J Neuropathol Exp Neurol
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Vol. 74, No. 12
December 2015
pp. 1180–1182

IN MEMORIAM

Lysia K.S. Forno, MD
February 14, 1918–May 8, 2015

Lysia K.S. Forno, MD

Lysia K. Saxe was born on Valentine's Day in Hallund, Denmark, and died at home in Redwood City, California, on the 70th anniversary of the Victory in Europe Day. During her childhood, she enjoyed bicycling through the countryside (and occasionally smoking cigars) with her brother Skjøld. Because both of her parents were teachers, it was not surprising that she would pursue higher education. She attended the University of Copenhagen and received her MD in 1943, at the time of the Nazi occupation. After a rotating internship, she trained in internal medicine, psychiatry, neurosurgery, and neurology at various Danish hospitals (1944–1947). She then served as a clinical assistant in Neurology at the Aarhus Municipal Hospital and Aarhus University Neurology Clinic (1947–1950). Her interest in the field of neuropathology was inspired by Dr. Erna Christensen, the first diagnostic neuropathologist in Denmark.

An American Association of University Women Fellowship provided her with the opportunity to come to the United States to study neuropathology with Drs. Raymond D. Adams and E. P. Richardson, Jr, at the Massachusetts General Hospital (MGH) in Boston where she subsequently was a resident and fellow in Neuropathology. She then trained in General Pathology at the Massachusetts Memorial Hospital, Boston (now Boston University Hospital). She returned to Denmark where she continued to practice pathology and neurology from 1953 to 1954. On the boat from the United States to Denmark, she met Bert H. Forno whom she married in 1954. Bert died in 1978.

In 1957, Dr. Forno began her association with the Stanford University School of Medicine (then located in San Francisco), where she worked with Dr. Knox Finley. She was a research associate in Neuropathology, Department of Pathology, and worked one-half to two-thirds time while balancing neuropathology with domestic chores and the care of her 2 young children. She became a naturalized US citizen in 1959.

Beginning in 1960, Lysia began her tenure as a staff physician (neuropathologist) at the VA Medical Center, Palo Alto. Although she was called "emeritus" from 1989 on, she continued as a full-time neuropathologist until her (externally imposed and never fully acknowledged) retirement in 2007. She enjoyed long productive and mutually respectful collaborations and clinical interactions with many colleagues and caregivers at the VA, including Drs. Jon Kosek and Luis Fajardo (deceased).

Many pathology and neurology residents passed through Lysia's laboratory. She was the mainstay of training in neuropathology for generations of Stanford students, residents, and fellows. The list of her highly accomplished trainees includes numerous distinguished professors of neurology and neuropathology. Because of her outstanding contributions to resident teaching, the Stanford Department of Neurology and Neurological Sciences established the Forno Award for Teaching in 1985. She was the first recipient and also received the Award in subsequent years. Through Stanford training programs, she also trained and was beloved by many neuropathologists, including Samuel Ludwin, Marjorie Grafe, Rolf Schober, Berndt Scheithauer (deceased), Meredith Halks-Miller, Stephen J. DeArmond, Raymond Sobel, and Terri Haddix, among others.

Her laboratory at the VA consisted of a narrow elongated room packed with all the equipment and reagents necessary to process neuropathologic tissues and (including the obsolete and

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now environmentally unacceptable) paraffin processing apparatus with open buckets of xylenes and formalin. This is where Ruth Grajcer, her technician and friend, worked for many years. Off to one side were two little rooms, one with a desk and a multiheaded microscope and the other where Lysia worked by her own microscope. Both rooms were packed from floor to ceiling with files, glass and Kodachrome slides, books, boxes, and papers. As the years passed, more and more were added to this enormous and precious collection. Lysia always seemed to know where everything was. She would climb on her stepladder and retrieve whatever piece of informative material she needed.

Trainees in neuropathology were given a clear list of duties and protocol for documentation, following the European and MGH traditions. All cases were carefully sectioned and extensively sampled. Every slide (routine and special stains and, later, immunohistochemistry) was thoroughly examined together with her at the multiheaded microscope. Meticulous systematic reports were required (and, of course, always documenting the state of the substantia nigra and locus coeruleus!). Lysia was a demanding but always kind taskmaster, but she did not tolerate laziness or sloppy work. A stint in her laboratory concluded with a test of microscopic slide interpretation at the end, and she expected everyone to pass.

Lysia's medical school lectures were superb. They were organized, complete, and beautifully illustrated with exquisite microscopic photographs she took herself. I (MKH) sat in on her lectures and regretted that the students had no idea that they were being taught by someone whose accomplishments and investigations had raised her to the absolute top of her field. Lysia liked to take pictures of her friends also, and now and then she would send an envelope with pictures of recent events.

Lysia generously shared her knowledge and expertise in collaborative studies in a broad range of topics in clinical neuropathology and basic neuroscience, including human and experimental neuropathies, encephalitides, sleep disorders, Alzheimer and other neurodegenerative diseases, hepatic encephalopathy, and other metabolic disorders (1–7). Her many colleagues and collaborators in neuroscience, neurology, and psychiatry at the VA and Stanford included Drs. Amico Bignami (deceased), Larry Eng, Marion Smith, Greer Murphy, Larry Steinman, Leslie Dorfman, and William Hofmann, to name a few.

Lysia's lifetime major research focus was in numerous projects on neuron degeneration and the neural pathways and neurotransmitters involved in human Parkinson disease (PD) and experimental parkinsonism. She did pioneering work on Lewy bodies and the animal model of MPTP-induced parkinsonism in the squirrel monkey and in rodents. Most of these latter studies were in collaboration with Dr. J. W. (Bill) Langston and colleagues at The Parkinson's Institute (Sunnyvale, CA). She was ably assisted by her long-time research technician Roxanne Norville in this work. She enjoyed continuous research support from the VA Medical Research Program (Merit Review) from 1961 to 2003 and from other sources.

