Invention and Innovation:
The Founders of Neuroscience in Oregon
Table of Contents

Introduction

William Fitch Allen, Ph.D., Sc.D. 1875-1951
By Robert Stone Dow Ph.D., with antidotes added by Charles Conrad Carter, M.D.

Laurence Selling, M.D. 1882-1964
By Charles Conrad Carter, M.D.

Olof Larsell, M.A., Ph.D., Sc.D. 1886-1964
By Karen Lea Anderson Peterson, M.A.

Arthur John McLean, M.D. 1894-1938
By Karen Lea Anderson Peterson, M.A.

John Raaf, M.D., Ph.D. 1905-2000
By Kim Burchiel, M.D., F.A.C.S.

Robert Stone Dow, M.D., Ph.D. 1908-1995
By James Joseph Cereghino, M.D., FANA

Roy Laver Swank, M.D., Ph.D. 1909-2008
By Dennis Bourdette, M.D., FANA, FAAN

Conclusion
The start of neuroscience study at the Oregon Health & Science University occurred with the appointment of William Fitch Allen, Ph.D., Sc.D., as Professor of Anatomy in 1916. The following provides biographical sketches of the later pioneers involved with developing the strong clinical and research commitment of the current departments of Neurology, Neurological Surgery, the Vollum Institute and the OHSU Brain Institute. This fall, President Barack Obama announced the “BRAIN” Initiative (Brain Research through Advancing Innovative Neurotechnologies) to legislate $100 million for the study of the human brain, saying, “We can identify galaxies light years away… but we still haven’t unlocked the mystery of the three pounds of matter that sits between our ears.”

OHSU is at the forefront of solving this mystery.
American neuroanatomists and neurophysiologists were saddened by the death of Dr. William Fitch Allen in Portland, Oregon on April 11, 1951. He continued his research activities uninterrupted until two weeks before his death and completed his final paper during his last week while in the hospital.

While on morning rounds at Good Samaritan Hospital in April 1951, Dr. R. S. Dow, a faculty member of the Department of Anatomy since his medical school days in the 1930s, stopped suddenly in the hall and said to the person with him, “That was Dr. Allen back there.” He went back, they greeted each other as a former pupil and mentor would. Dr. Allen said as Dow was walking out, “Bob, there is a manuscript in my right hand bottom drawer of my desk ready for submission for publication. If I don’t get back to my office, would you please see to it that it is submitted.” Dow reassured him that it would be done, and it was.

Allen was born in Uneonta, New York, November 11, 1875. He was descended from old New England stock and was proud of his relationship to Ethan Allen of Ticonderoga fame. His father was a Presbyterian
minister, and while Dr. Allen was outspoken on occasion in his antipathy toward narrow sectarianism and rigidity in religious ideas, his devotion to the highest standard of intellectual integrity, modesty in all things, and selflessness in his relationships with colleagues and students, made his life an inspiration to those of us who knew him intimately.

He began his university training at Cornell University but transferred at the end of his sophomore year to enter one of the early classes at Stanford University. He was influenced in this by a personal contact with David Starr Jordan while on lecture at Cornell. Here he received a Bachelor of Arts degree in 1900 and a Master of Arts in 1902.

With Professor Jordan and Charles Henry Gilbert, he began an investigation of the blood, vascular and lymphatic systems of cyclostomes and fishes. Six papers, beautifully illustrated with his own meticulous drawings, were published from 1905 to 1913.

In 1906, he was appointed assistant to Jaques Loeb at the Pacific Grove Marine Laboratory. For four years he collected material and managed the routine of the laboratory.

In 1910, when Loeb went to the Rockefeller Institute as director, Dr. Allen became instructor in embryology and comparative anatomy at the University of Illinois. The following year he went to the University of Minnesota to begin an almost 40-year career in medical education and neurological research. He received his Doctor of Philosophy Degree in 1916, his dissertation was on the spinal cord and medulla of cyclostomes.

In 1916, Dr. Allen came to Portland as Professor of Anatomy at the University of Oregon Medical School. He was one of the first full-time faculty members at the school. This institution, roundly criticized in the famous Flexner Report, was able to survive this critical period while seeking to maintain its class A rating. This success was in no small measure due to Dr. Allen’s devotion to research, his own high standards of teaching, and the example of his industry. Allen’s literally constant presence in his laboratory seven days a week, from early morning to late at night, was a habit he carried throughout his life. Hundreds of anecdotes are illustrative of his single-mindedness and unpretentious habits of living. He rode his bicycle to the foot of Marquam Hill, the site of the Medical School, for many
years, walking up the wooden stair steps to the top of the hill. After being hit by a car, he finally gave this up to mingle with students and clinic patients in the streetcar, his familiar lunch pail in hand. “Pop,” as he was affectionately called by all, enjoyed telling the stories of his absent-mindedness, often recounting that he left his umbrella and lunch pail so frequently on the streetcar that the custodian would have already reached for them without question on his frequent appearance at the Lost and Found Department of the local Traction Company.

Another favorite antidote reflects his unpretentiousness of behavior and appearance. He was often dressed in a janitor’s smock because of his daily care of his dogs. A freshman student, not having had a Dr. Allen lecture yet, was having difficulty with a window shade next to his cadaver, so went into the hall and encountered Dr. Allen. Thinking Allen was a janitor, the student asked him to please fix it. He did, then turned to the student and introduced himself as the professor of anatomy and went on his way.

From 1919 to 1929, he used the experimental anatomical methods of Marchi and Nissl. A series of important papers dealing with fiber tracts in the medulla oblongata, efferent paths of the cerebellum and pathways related to respiration, were published in this period. Lorente de No has said that Dr. Allen, while not too well known in this country because of his naturally retiring nature and geographical isolation, was one of the highly select anatomical researchers throughout the world whose reprints were expectantly received in Cajal’s Laboratory during this period.

Dr. Allen’s 7 day per week commitment to his research was not interrupted by holidays. The absence of heat in the laboratory on these days was no deterrence. One Christmas morning, an East Coast dignitary was being shown around the new school and came across Dr. Allen working, as usual, in his lab. The East Coaster remarked on the lack of heat. Dr. Allen agreed, but added that it wasn’t as cold as Thanksgiving.

