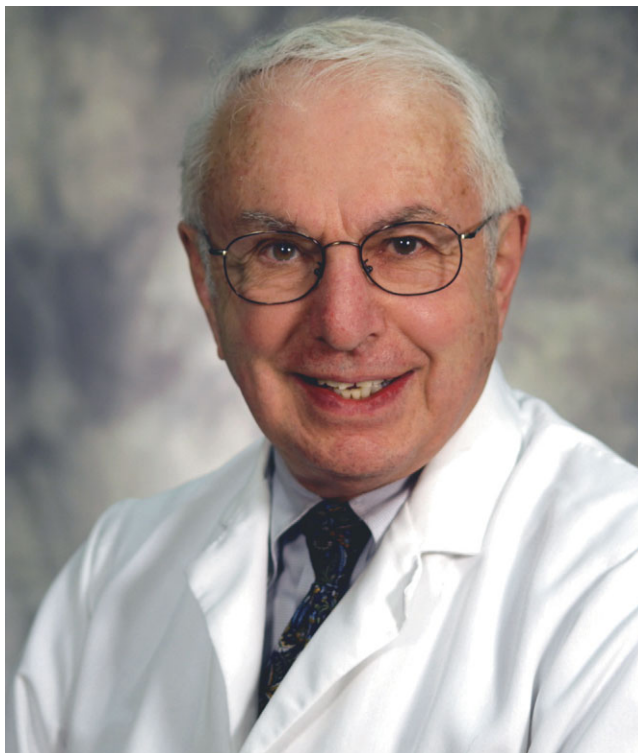


Lawrence G. Raisz**November 13, 1925–August 25, 2010**

John P Bilezikian,¹ Marc Drezner,² Barbara Kream,³ Paula Stern,⁴ Thomas Clemens,⁵ Ann Elderkin,⁶ Ethel Siris,¹ Stephen Krane,⁷ John Eisman,⁸ Andrew Arnold,³ Jean Feyen,⁹ Marja Hurley,³ Hiroshi Kawaguchi,¹⁰ Joe Lorenzo,³ William Peck,¹¹ Carol Pilbeam,³ David Rowe,³ T Jack Martin,¹² Janet Hock,¹³ Hector DeLuca,² Sevgi Rodan,¹⁴ Barbara Lukert,¹⁵ Theresa Chen,¹⁶ and Jenneke Klein-Nulend^{17*}

No one person in the world of bone has had a greater impact than Larry on us all. To honor his memory, we asked some of Larry's closest friends and colleagues to reflect upon his extraordinary life. What follows is an expression of that meaning sprinkled with Larry's inimitable wit and reflections on life, science, and the future.

Larry: Leader Extraordinaire

"It is often said that something may survive of a person after his death, if that person was an artist and put a little of himself into his

work. It is perhaps the same way that a sort of cutting taken from one person and grafted on to the heart of another continues to carry on its existence even when the person from whom it had been detached has perished."

Proust, Remembrance of Things Past

The beginnings

Larry was born in New York City where his father was a doctoral student in geology at Columbia University and his mother was a student at Columbia's Teachers College. He grew up in a family environment that emphasized intellectual achievement and was presented with wonderful opportunities

*Author affiliations appear on p 911.

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for his formal education at outstanding institutions in Cambridge and Boston, Massachusetts. At Browne and Nichols School, he was “intensively prepared for entering Harvard College.” Larry wrote a vignette of that preparatory school experience: “My English teacher, Jimmy Reeves, despaired at my inability to tell the difference between a comma and a semicolon. He told me that every time my theme had a ‘comma fault’ he would reduce my grade by 5 points. When the grade reached zero, he gave up.” When Larry entered Harvard College in 1942, at the age of 16, World War II was raging and those who ran our country thought it necessary to compress the time spent in university to assure a steady supply of young intelligent manpower. When he was 18, Larry wrote the following note in *The Harvard Crimson*, the student newspaper, on July 1, 1943: “A year ago last week Harvard began its greatest transition year in history from a peacetime University, rich in liberal tradition, to a wartime training center, turning out skilled men quickly and efficiently.” Note Larry’s good sense of prose style and his great first (the *lead*) sentence. It could have been predicted that Larry would eventually publish many fine papers and books and be the editor of a scientific journal (*JBMR*) that would profoundly influence a new field.

