs here at home. I can remember removing a poultice from a carbuncle in my early days—an amateur poultice, to be sure. It was offensive to the nose and to the eye and proved to be a large chew of tobacco.

These early members of our fraternity had learned their medicine in England, but when they came to America they left behind much of the quackery and charlatanism that was rife in England during the fifteenth and sixteenth centuries. Remember that this was a new country and that life was cheap and the way of life was hard. They were pioneers and they cut out the nonessentials.

We read of starvation, of Indian raids, of the various epidemics that decimated the colonies. The worst of their plagues was smallpox, that dread scourge, that stalked through the settlements in more deadly fashion than an Indian war party. Smallpox took its toll of lives time after time

until Zabdiel Boylston, about 1720, read or heard of direct inoculation with smallpox material. He must have been a courageous man, this Boston physician, for he decided to use this new and almost untried method of disease prevention. Many powdered heads were shaken in disapproval, but the experiment was a success. It is an interesting fact that his records of these cases were excellent. His statistics proved the value of inoculation, and his work was accepted here and abroad.

During these years from the establishment of the colonies to Zabdiel Boylston's time we find certain changes in the practice of our profession. The physician continued to be one of the leading spirits of the community. He was prominent politically, but he no longer played the dual role of medical adviser and minister to the soul. We find that medical thought was still dominated by the teachings in vogue in Great Britain, but we find each prominent physician teaching his apprentice or group of apprentices, and also find that many of these young men went to England to complete their education. A few went farther and studied on the Continent. They were independent in medical thought as they were in their politics. They delved into new things in medicine as they explored the terra incognita that lay beyond their settlements. They were still pioneers.

We read of those gallant gentlemen who gave of themselves that these United States should be forever free—names like Warren that have come down from father to son or nephew and still abide on the roster of the Massachusetts Medical Society. We read also of the Loyalists who, devoted to King and mother country, followed the English troops—exiles for their political convictions. We may read between the lines and learn that the doctor of those early days was far more a leader in his community than we are—a man of broad education and interests, looked up to and admired for his good works and his knowledge. There must have been much of sorrow

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and much of bitterness in 1776, for we read that some of the pupils of the beloved teacher, James Lloyd, sailed for Halifax to lead the lonely lives of exiles. Other pupils, the younger and more radical element, donned the blue and buff of the colonial forces. The doctor's life was a hard one. He stood on his own feet, foursquare to the world, and worked out his problems for himself. He had no assistance from laboratory and roentgen ray and all those things that make diagnosis easier for us.

About the turn of the century, while the states were settling down trying to find out what they had won besides independence, the character of medical education changed. Schools were established and the apprentice system was abolished except for postgraduate education. We looked to England for much of our medical lore, but we as a pioneer community developed our own trends in medicine. That word "pioneer" means much in American life. We can be proud that the members of our profession lived up to their traditions and to the trend of their own times. Untrammelled by the taboos of European medicine, they developed along their own lines.

Many tall tales have come down to us of these old days before 1846, when Morton soaked a sponge with ether that the grand old man of the Massachusetts General Hospital, John Collins Warren, might demonstrate that painless surgery had arrived.

Even the small-town doctor did his investigating, and under difficulties that would make us cringe. There are two treasured legends in my own family, one concerning my great-great-grandfather, Ingalls Kittredge. He practiced in Beverly, and it is said he brushed up his anatomy as occasion offered. One rainy night he crossed the bridge which then, as now, connected Beverly and Salem and drove his shay by devious ways to Peabody, where he met certain grave robbers who delivered to him the body of a recently deceased and, we hope, respected citizen of that rather lonely hamlet. On his way home after midnight with the subject seated beside him, he reached the bridge. The toll gate was open and all was dark. A cut with his whip and the horse galloped out on the bridge. Just before he reached the gate the keeper rushed out and slammed it shut. The sudden stop unseated the doctor's gloomy companion, who pitched forward and nearly went out over the wheel.

Old Ingalls Kittredge must have had a strong and dexterous hand as well as an agile brain. He grasped him by the nape of the neck and pulled him back. "Sit down, ye drunken fool!" was his comment. He paid his toll and drove home.

Can we not take this legend to heart? Even if the night is dark and stormy and the way to our goal long, can we not forge ahead to the increase of our own knowledge and the betterment of our service to our fellow men?

Ingalls Kittredge, his son, also was of an investigative turn of mind. One day he had as a patient a man dying with fever. There was a mass in the right side of the abdomen. He decided there was pus present, and to the horror of his associates he cut into the abscess, washed it with clean water from the spring and drained it with clean tow from the center of the bundle. The man lived, else I might not be here, for the good townspeople of Beverly beset his house at the corner of Essex and Federal Streets with a hangman's rope at hand until it was known the patient was out of danger.