*By Robert Stone Dow, Ph.D. with antidotes added by Charles Conrad Carter, M.D.*

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Laurence Selling, M.D.
1882-1964

In a time when Neuroscience was in its infancy in this country, Laurence Selling, M.D. was considered the most capable clinical neurologist in Portland. His father, Ben, (1853-1931), arrived in Portland circa 1862 with his family and gained a reputation as a businessman, philanthropist, civil rights advocate, and politician. Oregon historian E. Kimbark MacColl stated, “…Ben Selling probably gave away more money in proportion to his income than any Oregon citizen since the state was founded.” The man who married his grand-daughter once recalled that any discharged state penitentiary inmate could show up at Ben’s men’s clothing store and receive a free suit of clothes and $30 to start life anew.

To parents of such altruism Laurence Selling was born in 1882. He was open to knowledge all of his life, but formal education included: Portland Academy, a private prep school; Yale University, where he earned his BA degree; and John Hopkins Medical School. One of his teachers at John Hopkins, William Osler, M.D., was considered the Father of Modern Medicine.

While a student under Osler, Wilhelm Conrad Rontgen, who discovered
the x-ray, lectured to the John Hopkins School of Medicine. After Rontgen’s delivery, Selling remembers Osler commenting on the probability that the x-ray would never be a practical clinical test.

After Selling’s graduation from Hopkins, he spent 1 or 2 years in Breslau (now Wroclaw) with the pediatrician Clemens von Pirquet. He was a pioneer in the study of allergy as a cause of disease and his influence may well have motivated Selling’s life-long interest in allergy, triggered by chronic upper respiratory infections being a cause of secondary brain dysfunction.

In June of 1917, with WWI raging, he enlisted in the US Army Medical Corps as a lieutenant, went overseas about 8 months later, and was discharged in May 1919 at the age of 38, as a major.

On returning to his home town he became one of the founders of the Portland Clinic in downtown Portland which now has around 140 doctors scattered among the mid-city and satellite clinics.

His 3rd year medical student spring semester lectures on neurology were considered by the students to be well organized and connected neuroanatomy with clinical examination findings. Because he was always stressed by time limitations due to his medical practice, he would enter the class room on the hour, close his eyes, and pace back and forth in front and deliver an impeccable lecture of which note-taking was difficult because of the speed of delivery. At least one classmate voiced the thought that the lecture had been inscribed on the inside of his eyelids. His commitment to his time schedule was such that he might depart the class while still talking. Classmates closest to the door would follow him out and then return to the class to repeat his end of lecture words.

A former court reporter happened to be in the class of 1948. He was used to taking fast dictation and so was invited to Selling’s home where the lectures were repeated, printed from the short hand, and sold to classmates for a price medical students could afford.

Selling was designated Professor Emeritus in 1947 when the school’s first full time Professor of Medicine took over.

During his later years, in early fall, he would signal Dr. Edward S. West,
biochemistry head, from the classroom door window, then enter the room to provide a welcoming speech.

He gave the graduation address to the class of ’51. Among much wisdom gained in his over 50 years of medical practice he said, “…the vast majority of our patients get well no matter what we do or don’t do, and sometimes very much in spite of what we do.” Professor Selling died in 1964 at the age of 82.

By Charles Conrad Carter, M.D.
 OHSU Department of Neurology
The opening line of a biography written by the late Arthur C. Jones, M.D. (1896-1983) reads, “Education in the Pacific Northwest owes a large debt to Dr. Olof Larsell. The University of Oregon Medical School in particular bears the imprint of his influence. He contributed in many ways to the present high standing of the school and gave of his energy to support higher education throughout the State of Oregon.” And true enough, Larsell was an ardent scholar of history, clinical researcher, professor and a true mentor and friend to students and colleagues. He was born on the 13th of March 1886 in Rättvik, in central Sweden. His first five years were spent on Lake Siljan on the old Larsell family homestead. He recalled trips across the ice in a sled with his grandfather to the old church in Rättvik, a church which was built about 1180 A.D.

When Olof was only two years old, his father, John Larsell, went to America to find a new home for his family. He settled in Tacoma, Washington, and sent for the others in 1891.

Olof’s school days at the old Edison School were interspersed with vacations on the Puget Sound and to the mountains and lakes nearby. After
finishing grade school, Olof went on to study at Vashon Academy on Vashon Island. While there, Olof also managed an electric power plant, which offered educational opportunities outside the classroom. He mastered many technical skills that eventually helped him in his later work in the research laboratory.

A friend of the family urged Olof to go to McMinnville College (now called Linfield College) in Oregon, a natural choice since his grandfather had been a Baptist. Olof spent his undergraduate years in McMinnville and installed the first electric lights in the college in 1907. His major interest among the sciences was biology. He received his Bachelor of Science degree in 1910, and upon graduation, he accepted a position as an instructor in biology.

On the 22nd of June 1911, he married Leo Dorcas Fleming at her home in The Dalles, Oregon.

At the Friday Harbor Marine Biological Station he took two inspiring summer courses, which increased his enthusiasm for biological research. He also became great friends with Dr. William A. Locy, of Northwestern University. Through Dr. Locy, Olof obtained a teaching fellowship in zoology at Northwestern University in 1913. The study of the development of the bird’s lung had been the basis of his master’s thesis. Dr. Locy and Larsell published a joint paper on the embryology of the avian lung in the *American Journal of Anatomy* in 1916.

In the summer of 1913 and 1914, Larsell took courses in neurology at the University of Chicago under Dr. C. Judson Herrick. They developed a fast friendship, which influenced Larsell’s later research. He returned to Linfield for the 1914-15 school year but was offered an instructorship in zoology at Northwestern, where he could also work towards a Ph.D. He accepted the offer, and he and his wife returned to Evanston where he received his Doctorate in Philosophy in 1918. Larsell became interested in the nervus terminalis, carrying him farther into the field of neurological research. Three years of study on mammalian and reptilian material directed his research toward comparative neurology.

Larsell was appointed assistant professor of anatomy at the University of Wisconsin in 1918. The cerebellum had become a determining interest to Larsell while he was in Chicago. He resumed this work at Madison. His
initial paper on the cerebellum of the amblystoma was the forerunner of a long series of work which made him one of the world's authorities on the anatomy and function of the outgrowth of the rhombencephalon. The encouragement of Professor William Snow Miller, authority on the lung, led to resumption of work on the nerve terminations in the mammalian lung. Problems required new technic, and his solution resulted in the first clear exposition of the terminal nerve mechanisms of the lung.