Following the relatively short time at Harvard College, Larry entered Harvard Medical School, where he was introduced to disorders of the “bony skeleton” by Fuller Albright. After graduation in 1947, he served his internship at Boston City Hospital (BCH). Dr. William B. Castle, a charismatic physician and noted hematologist, was chief of a vibrant Harvard Service at the BCH, and Larry chose to undertake his first postdoctoral clinical training there. The opportunities to learn clinical medicine and to be aware of the emerging scientific basis of the diseases he encountered were extraordinary. Larry continued his clinical training at the Boston Veterans Administration (VA) Hospital where Dr. Maurice (Maurie) Strauss was chief of medicine. Maurie Strauss was a noted hematologist and nephrologist, a great physician and teacher who, as described in a 1974 *New England Journal of Medicine* paper (Papper, *NEJM*, 1974), “had enormous impact on people” and who “opened students’ eyes, minds and hearts.” Larry had been a postdoc with Homer Smith in the Department of Physiology at New York University in the late 1940s, and his work there on regulation of extracellular fluid volume and salt metabolism resulted in several of his earliest publications. He continued as a nephrologist and renal physiologist when he returned to Boston a few years later to become chief of the Renal Section at the Boston VA Hospital. It may be difficult for current medical graduates who are usually pressured to make their specialty choices early in medical school to comprehend how different it was 50–60 years ago, when one’s teachers and role models could profoundly influence the development of careers *after* graduation. It is likely that Dr. Strauss and others had a major influence on the direction of Larry’s early career just as Larry subsequently had a major influence on the careers of many of *his* students and colleagues.

Larry continued his studies on controls of renal function when he left Boston for a position at SUNY Upstate Medical Center in Syracuse. In 1956, he published his first bone paper on pseudopseudohypoparathyroidism in the *American Journal of Medicine*. This was it! Within a few years Larry’s research became

all bone and bone-related, with renal physiology and renal pathophysiology just parts of his past. One doesn’t know whether Larry’s rapid transition from kidney to bone was because he literally “fell in love” with bone or whether he excused his new passion by saying humbly that there were too many nephrologists and he was getting out of a field that was “too crowded.” It was clear, however, that Larry did not take the advice of Maurie Strauss, who said to him, “you should stay away from calcium, it’s a jungle.” We do know that had he continued as a nephrologist, Larry would have been the same gentle, persuasive giant that he was in our field for half a century.

Larry and the founding of the ASBMR and *JBMR*

In 1974, a small band of devotees to the emerging field of bone and mineral (Larry, Lou Avioli, Norman Bell, Claude Arnaud, John Potts, Bill Peck, and Shirley Hohl) met at the Drake Hotel in Chicago to consider the idea that the field needed a new society to advance this newly recognized scientific discipline. The meeting marked the birth of the American Society for Bone and Mineral Research, followed by its incorporation in 1977 and its inaugural meeting at the Disneyland Hotel in Anaheim, California, in June 1979. Shirley Hohl was the first executive director. At that first meeting, 147 people came for one day to hear, in one room, a few plenary lectures and to discuss the posters that lined the back and sides of the room. The meeting was declared a success. And indeed it was, although objectively, one couldn’t be so sure at the time. In fact, the new society had no money. It was Larry’s mother who lent the ASBMR \$4,000 to start it! Larry was the second president of the ASBMR (1980–1981). He was truly a leader extraordinaire, who led with his actions and whom others inevitably and irresistibly followed.

One example of this leadership was the establishment of the *JBMR*. The question to which Larry clearly gave the answer was: When does a scientific society identify itself with a scientific journal? It was Larry, above all, who prevailed upon the ASBMR to see the wisdom of starting a journal within only a decade of the Society’s founding.

Larry, Editor of the *JBMR*: 1986–1996

“Knowledge comes, but wisdom lingers.”

Alfred, Lord Tennyson

There was no question about who would be the first Editor-in-Chief of the *JBMR*. For a decade, Larry shepherded the journal on a path that quickly established it among the scientific elite in the bone field. Larry’s standards were unwavering, but he also unashamedly encouraged, cajoled, and otherwise convinced biomedical scientists that they wanted to publish their best science in this journal.