So much for the past. We can see a change—a tendency toward specialization if you will—even from the earliest days of the Massachusetts Bay Colony. At first our predecessors combined medicine with political and religious leadership. By the time of the Revolution they had given up their pastoral activities; then other intellectuals gradually assumed political leadership—medicine is a jealous mistress and will not permit a divided allegiance.

Our heritage, together with that of our predecessors in the last hundred years, is a grand one: self-confidence, leadership, the spirit of the pioneer, coupled with the desire to investigate and the will to achieve. They carried it with them in the migration to the West in the eighteen-forties and fifties, those hardy men of New England. From one of them, an obscure army surgeon at Mackinaw, came the brilliant investigation of gastric secretion that made the name of Beaumont famous. It was not only the adventurers who made the trek across the mountains to the plains. Whole families went, and to one of these pioneer groups that settled on the southern shore of Lake Erie we shall turn later for the greatest of the pioneers in neurosurgery—Harvey Cushing.

Neurosurgery has its beginnings in the cloudy past, before the days of history. This is attested by a collection of Peruvian skulls—one of the treasures of the Warren Museum at the Harvard Medical School. It is interesting to learn that then as now the man with the investigative mind might find that someone else had the same thought. In the museum at Copenhagen last summer I saw skulls from the Scandinavian countries with the same four saw cuts, the same holes, made to let out the evil spirit, and in some of them, as in the Peruvian skulls, the patient had survived the ordeal, for new bone had formed around the edge

of the opening. It is interesting to realize that in all ages and among all people the brain has been known as the seat of consciousness. I suppose that Cain learned this scientific truth when he struck Abel; that is, if he hit him on the head. It is even more interesting to realize the depths of our own ignorance of consciousness, the cause of sleep and so forth. We still have many things to learn. However, that is not the point at the moment. The point is that the priest, the surgeon or someone has been opening the skull since before the dawn of history, probably with the idea of curing some mental ill.

Neurosurgery in America can be said to be the offspring, born in lawful wedlock, of neurology and general surgery, with physiology as godfather. It is difficult to state exactly when and where this interesting event took place.

It seems to me that the organization in Philadelphia during the Civil War of an army hospital devoted to the treatment of nervous diseases, both medical and surgical, marks the beginning of the special handling of neurosurgical cases. The men in charge of this project were well suited to carry out the new venture. S. Weir Mitchell was a neurologist and a physiologist, W. W. Keen an enthusiastic and daring surgeon, while George Moorehouse was an able medical man and administrator. The surgical cases treated were almost entirely due to injuries of peripheral nerves. Today neurosurgery is far more engaged with the central nervous system than with somatic nerve fibers outside the cerebrospinal axis.

By 1888 cranial localization and the surgery of tumors had become an important subject for consideration. Reading the transactions of the first meeting of the Congress of Physicians and Surgeons held at Washington in September of that year, we find the record of a symposium devoted to these subjects. Keen and Roswell Park, who were surgeons, took part, as did Charles K. Mills, M. Allen Starr and others, who were neurologists. David Ferrier and Sir Victor Horsley, leaders in physiology and brain surgery, came from England to attend this meeting, and here we see again the close association of American and British medicine. We find also in these transactions the mention of a case of brain damage caused by birth injury reported by William N. Bullard in the February 16, 1888, issue of the *Boston Medical and Surgical Journal*; the operation was performed by Edward H. Bradford.

Let us think a moment of how neurosurgery was handled in Boston at that time and for the next twenty-five years. James Jackson Putnam had been appointed "electrician" to the Massachusetts General Hospital in 1872 and neurologist in

1873. Since that time neurology had progressed, but we find mention of barely a dozen cases of brain tumor in the programs of the Boston Society of Psychiatry and Neurology before 1905. Neurosurgical operations were few and far between, and were performed by the general surgeons at the instigation of and under the direction of the neurologists. However, even then certain surgeons were picked out, or perhaps picked on, by the neurologists to be the operators. As we have seen in the earlier reports, Bradford was one. My father was another. His was an investigative spirit and he delighted in exploring new fields. He obtained from Stone and Webster, then a young electrical engineering concern, a small electric motor, and devised a guarded circular saw with flexible cable which he used to open the skull. I keep the motor and saw as a memento of those early days. We must remember that all surgeons of that day here and abroad had ingrained in them by their predecessors the lesson that one of the prime requisites of surgery was speed. My father had it. Horsley had it. Maurice Richardson had it. With it they combined great deftness and precision. Speed is of great value today, but not so valuable as it was then, for now we have all the modern devices to combat shock and hemorrhage, and anesthesia has become a high art.