Dr. Larsell had always been interested in medical history. The Medical History Club at Wisconsin sponsored by Dr. Miller, heightened that interest and led Larsell to contribute his first study on the life and work of Magnus Gustaf Retzius (1842-1919), Swedish physician and anatomist who dedicated a large part of his life to researching the histology of the sense organs and nervous system.

Dr. Richard B. Dillehunt, third dean of the University of Oregon Medical School, met with Larsell in Chicago. This meeting led to an appointment as full professor in anatomy at the young school in Portland and Larsell moved his family back to the Pacific Northwest in the spring of 1921. The Larsell's two sons, John, who was born in Evanston, and Frank who was born in Madison, accompanied their parents. Robert was born the next year, in The Dalles, Oregon.

The medical school had been transferred to the new building on Marquam Hill only two years before. It was a fine fireproof building faced with white brick but already overcrowded. All the departments of the school had to be accommodated by the east wing. The grounds surrounding the place had been cleared of woods only a short time before, stumps had been removed by blasting, and there were deep pits in the brown clay which gave the campus the appearance of an abandoned battlefield. A goat was tethered on the hillside where the Dillehunt Hall now stands, and the animal house was just over the edge of the hill. Since there was no regular means of transportation, the University maintained a bus service. The bus was a truck with seats placed along both sides and two steps at the rear, up which the passengers might clamber, or which could serve as perches where late comers might hang when the bus was crowded. Flapping curtains of oiled canvas sheltered the students from the wind and rain, and only those at the rear of the bus could view the passing scenery. The old Marquam Hill road was not the width of the new one, and the gradient varied greatly, while the turn at the
bottom of the hill was so sharp that cars ascending had to start up the first steep grade from almost a dead stop. It was a source of wonder that the bus could negotiate the slope.

Larsell’s first classes were predominantly made up of ex-service men. Dr. Larsell organized new elective courses, one in histological technic which was in high demand, and also took full charge of histology. He at once established his own research, carrying on the work on mammalian lung innervations. A paper on the experimental degeneration of the vagus nerve and its relation to nerve terminations in the rabbit lung appeared in the *Journal of Comparative Neurology*, to be followed by dealing with the ganglia, plexuses and nerve terminations in lung and pleura in 1922.

Larsell became friends with Dr. George Burget, head of the department of physiology, which led to a cooperative study published in 1924 on the effects of mechanical and chemical stimulation on the trachea-bronchial mucous membrane. A study of the development of the cerebellum through embryonic and adult forms of amphibians, chiefly the frog, was published in 1926. His drive for a functional as well as a morphological interpretation of his findings motivated all of his research.

The Board of Trustees of Linfield College drafted him to serve on the Board in 1922, and he served as president of the Board from 1931-1938. These entailed endless hours of work outside of his duties at the medical school. In addition, in 1923, he formed a Medical History Club for faculty and student assistants. Many of the monthly meetings were held at the Larsell home. Larsell presented and later published papers on Anders Adolf Retzius, father of Gustaf Retzius (1924), Joseph Henry Wythe (1925), and the development of medical education in the Northwest (1924). At that time, most of the knowledge about the history of medicine in the Pacific Northwest was preserved only through his efforts. He interviewed many people throughout the territory and encouraged the members of the History Club and others to do interviews, as well. The History Club was reorganized in 1932 as a student group. Contributions by the members of the club form an important section in the annals of medical history in the OHSU Pacific Northwest Archives Collection. An autobiography of Jöns Jacob Berzelius, which was published originally by The Royal Swedish Academy of Sciences was translated by Larsell and appeared in book form in 1934 (Williams and Wilkins Co.) as one of a series sponsored by the History of Science Society.
Larsell studied the mechanism of blood during the years 1926-1929, in collaboration with others. For their joint effort on, “The Embryology and Neuro-Histology of the Sphenopalatine Ganglion Connections: A Contribution to the Study of Otalgia,” Ralph A. Fenton and Larsell shared the Casselberry Prize from the American Laryngological Association in May 1928.

Northwestern University almost drew the Larsell’s back to Chicago in the fall of 1926 when Larsell was offered a professorship in neurology. He spent the winter of 1926-27 as a visiting professor at the new McKlintock Campus. Fortunately for Oregon, the advantages of Portland outweighed those of Chicago, and he returned to UOMS to teach and continue his research. He lectured on neuro-anatomy at the University of California in 1931 and 1932.

Larsell continued to collaborate with Dr. Fenton on histiocytes in the human nasal accessory sinuses and other histological work in this field relating to sinus infection, lymphatic channels and drainage, the defense mechanism of the upper respiratory tract, and the vasomotor mechanism. As a guest of the Wistar Institute, he did significant research on the acoustic apparatus and function in the pouch young of the opossum at the Morris Biological Farm during the years 1929, 1934 and 1935. Material obtained there added to the work on the cerebellum; especially significant was the fact that functional studies in these unique, pouch young amplified the findings in regard to structural development in what is really an embryonic series. The relations of the labyrinth and its connections with the cerebellum formed a part of this group of contributions. Studies on the bat cerebellum gave more evidence of function-structure relationships. Summation of all this and prior work on the cerebellum appeared in several reviews on the subject, the first of which was entitled, “The Cerebellum: A Review and Interpretation” published in the *Archives of Neuroanatomy and the Sense Organs* in 1939. Dr. Larsell revised this text in a second edition and wrote the section on the Nervous System in the tenth edition of Morris’ Human Anatomy, to which he contributed many original plates and other figures drawn under his supervision by Miss Clarice Ashworth Francone, noted medical illustrator at the University of Oregon Medical School.

In 1938, Larsell was elected by the Board of Higher Education of Oregon as Dean of the Graduate Division and served until 1946. Consultation with faculty members around the state cut deeply into time for research.
The scientific fraternity of Sigma Xi received support from Larsell, who was a long standing member and sponsored many members among his students and assistants. As a member of the Society of Experimental Biology and Medicine he was a Fellow of The American Association for the Advancement of Science. He was also a member of the executive committee of the American Association of Anatomists and also belonged to the American Association of University Professors. He was a charter member of the History of Science Society, organized in 1924, and was elected to the Lardonshistoriska Samfundet of Upsala through his studies on Berzelius, Rudbeck, Retzius and other Swedish scientists. Gamma Alpha and Phi Beta Pi claimed him as a fellow, and in 1929, he served as Vice President of the Western Society of Naturalists. Dr Larsell was also a member of the Editorial Board of the *Journal of Comparative Neurology*, consulting editor for *The Journal of History of Medicine and Allied Sciences*.