The editors of the *JBMR* will always stand in the shadow of Larry Raisz, whose scientific philosophy and personality set the *Journal* on a remarkable trajectory that continues to this day. On the *Journal*’s 20th anniversary, Larry humbly remarked, “The journal succeeded because authors submitted good papers.” While this is undoubtedly true, in reality, investigators in bone and mineral felt honored, if not compelled, to submit to this new

journal because Larry was its editor. Through the *JBMR*, he set an example of how to think about and conduct science.

Larry conceived of a journal for the dissemination of bench-to-bedside science long before the words “translational research” entered our vocabulary. The inaugural issue covered topics ranging from the pathophysiology of osteoporosis to the emerging field of bone immunology. The juxtaposition of articles in clinical and basic science would remain a touchstone for the *Journal* and was conceived to reflect the diverse topics covered at the ASBMR annual meeting. All of this reflected Larry’s devout belief that when clinical and basic science are presented together, new insights were more likely to arise.

Larry’s eclectic vision for publicizing bone and mineral science created a journal that embraced new ideas and approaches. In the first issue, he told readers he would seek out controversy. This message emboldened both junior and established investigators to pursue novel topics. Larry also stressed that the *JBMR* would be international in scope, an uncommon approach in the days before Internet communication. This openness led to the appointment of Associate Editors for the *Journal* who not only had broad-ranging and excellent scientific expertise, but also came from countries spanning the globe.

Larry’s vision and energy propelled the *JBMR* to the top rank of publications in the bone and mineral field. The direction he provided to “capture” in the pages of the *Journal* the fruits of the scientific revolution that began during his tenure set the course for the *Journal*’s success. The content of the *Journal* continues to reflect Larry’s original vision: cutting-edge physiology studies; investigations regarding new drug development; and studies resulting from the emergence of molecular biology, cell biology, genomics, and proteomics as established disciplines.

Thus, the innovative nature of the *Journal* became a platform for its growth. It continues to echo the thrill and adventure he envisioned. No one understood bone and mineral biology as completely as Larry did.

Larry read every paper *before* publication and every paper *after* publication. He often called one of us (JPB) after rereading the latest issue to tell him, as head of the Publications Committee, that this paper or that paper could have been written more clearly, could have been shorter, could have had the layout of its figures sized better, or simply to say, with a phone voice that exuded only joy, “What a great paper!” Is there any Editor-in-Chief in the world who can be said to be or to have been as focused, as diligent, and as utterly in love with what he was doing?

Marc Drezner was appointed to succeed Larry as Editor-in-Chief of *JBMR* in 1996. After a decade of great service, it was Larry who welcomed Marc in rhyme:

Au Vieux Marc

...

We all knew the young Dr. Drezner
With his rapier wit, he would take no prisoner.
Those were the days when the boys from Duke
Would win a game that wasn’t a fluke.
And Marc was another Durham Bull
His life was rich, his plate was full.
Alas he decided that he could edit
A journal and we must give him credit.

When an exhausted Larry handed it over
Marc knew it would not be a bed of clover
But he flourished right thought the transition
And did great new things with each edition
But also as *JBMR*’s stature gained
The Huskies waxed while the Blue Devils waned.
As Marc builds the *Journal* and makes it great
The glories of Durham seem to abate.

*Raisz, on the occasion of Marc Drezner replacing
Larry as Editor-in-Chief of the JBMR*

Larry and the founding of the national osteoporosis foundation: authorship of the surgeon general’s report

As Larry’s science merged more and more closely with osteoporosis, compelling opportunities arose to make this serious disease a household name. Larry became a founder and original board member of the National Osteoporosis Foundation in the United States. As a major advocacy group for osteoporosis, the NOF was fortunate to have Larry, who worked tirelessly to advance public awareness of this disease. The Surgeon General’s report on bone health and osteoporosis in 2004 stands as a landmark to Larry, who was its scientific editor. The statement attributed to him, which formed the inspiration for this document, is “We know enough now to act on what we know.” This was typical of Larry. Always knowing more than anyone, he also knew when to stop, pause, and smell the roses of scientific advancement before plowing further the fertile grounds of discovery. Larry inspired the NOF with direction and a mission. The combination of his commitment to scientific excellence and patient care became a hallmark of the NOF as it drew strength from these principles. The NOF’s successful outreach and educational resources can be attributed to Larry’s leadership.