I can remember many of those early cranial operations during my work as house officer at the Massachusetts General Hospital, which began in 1906. The commonest was the operation for trigeminal neuralgia—usually the Abbe type, with intracranial section of the second and third divisions of the fifth cranial nerve. My father modified this operation by plugging the foramina with silver amalgam and later with bone wax. I can remember operations for tumor—one in particular, on a patient of Dr. Putnam's, about 1908. We operated in a private hospital on Commonwealth Avenue, and Dr. Putnam's office nurse had never seen a brain operation. She stood between the windows of the room, and as the first incision in the scalp was made and the old T-shaped hemostats were applied, she collapsed on the floor with her head in the basin in which the bloody sponges were dropping. Someone dragged her out, and that was that.

I also remember etherizing while Maurice Richardson operated for cerebellar tumor—big, red-faced, with a rolling gait accentuated by an old Potts fracture, he was a splendid general surgeon. There was no head rest. The anesthetist held the patient's head with one hand and the cone with the other, and the orderly or someone else poured on ether when the cone was held out under the edge of the sheet. I nearly drowned and nearly

etherized myself, and had to have a shampoo afterward. My own first attempts at brain surgery were of the same sort. I followed my masters. Their work was good as measured by the surgery of that day. I assisted Horsley in London for three months. Speed was his fetish. A sweeping scalp incision, four saw cuts with a hand saw, three or four taps of mallet on chisel, and a square of bone leaped out. Then came a rapid enucleation and even more rapid closure, all under a stream of weak bichloride solution. A physiologist, a neurologist, a surgeon, all in one, but trained in the old school of surgery.

What of neurosurgery in Massachusetts beyond the few men I have mentioned? Edward H. Nichols and Frederick C. Lund at the Boston City Hospital and others were doing neurosurgery as it came along. At the Massachusetts General Hospital, Charles A. Porter was working with Walter E. Paul, the neurologist, on peripheral nerve injuries and getting quite a series of cases. Not one of these men considered neurosurgery even as his major interest. The neurologists were doing more than the surgeons, for they were truly specializing in their chosen field and pioneering in the diagnosis of neurosurgical conditions and in some instances in treatment. Others besides Putnam were at work. I learned to know and respect Philip C. Knapp and E. Wyllys Taylor for their studies on the brain. Paul, as stated above, was working on the peripheral nerves, and George L. Walton had already published his important paper on cervical dislocations. I have one of the reprints which the latter gave to my father. Were any one of us to write that paper today there is little that we could add to it except some roentgen-ray pictures.

But at this time Harvey Cushing in Baltimore, Charles L. Frazier in Philadelphia and Ernest Sachs in St. Louis were beginning to develop real neurosurgical clinics. Cushing in particular was limiting his work to neurosurgery and modifying the meticulous, painstaking surgical technic originated by Halsted. Brain surgery requires the utmost in gentle handling of tissues, exact hemostasis and the persistence and ability to carry on for hours if necessary. To achieve this end, one must have a surgical team that is near perfection and every aid in anesthesia, instruments and operating-room facilities that modern science can give. Cushing recognized this fact and also the importance of exact and painstaking localization, with the use of every aid to be obtained from neurology and physiology.

Harvey Cushing came to Boston to become Moseley Professor of Surgery at Harvard and to thrill the world with the till then undreamed pos-

sibilities of cranial surgery. To Cushing, Massachusetts owes its supremacy in neurosurgery for many years. To him came patients from all over the world, and the young men flocked to sit at his feet and learn of his art. For with him, neurosurgery became an art. Surgeon, neurologist, pathologist and physiologist, he combined them all. Let us honor with the highest praise this illustrious figure in our profession who so recently has gone from us.

Let us examine the changes in neurosurgery that the seventy-five years from that first war hospital in Philadelphia to the present time have brought.

The pioneers have led us on from small beginnings to great achievements. Peripheral nerve surgery has become standardized. The surgery of brain tumor is on a firm foundation, and the spinal cord, the pituitary gland, even the ventricles of the brain, are open to inspection and treatment if need be.

What has Massachusetts added to the score since Harvey Cushing gave impetus to neurosurgery in this community?

A neurosurgical service is now an important part of many of our large hospitals. Donald Munro, the son of a gifted surgeon, John C. Munro, has taught us much about skull fracture, and also to seek out and find that elusive and treacherous aftermath of head injury, the subdural hematoma. Gilbert Horrax is following Cushing's lead in the surgery of brain tumor. Tracy J. Putnam left Boston last fall to become the head of the Neurological Institute in New York City. There he is carrying on the brilliant research work that he began in Boston. At New Haven, William German and John Fulton are carrying on the Cushing tradition of investigation and brilliant technical achievement. They received their training here in Massachusetts and as New Englanders we can claim them as our own. At the Massachusetts General Hospital we are busy with our problems in relation to the central nervous system. From a few scattered beds neurology and neurosurgery have grown to the status of independent services with a permanent visiting staff and a group of residents. From less than fifty operative procedures a year we have grown to more than that number a month. In the surgery of the sympathetic nervous system James C. White and Reginald H. Smithwick are exploring untrodden pathways.

