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Special Report

The Early History of Neuroradiology at the Medical School of the University of Minnesota, 1937–1939

Harold O. Peterson[1]

On December 31, 1936, I completed a two year residency in Radiology at the prestigious Massachusetts General Hospital in Boston. This program included *all* of diagnostic and therapeutic radiology. While in Boston, I had the good fortune to spend five to six evenings with Dr Merrill Sosman who presented a "workshop" type of teaching session on plain skull films and some pneumography to all the residents in the Boston area.

Dr Sosman at that time was chairman of the Department of Radiology at the Peter Bent Brigham Hospital in Boston and Professor and head of Radiology at Harvard University Medical School. He was one of only *three* people in the United States who had a special interest in neuroradiology. Neuroradiology, however, made up only a small part of Dr Sosman's total workload. He was chairman of the department and usually had two or three residents in training. There were no other associates, and he personally did or supervised all of the diagnostic and therapeutic radiology done in the department.

Plain Films of the Skull (1937)

The first radiologic study carried out on any patient suspected of having a brain tumor or injury would be plain films of the skull. In our department at the University of Minnesota, this consisted of a series of six or seven projections. Dr Sosman published a paper in 1936 which clearly indicated how important these films were. In this study there were 200 cases of verified brain tumors. Dr Sosman was able to locate 50% of the tumors on plain films alone and histologically identify 25% (also on plain films alone). When ventriculography was added he was able to localize 96% of all intracranial tumors.

Encephalography and ventriculography were common procedures prior to CT and MR and (although difficult to do) were in many cases very productive in terms of localizing masses and assisting in differential diagnosis.

When cord tumors were suspected, clinically routine plain films of the spine were always taken, but most of the time they did not show positive findings. Myelography using lipiodol and later Pantopaque was the next step.

Dr Cornelius Dyke, a student of Dr Sosman, had moved from the Peter Bent Brigham Hospital, where he was a resident to the Neurological Institute in New York sometime in the early thirties. Having had Dr Sosman as his mentor, he naturally picked up considerable knowledge in neuroradiology when he was in Boston. He was the first full-time radiologist at the Neurological Institute in New York. He made some remarkable contributions to neuroradiology but, unfortunately, Dr Dyke died in 1943, robbing neuroradiology of what surely would have been its most distinguished founder.

The third person who had an interest in neuroradiology at this time was Dr John Camp of the Mayo Clinic. Dr Camp had his basic training in radiology at the Massachusetts General Hospital in the early twenties as did Dr Sosman. In this sense, one could say that American neuroradiology had its early beginnings in Boston.

There were no neuroradiologists at the Massachusetts General Hospital in 1936, but there were two prominent figures in other aspects of radiology: Dr Richard Schatzki (who died on January 1, 1992, 5 weeks prior to his 91st birthday), who was already quite famous in the area of gastroenterology, and Dr Aubrey Hampton, who had gained considerable fame in the area of chest radiology.

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Thus it was that, when I came back to the University of Minnesota in January 1, 1937, to join Dr Rigler in the Department of Radiology, thereby swelling the total number of radiologists in the department from one to two, I was leaning more towards GI or chest radiology than any other subspecialty. After 3 or 4 weeks in the department, Dr Rigler asked what area of radiology most interested me. Because of my training in Boston, I told him I was interested in either GI or chest radiology; he scowled at both of these suggestions and said, "I want you to be interested in neuroradiology." Thus, I began my career at the University of Minnesota as head of the nonexisting Department of Neuroradiology and, at the beginning, still devoted most of my time to general radiology.

Early Beginnings of Neuroradiology at Minnesota

However, I did follow Dr Rigler's suggestion and started to review all of the cases of brain tumor ever diagnosed at the University of Minnesota, which resulted in a staff meeting publication in 1938. Next, I reviewed all of the cord tumors ever seen at the University of Minnesota, which resulted in another staff meeting publication in 1939.