After publication of the Surgeon General’s report, Larry made an enormous effort to increase the recognition of a fracture as a “sentinel event.” Larry understood that there was an urgent public health requirement to improve the identification of the patient at high risk for fracture, and he worked to highlight the point that the postfracture patient was at the highest risk for subsequent fractures. As a part of the National Action Plan to bring the components of the Surgeon General’s report to life, fracture as a sentinel event has become a major focus of attention. A meeting on health systems approaches for reducing the risk of new fractures in the post fracture patient was held in the fall of 2010 and was dedicated to Larry’s memory. Those who joined him in this effort must now accept the responsibility of moving forward without his presence but with the history of his inspired leadership.

Larry and scientific leadership at UConn and everywhere else

Larry was the Board of Trustees Distinguished Professor of Medicine Emeritus at the University of Connecticut Health Center. He was instrumental in establishing the Lowell P. Weicker, Jr., General Clinical Research Center and served as its first program director from 1993 to 2002. He was director of the University of Connecticut Center for Osteoporosis, and in 2005

he became the first program director of the New England Musculoskeletal Institute at UConn.

Larry's scientific contributions are discussed elsewhere, but it is important to remember Larry for his scientific leadership. He was the most visible attendee at the ASBMR Scientific Meeting, year after year after year, including his last meeting in the fall of 2009, when he was not well. Larry was the omnipresent questioner at the microphone after most presentations. Can one explain how Larry could pop up repeatedly, unashamedly, to ask a question that probably no one had thought of, while listening to the same presentation? If you sat next to him, you would know why. Larry had an uncanny ability to immerse himself immediately in the presentation; he was instantly in utter concentration listening to the abstract presentation, and when it was over, he was up, unable to control or contain himself, wanting to transmit to the author support, congratulations, and a great question. He would sit down, and immediately get ready for the next 10-minute jewel he was about to experience. His mind's eye had perfect vision. The microphone pulsed, time after time after time at ASBMR, in his inimitable voice: "Raisz, Connecticut."

Larry: Supreme Biomedical Scientist and Mentor

Larry Raisz was a preeminent leader, investigator, mentor, teacher, and clinician in the field of bone and mineral metabolism for over half a century. Larry's research program on the mechanisms of bone formation and resorption and the pathogenesis of osteoporosis led to more than 450 original publications, reviews, and book chapters. Larry mentored over 100 students, postdoctoral trainees, clinical fellows, and faculty members. The interactions that formed these close associations were of paramount importance to him.

At the SUNY Upstate Medical Center in Syracuse, his papers with Bill Au and others inaugurated the use of organ cultures to study the pathophysiology and biology of bone resorption. He continued this general approach with great success after he moved from Syracuse to the University of Rochester School of Medicine in 1962, where he became head of the Department of Clinical Pharmacology. At Rochester, he interacted with William and Margaret Neuman in the Department of Radiation Biology and Biophysics on mineral metabolism, parathyroid hormone, and osteoblast biology.

Larry's research career in Rochester was enhanced by a prior experience in the Strangeways Research Laboratory in Cambridge, England. In 1960, he spent a sabbatical year picking up the tricks of organ culture from Dame Honor B. Fell, director of the Laboratory and one of the world's experts in organ culture. There, he was given some bench space and the facilities of the laboratory to use. Hector Deluca first met Larry in 1960 at the Strangeways Laboratory. They arrived within a month of each other as sabbatical faculty. Larry and Hector shared a lab bench, a ½-mL graduated pipette, glassware, and rooster plasma, which was obtained by accompanying Victor, the technician, secretary, and general-purpose manager of the lab, to a hen house in back of the lab where they extracted blood from one of five big

roosters. This was excellent training in how to do much with very little, and it prepared both Larry and Hector for later belt tightening when NIH funds became short in supply. Hector recognized early on Larry's inner drive: if it were worth learning, experiencing, or seeing, Larry would be there with boundless energy. Larry's and Hector's paths would cross many times thereafter. On NIH Study Sections, for example, Hector and other members were treated to a man who read *every* grant (60 per meeting) and was able to comment on them all! While always rigorous, he was also always the defender of young and junior investigators.