Without fail for many years, Lysia delivered either a platform presentation or a poster of her work at the annual meeting of the American Association of Neuropathologists (AANP). The work was always of the highest quality. Her many seminal contributions to the study of neurodegenerative diseases (from the 1960s to 2010) have had enormous impact (8–27).

The AANP honored Dr. Forno with its Award for Meritorious Contributions to Neuropathology in 1991. At the presentation, Dr. Sam Ludwin gave a glowing tribute to which she responded with characteristic humility, essentially saying, "I just do what I like to do." At the dinner after the presentation, Dr. E. P. Richardson, Jr, recalled how when she went to the MGH in the early 1950s she was recognized as an outstanding trainee and, indeed, "someone special." The admiration, respect, and love of her colleagues that surrounded her continued even when during the most recent years she did not attend the meetings. In these later years, we were invariably approached by people who knew her, asking how she was, and sending her their warmest good wishes.

She was a kind and extremely generous person. I (MKH) met her soon after I arrived in Palo Alto in 1970. With 2 small children, I wanted to work a little in neuropathology and I phoned her and asked if I could come by and see her. She graciously invited me to her laboratory. When I arrived to visit her that first time, I was welcomed by a diminutive, friendly, smiling woman with a strong Scandinavian accent. We found a connection since she was from Denmark and I had come from the nearby small country of Estonia. We had both suffered through the ravages of the Second World War, although at that time she was a young woman and I was still a child. She told me that she had no work to offer me but suggested that I go see Dr. Lucien Rubinstein, the famous chief of neuropathology at Stanford. She must have talked to him herself after I left because, soon after I got home, he telephoned me and asked me if I would like to go to Santa Clara Valley Medical Center in San Jose once a month to examine brains that had been saved from autopsies. That was a task that he had agreed to do and detested; he was happy to relinquish it to me. So it was thanks to Lysia that I got started at a job that eventually grew to occupy me full time and, through her, I also was introduced to the Stanford neuropathology circle. During the ensuing years, Lysia and I saw each other frequently as she became my mentor, my consultant with problem cases, my friend, and my teacher. She taught me nerve teasing and always made me feel welcome. More recently, when I told her that my husband Tracy was diagnosed with PD, she gave me her prized folder of historical articles on the pathology of this disease. She had collected them before the ease of computers and printers; they were clearly a valued and treasured part of her files.

When I (RAS) was appointed to the Stanford Department of Pathology in 1992, Lysia graciously relinquished part of her VA appointment salary to me. It did not matter to her that she received five-eighths salary to do the work that she loved. She continued to work full time, with only brief summer vacations and trips to meetings, during which time I filled in for her. I was given strict instructions to "leave the neurodegenerative disease cases" for her when she returned.

Lysia always had a lot to say during social occasions, which she enjoyed, and she was a delightful guest. She liked an occasional glass of champagne or a single gin martini straight up, and she also enjoyed a glass of beer with lunch; at times, these orders startled the waitperson, who did not expect such a request.

Lysia had courage and fortitude. When I (MKH) would happen to meet her at the airport, she astounded me with the speed with which she could locate the gate where we had to

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depart while I was still trying to read the display board. She would take off at a rapid pace and lead the way. No better example of her grit is the story of one late evening when she was alone in her office. She fell from the ladder and broke her hip. She then drove herself to the hospital, had it fixed, and returned to work within a week. She outlasted 4 (very long-term) chairs of the Stanford Department of Pathology and at least 8 deans of the School of Medicine—those men just did not have her stamina.

Lysia had a remarkable intellect but was not pushy. She had very strong views on certain issues (most often related to neurodegenerative disease pathology and classification) and was not shy about expressing them. At AANP meetings, she would walk up to the microphone (which usually towered over her) and give her comments, whether agreeing with or politely challenging the presenter. She was also very shrewd. She knew exactly when to say she didn't know or (with a twinkle in her eye) profess ignorance, for example, in the frenzy of Stanford case review conferences when wild diagnoses and impractical workups were proposed. Consequently, she never made the wrong diagnosis.

In later years, her sense of direction declined. She invariably would lose her car in parking lots, and we knew that after every Stanford Christmas party or some other event, we would be going up and down the rows of cars in the parking lot in the dark, helping her to find her car. Her car would also acquire little dents here and there.

Nevertheless, her dedication to neuropathology never waned. After driving was not possible (i.e. permitted by her children), she continued to take taxis to and from the VA, and after retirement, to the Stanford Neuropathology conferences 3 times per month. Then, as she declined further, her caregiver drove her to these conferences. Even without her hearing aid, sitting at a microscope with a group and looking at slides were all that mattered. We remember Lysia, a tiny woman with a smile on her face, well-groomed white hair (like dandelion fluff), a brightly colored dress with a pretty pin at the collar, and an ever-present lace-bordered handkerchief in her hand or in her purse. At the conferences, she was supplied with a stepstool so she could reach the seat and a cushion on which she could then sit to reach the microscope eyepieces. We have missed her presence there.

Lysia will live on in the memory of her circle of relatives and friends and, through her major contributions to many scientific subjects, especially on the pathology of PD, she will live on globally as her work continues to be referenced to in almost every major publication on this topic.

Lysia Forno's contributions and long full life as a friend, mentor, role model, colleague, and mother were celebrated at a memorial on June 27, 2015. She is survived by her son Eric Saxe Forno, daughter Karin Ida Forno, MD, and daughter-in-law Karen Carroll.

Maie K. Herrick
Raymond A. Sobel

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