I was extremely fortunate to be closely associated from the beginning with a brilliant general surgeon, Dr William T. Peyton, who I believe—like me—had been informed that he should develop a Department of Neurosurgery. He was a wonderful person and, without his help and cooperation, it is unlikely that we would have been able to develop a significant and useful section of neuroradiology.

As an example of how little was required to direct a university department of radiology in those pioneer days, Dr Rigler left town on a 6-month sabbatical after I had been in the department approximately 2 years at the academic rank of Instructor, leaving me in charge of the entire operation. I was just 2 years beyond a 2-year residency program and clearly not qualified to run a radiology department at a major university medical school. Nevertheless, our staff of two radiologists dropped back again to one for the next 6 months, and I carried on as Chief.

Continuing Medical Education at the University of Minnesota

Sometime in the mid-thirties, the President of the University of Minnesota, Lotus Coffman, requested that all units of the University become involved in continuing education. A new building was being constructed on the campus to house a department of Continuing Education. The Medical School was also informed that all segments of the school should become involved in continuing medical education. Dr Rigler was extremely interested in continuing medical education and presented the first course in 1937 on the subject of general radiology; this was held in April of 1937 and 29 radiologists attended. The next year (June of 1938), a second course was given in general radiology and 40 radiologists attended. These courses were held in the Chapel of the new Center for Continuing Education building where there were facilities to house and feed about 40 students.

It was at this point that Dr Rigler decided to take his 6-month sabbatical leaving me in charge of the entire department and suggested that I put on a course at the Continuing Education Center. It didn't take me long to decide that the subject matter should be neuroradiology.

While planning for the course I enlisted the help of Dr John Camp of the Mayo Clinic. We knew of only two other people interested in neuroradiology. They were Dr Sosman and Dr Dyke. They were invited to participate in the program and they accepted. We felt we had on our staff all the people interested in neuroradiology in the United States. We then got the assistance of several other people from the Mayo Clinic and the University of Minnesota who were expert in other related areas such as neurology, neuroanatomy, neuropathology, neurosurgery, and orthopedics.

As can be seen from the program, the subject matter included plain films of the skull and spine, pneumoencephalography and ventriculography, and clinical material by neurologists, neurosurgeons, orthopedists, and one basic scientist—Dr Rasmussen, a neuroanatomist. There was no mention of angiography, although some was being done at the University of Michigan and elsewhere in the world, but angiography had not yet been developed at the University of Minnesota or the Mayo Clinic.

There was a symposium on the protruded intervertebral disk. One might have expected me to participate in this subject, but at this point I

UNIVERSITY OF MINNESOTA

Center for Continuation Study

Continuation Course in Neurologic Roentgenology **November 13–15, 1939**

PROGRAM

Monday, November 13

8:30– 9:00 Orientation . . . Mr Nolte, Dr O'Brien
9:00–10:30 Anatomy of Brain and Skull . . . Drs Rasmussen and Rigler
11:00–12:00 Pathology of Tumors of the Brain and Spinal Cord . . . Dr Kernophan
1:30– 3:30 Normal Encephalogram and Ventriculogram . . . Dr Dyke
4:30– 6:00 Round Table—Intracranial Calcification . . . Drs Sosman, Dyke, and Camp
7:30– 9:00 Symposium—Brain Tumors
Neurology . . . Dr McKinley
Roentgenology . . . Dr Sosman
Surgery . . . Dr Craig

Tuesday, November 14

8:30–10:30 The Abnormal Encephalogram and Ventriculogram . . . Dr Dyke
11:00–12:00 The Normal and Abnormal Sella . . . Dr Camp
1:30– 3:30 Meningiomas and Lesions of the Calvarium, Including Fractures . . . Dr Sosman
4:30– 6:00 Clinical Pathological Conference . . . Drs Baker, Peterson, Peyton, Sosman, Dyke, and Camp
7:30– 9:00 Symposium—Protruded Intervertebral Discs
Neurology . . . Dr Walsh
Orthopedic Surgery . . . Dr Macey
Roentgenology . . . Dr Camp
Surgery . . . Dr Love