Larsell gave assistance to many students, over and above that which was required. Many years supervising in student admissions, and in consultations with prospective degree candidates added to his awareness of the difficulties students suffered. Many realized their ambitions only through his help, and sometimes they did not know of his efforts.

A steady enthusiasm is contagious, and many can attest to the fact that Dr. Larsell gave them the first impetus toward real accomplishment. He had said that there is only one thing he would rather be than to be a physician, and that is a teacher of physicians. His credo might well be summarized in his own oft repeated quotation, “In all thy getting, get understanding.” [Proverbs 4:7]

He was professor of anatomy at UOMS until 1952. In 1952 he moved to Minnesota to become Professor of Neuroanatomy at the University of Minnesota until 1954. He then spent a year at the University of Oslo in Norway on a Fulbright Fellowship before returning to Portland to continue his research on the cerebellum at Good Samaritan Hospital. In addition to publishing numerous journal articles, he published several books, some of the most notable being, *The Doctor In Oregon: A Medical History* [Portland: Binsford and Mort for the Oregon Historical Society, 1947] and a work of three volumes: *The Comparative Anatomy and Histology of the Cerebellum From Myxinoids Through Birds* [Minneapolis: University of Minnesota Press, 1967], *The Comparative Anatomy and Histology of the Cerebellum From Monotremes Through*
Apes [Minneapolis: University of Minnesota Press, 1970], and The Comparative Anatomy and Histology of the Cerebellum, Cerebellar Connections and Cerebellar Cortex, [Minneapolis: University of Minnesota Press, 1972]. The last of the three volumes was not complete at the time of Larsell’s death, so Dr. Jan Jensen of Norway, editor of the first two volumes and a world renowned expert on the anatomy of the brain, completed the book.

Known for his enduring energy, at 78 years of age, Larsell was working on the final chapter of his monumental monograph on the cerebellum and other unfinished neurological research, when he died on April 8, 1964.

*By Karen Lea Anderson Peterson, M.A.*

*OHSU Archivist – Assistant Professor*
Arthur John McLean, M.D.
1894-1938

Arthur John McLean - a student of Harvey Cushing, the father of American neurosurgery and Otfried Foerster, the celebrated German neurosurgeon - was Portland's first trained neurosurgeon. His life was cut short by a tragic accident and so it is uncertain what his future might have held. What emerges from the record is his recognized brilliance contrasted against the intense drama of his life.

When Dr. McLean died on December 7, 1938, he was just 44 years old and had not yet reached the apex of his career. When his body was found, the wheels of his car hung over the edge of the canyon where it had crashed through a guardrail on N.W. Cornell Road. The car was still running, his body 10 feet from the car and a handkerchief tied around a deep wound on his head.

Some alleged that McLean had committed suicide while others asserted that McLean would never have taken his life. One Portland physician is quoted as saying, “McLean simply wasn’t the kind to kill himself. He was the sort who would want to stick around, just to prove that all he had said was right” (Oregonian, 2/5/1939). McLean had made enemies and
denounced his opponents fervently. He demanded perfection of himself and of others. Another physician remembers, “…a charge of laxity was perhaps the bitterest accusation that he hurled at his fellow physicians” (Oregonian, 2/5/1939). Some said he had grown bitter and had developed deep prejudices.

McLean was born in Seattle on October 29, 1894. A two-year stint in the military interrupted his education at Reed College, from which he graduated in 1921. The Griffin, Reed’s yearbook, described McLean as, “The busiest man on campus… carrying six subjects was his business…” He was ever the personification of the term “intellectual enthusiasm.” He went on to receive his M.D. from Johns Hopkins Medical School in 1925. He studied neurosurgery with Harvey Cushing, as a neurosurgical resident at Peter Bent Brigham Hospital (1925-1929). He was Surgical House Officer (1925-1926); the Arthur Tracy Cabot Fellow, in charge of laboratory research at Harvard Medical School (1926-1927); Associate in Surgery, Peter Bent Brigham Hospital (1928-1929); and Acting Resident in Surgery at Peter Bent Brigham Hospital (June –September 1929). He then moved to Breslau, Germany with his wife, Gladys Merle Bragg, where he studied from 1929-1930 as a George Gorham Peters Traveling Fellow, with Dr. Otfried Foerster. He returned once again to Boston in 1930-1931 to serve as a Resident in Surgery before moving to Portland.

In 1931, McLean entered private practice in Portland, opening an office in the Medical Arts Building. He joined the faculty of the University of Oregon Medical School as clinical instructor in Surgery and Neuropsychiatry (1931-1934), assistant professor of pathology (1936-1938) and clinical associate in Surgery and Neuropsychiatry (1934-1937). In 1937, he resigned his position but at the behest of his colleagues he returned, continuing as assistant professor of pathology until 1938, when he once again resigned. He went on to teach, independently, a course for clinicians in Neurological Diagnosis and Neurological Surgery at Good Samaritan Hospital.

From the McLean collection, we know that he gave the impression of being brash, disrespectful and hot-headed, but the record also portrays a man of reason, who could not stand dishonesty and hated stupidity. His fellow faculty members pronounced him a “brilliant” physician, his teaching work “beautifully” organized, and a “magnetic” person in the eyes of the medical students.
McLean was invited to be one of the charter members of the Harvey Cushing Society. In the Founding book, there is a letter to McLean from William P. Van Wagenen, dated October 24, 1931, inviting McLean to join as a founder. McLean accepted and Van Wagenen acknowledged his acceptance. Oddly, there is no record to explain why he was never listed as a member. In addition, in the volume *A History of Neurosurgery*, there is no reference to McLean. Further, it seems that he did not belong to the Society of Neurological Surgeons because he is not listed among their historical figures.

He was accused by some of his detractors of writing nothing new, yet others claimed that his findings were not mere mimicry but based on indisputable and dedicated research. Dr. Cushing appeared to be always supportive of his work: In 1936 Cushing writes to “Mac” and pronounces McLean’s paper on cerebral neuroepithelioma “…a perfectly bang-up piece of work. We are delighted with it… it is certainly the best worked-up case in the literature.” Cushing encouraged him not to apologize for his youth. Foerster was equally confident and affectionate. He invited him to contribute to his *Handbuch der Neurologie* in 1936. McLean authored two chapters titled “Intracranial Tumors” and “Pituitary Tumors.” The prevalence of requests for reprints of his papers came from around the world. McLean’s operative record speaks well of his competence as a neurosurgeon. His mortality rate in 55 operations over 6 years was 21.8% and compared well with other leaders in his field. Cushing’s mortality rate in 11 years was 30.9%, though in the final years dropped to 8.7%.