Larry published two brief, single-authored communications in *Nature* in 1963. In the first of these papers, he reported the development of a technique for prelabeling embryonic bone rudiments with radiocalcium given to pregnant mothers to establish an assay for direct effects of parathyroid hormone on bone. This approach was subsequently used most successfully in the Raisz lab to understand the regulation of bone resorption. The second of these two short papers on the responses of cultures of parathyroid glands to altering ambient concentrations of mineral ions was also a jewel. It must have taken much hard work to locate, remove, and successfully culture parathyroid glands from 13-day embryonic chicks and analyze cellular changes histologically with bioassays he devised. Kits weren't available then. This work formed the basis for much of the future of the Raisz laboratory's endeavors.

Larry's time at Rochester proved to be a period of great scientific growth. Paula Stern came to work with Larry as a postdoctoral fellow in 1963–1964. Larry mentored by example as he worked side-by-side with her in the laboratory, helping to troubleshoot any problems. Every week, he and Paula would go through *Current Contents* and check off papers of interest. Larry's secretary, Jane Goodale, would collect the journals and set them aside in a room in the library. In the weekly journal club, Larry and Paula would each report on multiple papers and engage in lively discussion. Larry always zeroed in on the critical experiment. He conveyed a sense that science was not about competition, because there were many problems to be solved and many questions to be asked. He would say, "there is enough for everyone."

During the Rochester years, Larry spent another sabbatical at the National Institute of Dental Research, which led to the description of osteoclast activating factor and a paper in *Science*. While at the Dental Institute, he learned the collagenase digestible protein assay and applied it as a measure of bone collagen production in primary rodent calvarial organ cultures. That seminal work launched the careers of a number of young scientists. Greg Mundy also joined him in Rochester. It was then that prostaglandins assumed an important role in Larry's thinking about bone biology.

In 1974, Larry joined the new School of Medicine at the University of Connecticut Health Center in Farmington as the first chief of the Division of Endocrinology and Metabolism. From 1974 to 1997, he was instrumental in building an internationally known program in bone biology with Greg Mundy and new colleagues (or "bone heads," as he would call them), such as Ernie Canalis, Barbara Kream, Joe Lorenzo, Marja Hurley, Carol Pilbeam, Gideon Rodan, David Rowe, and many others. Eventually, they were able to help him maintain a grasp on

the basic science and shift some of his emphasis to clinical osteoporosis with colleagues such as Pam Taxel and Anne Kenny. Always dedicated to basic science and the laboratory ("Show me the data!"), he realized the importance of organizations such as ASBMR and NOF in further advancing awareness of disorders of bone and mineral metabolism. He became the preeminent statesman for the bone field.

Marja Hurley was one of the first to work with Larry in Connecticut when she was a UConn medical student in 1974. Larry's mentorship led to her joining the faculty of the UConn and to a deep friendship for the next 30 years. A series of new fellows and new faculty arrived at the Health Center in the late 1970s. Barbara Kream arrived on Larry's doorstep in 1977 looking to complete her last year of postdoctoral training. She initially came to interview with Larry on a sunny Tuesday morning several months before her start in the lab. She was led to a small room where she encountered a masked man with a knife. It was Larry participating in "bone-cutting Tuesday," when he and the other lab members would dissect the radiolabeled fetal rat long bones for the weekly culture experiments.

Around the same time, David Rowe began his career at the Health Center as the head of the Division of Pediatric Endocrinology. Gideon Rodan had arrived as head of Oral Biology at UConn. The remarkable scientific, professional, and personal relationship with Gideon and Sevgi Rodan helped to define an era when the center of the bone universe had clearly tilted in their direction. With gathering scientific momentum, Larry spoke optimistically about the newly formed UConn medical and dental schools that were recruiting extremely accomplished research-oriented faculty in both the basic and clinical sciences and how these programs would be the epicenter of academic medical training for the region. Many hours of planning went on in his second floor office (with its threadbare couch) in which program projects, clinical and basic training grants, and General Clinical Research Center applications were formulated and new research ideas discussed.

Joe Lorenzo started with Larry as an endocrine fellow in 1977. Joe quickly recognized that Larry lived for his science and was devoted to understanding biology and applying this knowledge to patient care. Larry was practicing the craft of translational research long before it became fashionable. He believed that discovery would bring us better patient therapies and he worked tirelessly toward this goal. Larry's greatest joy was the time that he spent in the lab, designing experiments and preparing rodent bones for those fabled organ cultures. There was always a special gleam in his eye when he would outline each of the groups in a study, making sure to complete the matrix of control and experimental conditions to include all the "perms and coms" of the conditions that were being tested. Even during his final days, he found a way to design another experiment.