Wednesday, November 15

8:30–10:00 Radiologic Treatment of Gliomas and Pituitary Adenomas . . . Dr Sosman
10:30–11:00 Platybasia . . . Drs. Peterson and Peyton
11:00–12:00 Encephalography in Spastic, Mentally Deficient, and Epileptic Children . . . Dr. Peterson
1:30– 3:30 Roentgenologic Diagnosis and Localization of
Lesions Affecting the Spinal Cord . . . Dr Camp
Discussion . . . Dr Dyke
4:30– 6:00 Round Table—Film Reading and Outline of Technique . . . Drs Camp and Peterson

FACULTY

Abe B. Baker, Assistant Professor of Nervous and Mental Diseases, Medical School
John D. Camp, Associate Professor of Radiology, Mayo Foundation
Winchell M. Craig, Professor of Neurosurgery, Mayo Foundation
Cornelius G. Dyke, Assistant Professor of Radiology, Columbia University College of Physicians and Surgeons
James W. Kernohan, Professor of Pathology, Mayo Foundation
J. Grafton Love, Assistant Professor of Neurosurgery, Mayo Foundation
J. Charnley McKinley, Professor of Nervous and Mental Diseases, Medical School
Harry B. Macey, Instructor in Orthopedic Surgery, Mayo Foundation
Julius M. Nolte, Director of Center for Continuation Study, University of Minnesota
William A. O'Brien, Director of Postgraduate Medical Education, Medical School
Harold O. Peterson, Instructor in Radiology, Medical School
William T. Peyton, Associate Professor of Surgery, Medical School (Neurosurgery)
Andrew T. Rasmussen, Professor of Anatomy, Medical School (Neuroanatomy)
Leo G. Rigler, Professor of Radiology, Medical School
Merrill C. Sosman, Assistant Professor of Roentgenology, Harvard University Medical School
Maurice N. Walsh, Consultant in Neurology, Mayo Clinic

was just beginning to develop my interest in this area and had not yet embarked on my life-long interest in and involvement with myelography. I feel sure I was the first radiologist in the world to do a complete myelogram alone with complete removal of the contrast media.

You will also note that Dr Sosman was involved in several discussions, one of which included the *radiation treatment* of gliomas and pituitary adenomas. As I mentioned earlier, most radiologists at that time were involved with radiation therapy as well as diagnosis.

I thought we had all the known "specialists" in the field of neuroradiology in the United States and Canada on our teaching staff for this course, but was surprised to learn of one other person who attended this course as a student. During our Film Reading Conference, I had presented what I thought was a very difficult diagnostic problem in which ventriculography was the key. There appeared to be a large cyst in the posterior fossa just under the tentorium; the lateral and third ventricles were dilated but otherwise normal. A rather quiet voice from the back of the room made the correct diagnosis. This person turned out to be Dr Arthur Childe who was the head of neuroradiology at the Montreal Neurologic Institute. He made the correct diagnosis of a herniation of the atrial part of the lateral ventricle through the tentorial notch into the posterior fossa. Some air from the ventricular puncture was able to pass into this part of the lateral ventricle below the tentorium. I thought there was a cyst in the posterior fossa, but could not understand how air would get into the cyst. The aqueduct and the fourth ventricle were never visualized. Finally, the posterior fossa was explored and the herniated lateral ventricle was recognized by the surgeon. Ultimately, it was discovered at postmortem that the primary pathology was a long-standing hydrocephalus secondary to a stenosing process in the aqueduct.

Somehow I lost track of Dr Childe for a time but learned, at a much later date, that he had moved to Winnipeg, Canada, and was shifting his interest from neuroradiology to pediatric radiology. Nevertheless, in 1950, he did participate in our course in neuroradiology and spoke on pneumonecephalograhy and ventriculography and plain film findings in cord tumors. He was a quiet, retiring type of person and, although he was connected with the Medical School in Winnipeg, he seemed to disappear from the scene of neuroradiology in North America. His successor at the Neurologic Institute in Montreal was Dr Donald McRae.