Two anecdotes surface from the collection which illustrate McLean’s qualities that raised the ire and respect of adversaries, associates and friends alike:

To commemorate Cushing’s 60th birthday in April 1928, a festschrift was to be published as a special volume of the Archives of Surgery. McLean was invited to contribute a paper. He submitted a manuscript titled, “A New Type of Apparatus: Its Physics and Results,” in which he gives a technical description of the Bovie Electro-surgical Unit (surgical current generator). In 1920 William T. Bovie had developed this innovative electro-surgical unit that Cushing had introduced to clinical practice.

McLean submitted his manuscript for editing to G. H. Liebel (of the Liebel-Flarsheim Company, manufacturers of the first Bovie), as well as to Cushing,
Bovie and others.

Liebel’s response to the paper was that it would be “way, way over the head of any physician or surgeon and would be way, way over the head of any engineers…” Further, Dr. Liebel informed McLean that Bovie was about to deliver an address describing the electro-surgical unit.

Bovie’s reaction to McLean’s paper was scathing. Bovie wrote to McLean discrediting his attempt to write about the biophysical aspects of electro-surgery as “confusing froth… leading to no definite conclusion. …You are writing,” Bovie charges, “in a field for which you have not been adequately trained. Many of [your] ideas are erroneous… and might give you a reputation of being superficial.” Bovie went on to say that McLean’s description of their invention before they (Bovie and Liebel) published about their own work was equal to stealing. He also accused him of not giving credit to others involved in the research. He threatened that if McLean did not assure him that he and Liebel would have priority to publish, he would take it up with Cushing.

McLean’s rejoinder is equally acerbic: “Your extraordinarily harsh letter,” he begins, “…arrived this afternoon. I think my letter of yesterday morning is sufficient personal answer to your gratuitous slurs concerning publications in medical fields. The paper is recalled, and I shall take care that I publish nothing whatever concerning the machine or its use so long as you remain alive; I think that may be a reasonable guarantee against even the possibility of inadvertent trespass upon the field you have vigorously marked out.” Since he had been forewarned of Bovie’s upcoming presentation, McLean immediately withdrew the manuscript.

Cushing wanted McLean’s paper to be published, but the histological part of the paper hinged on the apparatus. So rather than have nothing appear from McLean, Cushing offered to furnish a general description of the machine for anonymous inclusion in the paper, but McLean declined, saying it was overly general and vague, therefore worthless. He returned it to Cushing to be used in the Scott lecture where Bovie was to give his address.

Liebel, in correspondence with McLean, writes, “I believe the one who is going to suffer most from this [falling out] is Dr. Cushing.” McLean offered the photographs that were to be included in his article to the Liebel Company
but adamantly refused to be acknowledged for them.

Cushing once again requested that McLean submit the paper for publishing, and at this, McLean acquiesced. In spite of the dissention, the paper was published in the festschrift. In the end, McLean apologized profusely to Bovie and the two men eventually spent a great deal of time discussing the paper. Bovie simply did not feel that McLean should address the technical description of the machine in surgical literature.

McLean was not easily discouraged. In 1929, while still at Peter Bent Brigham Hospital with Cushing, he had received a grant to research the electrosurgical operating unit and to investigate and perfect a simpler and more flexible unit. And even after the disagreement with Bovie, McLean continued to write about electricity and surgery. He published, “Characteristics of Adequate Electrosurgical Currents” in the American Journal of Surgery, December 1932. As well, physicians and scientists continued to request reprints of his articles in the field of electro-surgery and solicit his recommendations for electrosurgical apparatus for cutting and coagulation.

A second anecdote of great local interest concerns his relationship with his colleagues in Portland. As noted earlier, McLean repeatedly resigned from the faculty. All that can be discerned from our records is that they had intense disagreements over policies. However, the disagreements appear to have been extensive and McLean was never one to mince words.

In November 1937, he delivered an 80-minute clinical report before the Multnomah County Medical Society in which he lashed out at certain members of the medical profession. He later had this address, titled “Brain Tumors Always Die: A Satiric Parade,” privately printed at his own expense. In this diatribe he denounced, first of all, those who still believed that brain tumors represented only a death sentence: “Among the enlightened places where one would expect not to find doddering adages still extant are hospitals. Yet the title of my paper, ‘Brain Tumors always die’ is the factual recording of a remark made pre-operatively on three widely-separated occasions to different patients of mine by the sisters in a Portland hospital. The first time it occurred I believed it was but a repetition of the 1890 adage; the second time I wondered if that was the sole reason and after the third, I took my patients elsewhere, believing it useless to attempt cooperation for the patient’s benefit in such atmosphere…”
He did not stop with the hospitals. “Neurosurgical work requires some 3.5 to 5 hours of examination for preliminary diagnosis; neurosurgical operations demand for the patient’s safety a fastidiousness of technique often completely lacking at the hands of general abdominal surgeons not specially trained in neurosurgical methods…. As a member of the neurosurgical tribe, one has a right and a duty to demand of those who profess to be its practitioners, a modicum of knowledge, of technique, and of nicety which, by my observation of results, is quite absent in this surgical slattern of whom I speak…” “The long list of resignations from the surgical and clinical sides of the medical school since his headship that constitutes a role of honor; most of the men who are acknowledged leaders in the specialties are locally found recently outside the medical school rather than in it transmitting their knowledge to the younger men, and as long as he remains in authority, with his tight ring of sycophants and his interknit downtown clinical organization, so long will the clinical teaching of surgery and surgical specialties at our local school remain the chagrinned and amusing laughing-stock that it at present is for students. As regards my own specialty, I have come to regard myself as derelict unless I speak out in condemnation of such results as representative of what modern neurosurgery can and does accomplish whatever may have been the extenuation of the last decades, a continuation in present circumstances has no warrant in fact or accomplishment…."