Carol Pilbeam first heard Larry speak on calcium and osteoporosis in 1985 during her medical residency. A study of this "new" disease seemed perfect for Carol, an ex-geologist-turned-geriatrician. Larry always had trouble saying no to anyone who wanted to do research, so she arrived in his lab two years later with no research funds and very little laboratory experience. It was some years before she realized just how generous Larry had been in letting an unknown person settle into his lab. Larry

was a mentor, colleague, and friend to Carol for more than 23 years. They shared lab space, research projects, students, and transgenic mice, as well as leftovers in the lunchroom. If it had not been for Larry, Carol would never have skied down a hill or fallen off a windsurfer. His positive attitude and enthusiasm kept her and the lab going through the tough times. A gifted scientist who was passionate about his own research, Larry loved to hear and think about the research of others and was apt to make some insightful comment wherever he went. His door was always open to his colleagues and students. He had amazing energy, generosity of spirit, and a phenomenal ability to enjoy so much at one time. Like so many others, Carol always looked forward to seeing him because he made everything more interesting and fun. How many hours were spent in his office with his colleagues, sitting on the threadbare, orange corduroy couch that had the broken leg!

One of Larry's strengths was his ability to engage people from all over the world and bring many of them to Connecticut for brief or extended stays. Jean Feyen first met Larry at the European Symposium on Calcified Tissues, held in Angers, France, in 1984. Jean had just started work for his doctoral thesis on the regulation of the production of prostaglandins and bone cells. Reviewing the literature on this topic, it became obvious that Larry's name appeared in most of the articles on this topic. After his first discussion with Larry, Jean realized that spending some time with this remarkable man would be a tremendous opportunity to develop and expand his scientific horizons. Jean remembers Larry's tremendous energy and drive. Despite his challenging work schedule, Larry would always find the time to discuss the progress of the lab work. The danger of these update sessions was that one experimental observation would trigger at least five new hypotheses and 20 new experiments. If time were short during the week, Larry would invite people from the lab to join him on one of his weekend activities, such as sailing or windsurfing on a lake near the Health Center. During these outings, there was always enough time to talk about lab activities. Larry always provided his trainees the opportunities to present work in progress at workshops and meetings and discuss ongoing projects with the many scientists visiting the Raisz laboratory from around the globe.

Larry trained many Japanese postdoctoral fellows in bone biology research. The Japanese bone societies are grateful that many of those people, including Toshiyuki Yoneda and Masaki Noda, are now supporting and advancing bone research in Japan because of Larry. He visited Japan frequently to meet his friends Etsuro Ogata and Tatsuo Suda, who were founders of the present Japanese bone societies. Hiroshi Kawaguchi's career as a researcher started with a fateful encounter with Larry in 1991. Hiroshi spent time in the Raisz group from 1991 to 1994, and this experience was formative in his decision to embark on preclinical translational research that would lead to the treatment of skeletal disorders. Larry was his role model as a researcher and mentor. Even after Hiroshi left Connecticut, Larry visited him several times in Japan and kept current of his career. In fact, Hiroshi received an email from Larry's address after he passed away. It was actually from Larry's wife Helen. However, Hiroshi believed the email was directly from Larry inquiring about the Japanese traditional Obon Week. This is a week during

the year when spirits of deceased persons come from heaven to this world in order to meet their family and friends. Hiroshi sent him a reply asking him to visit Japan, since heaven is equidistant from Connecticut and Japan.

In 1997, Larry stepped down as head of the Division of Endocrinology and Metabolism and Andrew Arnold was recruited to become director of the Center for Molecular Medicine and division head. Larry played a crucial role in recruiting Andy to Connecticut from Massachusetts General Hospital, and Andy considered it a huge honor to succeed him as division head. As must be true for so many in the bone field, Andy remembers that Larry asked the first and best question from the audience after his first-ever oral presentation at ASBMR. Over the following years, Andy's already tremendous respect and appreciation for Larry's intellect and generative qualities grew and grew. During the next few years at national meetings, Andy would occasionally be asked if Larry had retired, and he could barely control his laughter when responding! Larry, of course, was as busy as ever, taking on new projects and roles both at home and abroad; his energy knew no bounds. ASBMR members can well imagine how amazing it was to have Larry at seminars, research meetings, and clinical conferences. Indeed, Larry's presence transformed the more routine parts of life into something special.