The specialist does not spring full panoplied as Pallas Athena did from the head of Zeus. His is a long apprenticeship; not to one teacher as in colonial days, but nonetheless an apprenticeship. He must sweat his way through college and medical school with the others who, like himself, be

lieve that the healing art is the ultimate in service to humanity. Then comes his hospital service, his work in allied branches of medicine and finally his residency in his chosen field. Five full years and perhaps more. Then comes the plunge and he is out on his own.

Cushing's clinic at the Peter Bent Brigham Hospital was the first in New England to educate neurosurgeons, and they are following in his footsteps all over the world. Now there are other groups carrying out the same plan. We find these young men in medical schools in large centers and also in the small cities. Some of them have had hard work to get started, owing to professional jealousy and the desire of some of our profession to do everything in surgery whether they do it well or ill. More have been welcomed as helpers in the field and through their efforts the standards of practice in their communities are being elevated. I look forward to the day when the whole of this country will be covered by men trained in this branch of surgery as it is by the exponents of the other specialties.

Prophecy is dangerous and the prophet is often discredited, but I believe that we can see a bit ahead. The malignant gliomas still defeat us. It is for some new pioneer to lead us out of that hornet's nest. The sympathetic nervous system has yielded many triumphs since Royle's ill-starred attempts to modify spasticity brought it to our attention. Fulton at the Peter Bent Brigham Hospital studied one of these early cases and was quick to see the possibilities of its effect on the vascular system. Smithwick and White have added to our knowledge, and I believe there are great possibilities ahead, including control of pain, the amelioration of hypertension and so forth.

The possibility of the surgical treatment of certain forms of insanity is more than a rainbow. Destructive surgery, it is true, but nevertheless it may be the dawn of a new era in the treatment of this tremendous group of sufferers.

Neurosurgery is ever changing. As it goes forward to these new things, it is setting aside and giving to the profession at large certain things that it called its own not so many years ago. Who does the nerve sutures in our great hospitals today? Not the neurosurgeons: no, indeed. The house officer dealing with severed tendons in the wrist picks up and sutures the median or ulnar nerve as a matter of course. The surgeon caring for a fracture of the humerus cares for the musculospiral nerve, and in the war hospitals of Europe the operating surgeons in the mobile units are repairing bullet wounds of nerves and of the central nervous system.

What lesson may we learn from these facts

which I have brought so sketchily to your attention? Neurosurgery has been and is undergoing a period of growth and expansion, partly on account of research and advance by neurosurgeons in their own field, and partly because of the application in neurosurgery of advances in general surgery, in neurology and in physiology. It is by reason of this continuing advance that neurosurgery is accepted as a specialty in medicine. It is not a narrow, hidebound specialty, but a broad specialty equipped and able to invade that all-important cavity containing the central nervous system and to follow through the body wherever nerve cells send their tendrils. But that is not all. Today the neurosurgeon is going forward as a pioneer, following the precept of all pioneers and blazing out new trails for others to follow. So it is with all specialization in medicine. Specialties will hold unto themselves certain procedures which, because of their inherent difficulties or because of the complicated equipment necessary to carry them out, are not suitable for general use. It would be folly for one not especially trained to attempt the surgery of brain tumor, nor could one of us neurosurgeons in his own office perform the miracles of diagnosis carried out daily by the radiologist. As soon as a procedure becomes standardized and can be applied by the profession at large, it should cease to be held and guarded as a potboiler by the specialist. If he waits beside the trail, nursing his little potboiling fire, he will fall behind his brother pioneers and the profession may lack something which they could use for the betterment of humanity.

These are the thoughts that I would leave with you in these closing hours of the 1940 meeting of the Massachusetts Medical Society. All of us are seekers after truth, and especially for that truth which will benefit the health of our fellow men. Ours is a science, an art and not a business. To apply business methods to medicine either by our own volition or by legislation will impede its advance. By giving of ourselves without stint we shall obviate the necessity of such regulation. Surgery is like a great river ever flowing onward. This river is made up of the waters of many streams, and of these neurosurgery is one. Each stream contributes something to the whole and to the smooth course of the river's progress. Any one of us, in practice, in the laboratory, in a specialty or in any of the many branches of medical science, may come upon some hidden spring to add to its volume. Let us, as members of the Massachusetts Medical Society, seek out these hidden springs and share them with the brethren of our profession, to the end that suffering and sickness be lessened in the world.

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