In tribute to McLean it was said that “No one, anywhere, ever exemplified a finer loyalty, a more loving nature, the kindliness of his contacts with his students and those who wanted to learn from him was at times emotional in its quality. No one will know, except those who were truly his apostles, how much of himself he gave to teaching. In it he was consumed not by an ideal of self-aggrandizement but by an unquenchable thirst for the truth behind all the didacticism… Could McLean have achieved a serenity of spirit to match the true greatness of so much of his character, his intellectual and spiritual stature might have been limitless. But he had very strong prejudices and feelings and had developed a deep prejudice… Dr. Arthur McLean leaves accomplishments which will dwarf the best of his detractors. In the proper setting, with more wisdom and understanding on the part of his associates, he could, had he conquered his small bitternesses, have become a world figure.”

According to his attorney, his affairs were in order down to the smallest detail. His undated will was given national publicity: “…To 95 percent
of Portland’s medical practitioners and their ethics, and the whole local organized medical profession, a lusty, rousing belch. To Portland’s thieving patients, the haphazard care they will receive for their chiseling tawdriness. I desire that there be no funeral service of any sort; that the eleventh stanza of Swinburn’s ‘Garden of Proserpine’ and the entire ‘Thanatopsis’ of Bryant be read aloud over my body by a lay person; that my cremated body’s ashes be strewn by a paid employee on the waters of the straits of San Juan de Fuca.”

And “To my name, oblivion,” McLean declared in his last will and testament. The unexamined records of A. J. McLean have lain silent for nearly 70 years. There is little evidence to warrant censure or to condemn his name to oblivion, yet up until this point in time it appears to have been accomplished.

*By Karen Lea Anderson Peterson, M.A.*

*OHSU Archivist – Assistant Professor*
Raaf, the Father of Neurosurgical Graduate Education in Oregon, was Responsible for Training Generations of Oregon’s Neurosurgeons.

Following a remarkable 50-year career as Oregon’s senior neurosurgeon, and a lifetime that spanned nearly the entire 20th century, John E. Raaf, M.D., Ph.D., died at home on April 11, 2000, at the age of 94 following a brief illness. Raaf was born on Nov. 12, 1905, in Hailey, Idaho, the only child of John J. Raaf, M.D. and Madge Hart. His father was one of two physicians in the untamed mining town of Hailey, long before it became the ski resort, Sun Valley. Raaf accompanied his father on house calls that in those days might include surgery in the kitchen or living room with a member of the family administering a chloroform or ether anesthetic.

Raaf earned his bachelor’s and medical degrees at Stanford University. Two years of residency in general surgery at the University of Rochester, N. Y., were followed by a fellowship in general and neurological surgery at the Mayo Clinic in Rochester, Minn. While at the Mayo Clinic, Raaf performed research on tumors of the cerebellum that earned him a doctorate in neurosurgery.
In 1936, at the invitation of Thomas M. Joyce, M.D., Chairman of the Department of Surgery at what was then called the University of Oregon Medical School, Raaf moved to Portland to join the medical school faculty and begin a private practice. He taught neurological surgery at Oregon Health Sciences University for many years, rising to the rank of professor. In 1986, Raaf was awarded clinical professor emeritus rank.

Raaf began the first neurosurgical residency program in Oregon in 1947 and was responsible for training generations of Oregon’s neurosurgeons. His busy practice, and later teaching, was based at Portland’s Good Samaritan Hospital and Medical Center.

In 1938, following the premature death of the first neurosurgeon in Oregon, A.J. MacLean, M.D., Raaf became the only neurosurgeon on the West Coast between Seattle and San Francisco. A large part of his practice involved operating on trauma patients with head injuries. Before World War II, it was thought that trauma patients with head injuries should not be moved, so Raaf traveled by car and small plane all over the Pacific Northwest to care for these patients. He achieved national recognition for his success in saving seriously injured patients with aggressive surgery to relieve pressure from intracranial bleeding. Raaf described his methods and experience at medical society meetings and in numerous papers for medical literature.

Raaf founded and was a member of many professional medical societies in the country. He was the last surviving founder of the American Association for the Surgery of Trauma and also served as its president. Raaf was a founder and president of the American Academy of Neurological Surgery and the Western Neurosurgical Society; founder of the Oregon Neurosurgical Society and the American Trauma Society; president of the Portland Academy of Medicine, Portland Surgical Society and Pacific Coast Surgical Association; and vice president of the American Association of Neurological Surgeons, Western Surgical Association and the American College of Surgeons.

A strong, athletic man, Raaf learned to hunt and fish from his father while growing up in Idaho. His father was an avid sportsman who took a shotgun with him on house calls, often bringing home a pheasant or sage hen for dinner. Raaf said he observed his father bag 40 birds one season without missing a single shot. As a student at Stanford, Raaf excelled in boxing,
an unlikely choice for a future neurosurgeon. A golden glove award hangs from his key chain. In Portland he took up rowing on the Willamette, horseback riding and squash, but his greatest love was fly-fishing on the Rogue River in southern Oregon. Raaf’s ability to cast a fly across the white water of the Rogue bordered on an art form. Raaf’s family and a close group of neurosurgical friends were fortunate to be invited each fall to the annual meeting of the Rogue River Neurosurgical Society, during which the scientific program was replaced by dawn to dusk angling for trout and steelhead salmon and celebrating success with the famous Rogue River gin fizz.

His patients, friends and colleagues remember Raaf as a gentle, compassionate, skillful surgeon who was a pioneer in establishing the field of neurosurgery in the Western United States.

*By Kim Burchiel, M.D., F.A.C.S.*

*OHSU Department of Neurological Surgery*
Robert Stone Dow, M.D., Ph.D.
1908-1995

Robert S. Dow M.D., Ph.D., born in Colorado in 1908, moved as a child with his parents to McMinnville, Oregon where his parents were searching to find a good small college to assure an education for their four children. Following McMinnville public school education, Dow entered a small Baptist college of about 300 students at the time known as Linfield College (now Linfield University). He majored in chemistry and minored in biology and worked as a research assistant his final year, graduating in 1929. He was accompanied by his father to the University of Oregon Medical School Admissions Committee (now Oregon Health & Science University, OHSU) interview where they expressed their financial concerns about medical school. Dr. Olof Larsell, the interviewing member of the committee, was himself a Linfield graduate and impressed with Dow’s work as a research assistant, offering him a paying assistantship in anatomy if he entered a 5 year program to obtain both a master’s degree and an M.D., both of which were obtained in 1934. He then chose to work another year with Professor Larsell to obtain a Ph.D. in anatomy in 1935. His doctoral thesis involved obtaining pregnant bats (bats have a large vestibular component) from a church belfry in Portland to describe the embryologic features of the bat cerebellum. It was his mentor, Professor Larsell, the world authority on the
comparative anatomy of the cerebellum, who instilled in Dow a love for the cerebellum.