At a special white coat ceremony in 2010 to raise money for biomedical research, here was Larry undaunted, exhorting the new generation to the task that lay before them:

The Charge of the White Coat Brigade

They come by their hundreds in order to ease
The suffering of illness, the pain of disease
They teach us all about healthy behavior
For in the long run, prevention is saviour.
But to maintain the progress of this fine brigade
New knowledge must be sought, new discoveries made
Government and foundations, which once were there
Are finding their cupboards ever more bare.
But if we all work and plan together
This is a storm we all can weather.
And make better health our next port of call.
But this is a gala so let's have a ball.

Larry Raisz, April 2010

As eloquently expressed by Bill Peck, Larry was the quintessential investigator/mentor; he had a prodigious knowledge of the field, a fertile scientific imagination, boundless energy and enthusiasm, and seemingly limitless patience and listening ability. He was a master communicator — direct, clear, honest, self-effacing, and unfailingly humorous. As a keen student of human nature, he was genuinely interested in us as individuals and as scientists. He enjoyed the successes of his colleagues and trainees. These qualities in rare combination, coupled with his direct, realistic approach, stimulated great confidence among those of us who had the outstanding fortune to learn from and work with him. Larry will always be with all of us in spirit and we will continue to mentor young investigators and do “good science” as exemplified by this remarkable man.

Larry: Friend

Larry Raisz was a friend to many of us. If everyone who considered him a friend had the opportunity to write a reminiscence, this section of the “In Memoriam” would easily take up an entire issue of *JBMR* and more. So the following can be considered a sampling, and perhaps one or more of the contributions will recall your memories and echo your sentiments.

From the time that I met Larry when visiting him in Rochester 44 years ago, he became a friend. That meant the sharing of highs and lows of research over those years, but Larry was such an optimist that the lows were rare and short-lived. It also meant real personal friendship, whether spending free time together in many parts of the world or learning so much when we shared his wonderful enthusiasm for new knowledge. His interest in science was unbounded, his sense of humor never far from the surface, and above all, his kindness and generosity to those about him at all levels made him a very special person. He certainly made the world a better place.

Jack Martin

As I remember my long friendship with Larry, a kaleidoscope of memories surfaces. Living in Connecticut, we would go on family walks along forests, woods, and bluffs on many Sundays. I do not think there exists a path or a ski trail from which Larry hesitated to stray. “Winding Trails” in Farmington is a park with a large lake — the site of many picnics when my children were younger. Helen stayed with us for good conversation and swimming, while Larry rushed, hot blooded and with whole-hearted enthusiasm, into the water to windsail endlessly, irrespective of the state of the wind or the temperature. Larry talked me into going to the bone meetings in Davos. The year my sister came, we skied together in a whiteout down some of the steeper runs. Larry billowed out at great speed while my sister and I hurtled after him, praying he knew where he was going, considering that none of us knew which way was up and all around was white. Wherever we go after death, I am sure Larry will be checking out the skis and a sailboard, while clutching the latest version of his beloved citation index!

I once told Larry that walking into his office was like opening Pandora's box. One never knew what would fly out, except that it would be stimulating and interesting, involve a ton of reading, and color my thinking on the next experiment. His puckish sense of humor led to his suggestion that I look into the anabolic effects of parathyroid hormone, the first step in a long road that eventually led to my work at Eli Lilly and the commercialization of PTH as an anabolic treatment for osteoporosis. Years after, Larry told me he was not sure how good the evidence was at the time (1975) for anabolic actions, but he thought the task of finding out would be a good distraction from pregnancy, and it would be fun science for all of us.

Janet Hock

It is difficult to describe the friendship I shared with Larry because it was one built on a common ground of behavior and values. In later years we did not talk often, but we seemed to share the same views and understanding. We became good friends quickly when we met and shared a laboratory at the Strangeways Research Laboratory in Cambridge, England. We dealt with the same laboratory corporal and enjoyed everything English, including pub lunches that were usually Scotch eggs or meat pies washed down with an excellent bitter or ale.