First Course in Neuroradiology in 1939

Fifty-two people attended this course. The largest number (15) came from Minnesota and the next largest numbers ranging from four to seven came from Indiana, Missouri, Kansas, and Illinois. Some radiologists came from as far away as the states of Washington, Colorado, and Montreal, Canada. This was a 3-day course lasting 8 hours each day. The cost for the course was $15.00.

Second Course in Neuroradiology

In 1942, a course was given in the Continuing Education Center on emergency radiology and a significant part of the course was devoted to radiology of the head and neck.

Third Course in Neuroradiology

In October of 1950, the entire course was on neuroradiology for radiologists and Dr Knute Lindblom of Sweden participated in this course. He discussed discography at this time. I immediately took up this procedure, but abandoned it after many years.

Fourth Course in Neuroradiology

In November of 1955, another course was presented on neuroradiology for radiologists and Dr Eric Lindgren, also from Sweden, was the featured speaker. He was very knowledgeable at that time in cerebral angiography and pneumoencephalography, especially in the area of the basal cisterns.

Fifth Course in Neuroradiology

In 1963, another course on neuroradiology took place, at which time Dr James Bull of London was the featured speaker.

Sixth Course in Neuroradiology

In 1972, a sixth course in neuroradiology took place, but I do not have detailed information available to me at this time.

The continuing education courses in radiology rapidly outgrew the facilities available. For sometime they were held in the new Mayo auditorium

which is a part of the Medical School proper and could hold about 400 people. Subsequently, the numbers grew so large that a much larger auditorium in the Law School was used. At the present time, most of the courses are being held in the downtown hotels.

A bit of additional information is that a "Chair" has recently been established through the Minnesota Medical Foundation and is known as the Margaret F. and Harold O. Peterson Chair in Neuroradiology. Dr Richard Latchaw is the first neuroradiologist to hold this appointment and Margaret and I are very happy about that. He went to medical school here at the University of Minnesota and later on spent 2–3 years in our Department of Neuroradiology working with Larry Gold shortly after Steve Keiffer left our department. He has of course already made a great name for himself and will add much luster and prestige to this department. We are pleased and proud that he accepted this assignment to rebuild our section on neuroradiology and to become the first occupant of the Margaret F. and Harold O. Peterson Chair in Neuroradiology.*

Addendum

In 1940, I started an evening lecture and film demonstration course on neuroradiology for a small group of residents. The initial course, primarily to neurology and psychiatry residents, was given to residents who wanted to brush up for their Boards. The next year, radiology residents were involved as well as neurosurgical residents. A few practicing radiologists also attended.

This evening lecture course eventually became a major enterprise with about 50 people attending. It was given every other year, 2 hours per session covering all aspects of Neuroradiology. A large Gordon film projector was used and I could proceed in an informal manner pointing out on the film what I wanted them to see on the screen. All the material came from our own cases. Eventually, I had a large teaching collection built up and several residents told me they made slides of the collection.

In 1950, Dr Abe Baker, Chief of Neurology, was instrumental in forming a new society, "The Academy of Neurology." He asked me to give a refresher course each year at the annual meeting and wanted the entire field of neuroradiology covered in *one* session. As the material available increased in volume, the teaching sessions got longer and longer. I carried a portable Gordon projector on these annual trips around the country. One of the longest courses lasted for 16 hours at the New Shamrock Hotel in Houston. I had my voice give out at some of these long sessions and came prepared later with a laryngeal spray concocted by an ENT friend. It had cocaine in it and that acted very well on my larynx as well as on my cerebrum. Most of the neurologists taking the course would stay from start to finish and a few came back in later years. The course in Houston was written up in the newspaper and was called a medical filibuster.

I gave a similar course on two occasions to one of the national associations of neurosurgeons.

We would start at 8:00 or 9:00 a.m. and have 1-hour breaks for lunch and dinner, and finish around midnight. It was amazing to me how many people were still there at the end.

I took this same material (still on films) to Bogota, Colombia, and gave evening lectures to radiologists for 1 week sometime in the 60s.

* *Editor's note:* Dr Peterson's beloved wife, Margaret F. Peterson, died on March 6, 1992, shortly after the preparation of this manuscript.