Dr. Dow then became a rotating intern at the State of Wisconsin General Hospital in Madison, Wisconsin, which at that time had an exchange program with the University of Oregon Medical School. Hans Reese, the neurologist there, sparked Dow’s interest in clinical medicine. Following that, he obtained a Rockefeller National Council Research Fellowship working with Professor John Fulton at Yale University in Connecticut. When he applied for a second year, the interviewer sensed that Dr. Dow was not sure if he wanted a clinical or research career. Instead, he accepted in 1937, a Belgian-American Educational Foundation Fellowship to work with Professor Frederick Bremer in Brussels Belgium. In Bremer’s lab he continued to work on the cerebellum, but he and his wife Willetta also had time to travel around Europe. Two days a week they would go to the Institute Bunge in Antwerp, Belgium where he worked with Ludo van Bogaert and neuropathologist Hans Scherer. It was there that Mrs. Dow (as Dow always referred to her in public), a trained histological technician, who had done much of the histologic material work for Dow’s theses, studied advanced histological techniques. Together, they studied material from 5 multiple sclerosis patients and identified the perivenular location of plaques. Bremer was both a clinician and researcher and became the model for Dow that it was possible to do both research and clinical work. It was in Bremer’s laboratory that Dow and Giuseppe Moruzzi met in what would become a lifelong and fruitful collaboration.

During that year Dow was also able to do a three month clerkship with Professor Gordon Holmes at The National Hospital Queen’s Square in London, England where Holmes was a world authority on cerebellar injury.

In 1938 the Dows returned to New York where a third year of fellowship was done at Rockefeller Institute in the laboratory of Herbert Gasser, working with Lorente de No, Harry Grundfest, and Birdsey Renshaw. With Grundfest, Dow learned to study electrical stimulation of single muscle nerve fibers using a crude cathode ray oscilloscope. The contacts made at the Rockefeller resulted in lifelong friendships and collaborations. When Dow returned to Oregon in 1939, he took an oscilloscope circuit diagram to the Engineering Department at Oregon State University in Corvallis where they constructed a crude instrument for him to use in his research. The
instrument needed constant calibration and repair, which Dow did not want to take the time to do, so he found a student at Reed College in Portland, Howard Vollum, and a tinkerer, Jack Murdock, which allowed him to use the first medical cathode ray oscilloscope in Oregon. Vollum and Murdock assured Dow that after World War II was over and materials would again become available they would start a manufacturing company, which they did and called it Tektronix, Inc. Vollum Hall on the OHSU campus is named for Howard Vollum, and the Murdock Charitable Trust has been a generous supporter of Dow and of OHSU research. Birdsey Renshaw was recruited by Dow to the OHSU faculty. Unfortunately, Renshaw had an untimely death from fulminant poliomyelitis after 2 years at OHSU. He described what is now known as the Renshaw inhibitory spinal muscle neuron.

In 1939, the Dows returned to Oregon to a salary of $3,000 per year in the anatomy department. After his return, Dow recieved his Oregon Medical license. At that time there were no neurology residencies, and if one had 3 years of some neurologic training, one could become a sub-specialty trained neurologist. Thus, he became the first sub-specialty neurologist in Oregon. While his full time appointment was in anatomy, he began to work with Dr. John Raaf in neurosurgery. Because of the physician shortage in World War II, the University allowed him to work evenings in clinical work in Dr. Raaf’s office, which ultimately became a 25 year affiliation.

In 1944, at the request of the US Office of Scientific Research and Development, a war time agency, he was awarded a project to compare the newly developed tool of electroencephalography (EEG) with the clinical examinations of employees who had been suffering head injuries in large numbers while working building ships at the Henry Kaiser shipbuilding facilities on the Columbia River. This tool was not too sensitive for predicting outcomes in head injury. Another medical school staffer, Archie Tunturi, had a similar project in dogs and arrived at a similar conclusion. Dow established at the medical school the first EEG clinical laboratory with the first EEG machine west of the Mississippi River. The machine was devised by Albert Grass and manufactured by Grass Instruments, and Dow became good friends with Albert and Ellen Grass, pioneers in the EEG field.

After 6 years at the medical school and with the end of World War II (1946), the Dean announced that Dow would have to make the choice between clinical medicine and full time research. Professor Olof Larsell was devas-
tated by this forced decision, and Dow was fond of saying Larsell told him, “Would you desert research for the fleshpots of clinical medicine?” Dow was always quick to add Larsell had deep respect for all of the clinicians Larsell had trained in anatomy.

Thus, in 1946, Dow became the first to establish a full time private practice of neurology in Oregon. But even then he kept contact with his researcher friends. Moruzzi, in a letter marked, “please destroy after reading,” confided to his good friend that after spending the war years with Lord Adrian in England, he was concerned about returning to his native Italy where his uncle had been imprisoned. Dow offered for him to come to Oregon, but Moruzzi chose to return to Italy where his work with Magoun on the reticular activating system became landmark. After 7 years of practice, Dow and his family were able to go to Italy as a Fulbright Research Scholar to work with Moruzzi on the book, *The Physiology and Pathology of the Cerebellum*, published in 1958 as the authoritative work in the field. This volume had been planned as a follow up to Larsell’s multi-volume *Anatomy of the Cerebellum* books.

On his return from Italy he was able to convince the Board of Directors of the Good Samaritan Hospital (then administered by the Episcopal Diocese of Oregon, now Legacy Health Care System) that they should generously and enthusiastically support his request to engage in neurologic research and education as well as clinical practice. He maintained a private office with other neurologists (particularly Dr. Wilbur Larson) and neurosurgeons (Dr. John Raaf), a few blocks from the Hospital. Dr. Dow became Chair of the Hospital’s Neurology Department while Dr. Raaf was chair of Neurosurgery.

In 1989, the Laboratory of Neurophysiology was established. Dow recruited three old friends from Italy, Germany and Mexico to become the first staff members. Animal work using ablation, cooling, chemical and electrical stimulation of the cerebellum were performed. In 1988, the lab was renamed The R. S. Dow Neurological Sciences Institute. In the 1990s this program was absorbed by OHSU.

In 1961, Dow obtained a National Institutes of Health training grant to train neurologists. It was unique in its affiliation with a private teaching hospital rather than a medical school. Only two others were in private hospitals - The
Mayo Clinic in Rochester, Minnesota and The Barrows Neurologic Institute in Phoenix, Arizona. Dow instilled in his residents his love for both research and clinical medicine. He established a program with Linfield University where the residents could do a 3 month research rotation, publish the results of their research, and obtain a Masters Degree in Neurophysiology from Linfield. This program was also later absorbed by the residency program at OHSU.

A number of the people trained in both the laboratory and clinical program have gone onto distinguished careers. Dow was also influential in affiliating the Nursing School program at Good Samaritan with a degree program at his old alma mater, Linfield, and that program continues to produce many nurses to serve in Oregon and elsewhere.

Dow was elected to membership in the American Neurological Association (ANA), the senior and honorary society in 1948. As a former student of Fulton, he was an enthusiastic supporter of the Fulton Society which meets regularly with the ANA. He was President of the American EEG Society in 1958 and President of the American Epilepsy Society in 1964. He received NIH grants to study the cerebellum and to establish a comprehensive epilepsy program and a comprehensive stroke program. He served on the Neurology Study Section for the National Institutes of Neurologic Diseases and Stroke and on review panels for the Food and Drug Administration. He was the recipient of numerous national and international awards.

Ever mindful of the overall needs of his patients, he was the impetus for the founding of the Epilepsy Association of Oregon, the Alzheimer’s Association of Oregon, the infant Speech and Hearing Center and Will-Cope, a Parkinson’s disease support group.

He performed early work on cerebellar stimulation for epilepsy in an effort to therapeutically utilize the demonstrated inhibitory influences of the cerebellum on seizures. The work was disappointing but he remained strongly convinced that his early hypotheses of a cerebellar influence on higher cortical functions would eventually be demonstrated.

His own words reflect his deep love and expectations for the cerebellum. The presence of the cerebellum “…..throughout the vertebrates, its universal and beautifully spatially-oriented cortical structure and its afferent and
efferent connections with every other part of the nervous system must mean that the cerebellum has some special and unique function. To learn this function will continue to challenge us.”

*By James Joseph Cereghino, M.D., FANA
  Professor of Neurology, Oregon Health and Science University*
Dr. Roy Laver Swank, first Head of Neurology at what is now Oregon Health & Science University, died November 16, 2008, in Portland, at age 99. Dr. Swank was best known for his advocacy of a low-fat diet for multiple sclerosis (MS), but his career encompassed much more.

Between 1934 and 2003, he published over 170 scholarly works. His varied research included studies on a stain for myelin undergoing degeneration (the Swank-Davenport stain), thiamine deficiency, chronic combat exhaustion, prevention of microemboli following cardiac bypass surgery, effects of fat on blood viscosity, and diet in the treatment of MS.

Dr. Swank was born in Camas, Washington. He graduated from the University of Washington in 1930 and received his M.D./Ph.D. in 1935 from Northwestern University. During 1936-1942, Dr. Swank conducted research at the Brigham Hospital, Harvard Medical School, Boston City Hospital, Karolinski Institute, and Montreal Neurological Institute. In 1942, he enlisted in the US Army for the duration of World War II. Observations made while he was in charge of a psychiatric hospital in Paris resulted
in his publishing two early articles on chronic combat exhaustion, or posttraumatic stress disorder.

In 1948, Dr. Wilder Penfield recruited Dr. Swank to the Montreal Neurological Institute. Because of a benefactor’s gift, Penfield stipulated that Dr. Swank conduct research on MS. Knowing little about MS, Dr. Swank read extensively on the subject. He became interested in the possible association of dietary fat and MS. To pursue this, he conducted a series of investigations in Norway and demonstrated that MS was more common inland, where the diet was high in fat, than on the sea coast, where the diet was low in fat. Dr. Swank was fond of telling how this research was funded. He met with Penfield to explain his idea. Penfield promptly told him to go to Norway and personally wrote a check to fund the study. Because of this research, Dr. Swank began treating patients with MS in Montreal with a low-fat diet and continued this for the rest of his career. In 1990, he published a 34-year follow-up on the Montreal patients with MS who had started the low-fat diet, which showed that those who remained on the diet had a lower mortality and were less disabled than those who had not.

In 1954, Dr. Swank became Head of Neurology at the University of Oregon Medical School. For the next 20 years, he conducted research while caring for patients with MS. He wrote several books on the low-fat diet, including the popular *The Multiple Sclerosis Diet Book*.

One discovery during this time helped thousands of patients undergoing heart surgery. For his blood viscosity research, Dr. Swank invented a filter that removed cellular aggregates from blood. Fortuitously, the filter proved beneficial in preventing microemboli during cardiac bypass surgery. He created a company to make filters commercially; the Swank Filter was widely used during cardiac bypass surgery.

Dr. Swank retired from the university in 1974 but continued academic endeavors and clinical practice until 1999.

Dr. Swank was preceded in death by his first wife, Eulalia, his two sons, and his second wife, Betty. He is survived by his wife, Leeanna, his daughter, two grandchildren, and three great-grandchildren.
Since the appointment of William Fitch Allen, the professorship of anatomy in 1916, it has become evident that each of us has 100 billion brain cells (neurons) connected to an average of 10,000 other brain cells. The next step is to discover how these connections can rise to a thought, a memory, or the making of a decision. (Information from an article presented in the Oregonian, authored by George F. Will, a Washington Post reporter, is used in the above statement)

By Dennis Bourdette, M.D., FANA, FAAN
Chair of Roy and Eulalia Swank Family Research Professor
Department of Neurology, School of Medicine Oregon Health & Science University

Brilliant, creative, and energetic, Dr. Swank believed that scientists should freely pursue their ideas. This belief guided Dr. Swank throughout his remarkable career.

Conclusion

Since the appointment of William Fitch Allen, the professorship of anatomy in 1916, it has become evident that each of us has 100 billion brain cells (neurons) connected to an average of 10,000 other brain cells. The next step is to discover how these connections can rise to a thought, a memory, or the making of a decision. (Information from an article presented in the Oregonian, authored by George F. Will, a Washington Post reporter, is used in the above statement)
Invention and Innovation:
The Founders of Neuroscience in Oregon

A Collaboration of the
OHSU Historical Collections & Archives
and the Departments of Neurology and Neurological Surgery

Designed by Jerry W. Pulkeron

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