Larry did not shy away from a confrontation over any matter of principle, such as defending a young scientist at study section meetings. He was someone you could rely on to do the right thing, often serving the conscience of a group or meeting. Science always drove Larry. He was an extraordinary mentor, as all of his "students" will testify, and served as a guide for me in later years. Larry enjoyed life and encouraged others to do the same as long as it did not interfere with the lives of others. I realize now, more than ever, how important his friendship was to me.

Hector DeLuca

Soon after Larry moved his laboratory to Farmington, Connecticut, Gideon and I started a friendly, noncompetitive, and exciting collaboration with him. I still remember vividly how his "45Ca-labeled tibiae" dissolved when we incubated them with conditioned media from our osteoblastic osteosarcoma cells and when nothing happened with our non-osteoblastic cells. It turned out that our cells were making tons of PGE₂, which was responsible for melting away the rat tibiae. This was followed by years and years of professional collaboration between the Rodan and the Raisz labs. We learned so much from each other. But the highlight was the endless weekend conversations between Larry and Gideon, both being total workaholics spending their weekends, of course, in their labs. What wonderful days of discovery they were. I am truly sorry that Gideon is not here to write about those days. We then moved to Merck & Co., in 1985, to establish a department of osteoporosis but the endless conversations never ended, culminating in the highly successful publication of *Principles of Bone Biology*. I still remember going out Saturday mornings to run my errands and coming back three hours later to find Gideon still on our kitchen telephone (where we had conference call capabilities) conferring with Larry and John Bilezikian.

Larry was a legend not just in science but in the way he carried on in his personal life. He was never tired, and always enthusiastic about any new activity. One episode that will always stay with me happened in Davos. Two years ago, as Jack Martin and I were sitting in the hotel lobby in Davos, exhausted from our respective trips and unhappily waiting for our rooms to be ready. There came in Larry Raisz. He was told the same thing, that he also had to wait for his room. Instead of sulking impatiently like Jack and me, he cheerfully informed us that he was going skiing!

On a personal level, we had years and years of a marvelous friendship, regardless of the fact that we lived in different states. Larry continued to be a devoted and caring friend by frequently visiting us during Gideon's sickness, in spite of his very busy work schedule. We celebrated Gideon's last birthday with a poolside party, with Larry present.

Sevgi Rodan

Larry was a true friend as well as a mentor. His zest for living was contagious. Everyone was important to him. He would greet you with a big smile and outstretched arms, and make you feel like seeing you made his day! All of us do better work when we have a healthy level of self-esteem, and Larry enhanced the work of his colleagues by boosting their self-confidence. Knowing that someone else believes in you makes it much easier to persevere when encountering the ups and downs of a research career.

Having lunch with Larry in the conference room of his department was always a real treat. The conversation was lively and varied widely from results of experiments to the latest movie, windsurfing, or upcoming elections. Larry was a role model for living life to the fullest.

Barbara Lukert

Larry was my research advisor and academic mentor, but more than that he has been an inspiring colleague and a trustworthy friend. When I was his graduate student, he established my foundation in scientific training and instilled my lifelong love of science. He was always open to new ideas, often encouraging me to look into new areas of research and participating in the collaborative learning process. Never pretending to be an authority in areas outside of his expertise, Larry directed me and his other students to approach and consult leaders in other fields to learn new techniques and methodologies. He was extremely inquisitive and regularly challenged us with questions and different perspectives to help us understand the fundamental issues of our research. I still vividly remember the "brain-crunching" — as we would call them — weekly lab meetings. Though Larry ran a world-class lab, he still took time to befriend everyone in his lab and was able to empathize with each individual's circumstance. Our friendship continued after I graduated from his lab in Rochester and settled in California. Even as I moved away and went on my own career path, Larry continued to express interest in my work and often lent a helping hand by commenting on proposals, reviewing data, or inviting me back to his lab to discuss the latest science with his team at Farmington. He and his wife Helen have welcomed me into their home many times, giving me a personal glimpse of his commitment to his family and life outside of science. I will miss Larry for his warmth, dedication, and humility. I have been truly blessed to know Larry and to have him as a lifelong mentor/friend.

Theresa Chen

Larry was my supervisor and mentor during my postdoctoral fellowship in the United States. He taught me science, and how to enjoy it passionately! There is also the other Larry, my dearest friend. When I came in 1988 to Connecticut for a postdoctoral fellowship, I first stayed with Larry and Helen Raisz in their house for a couple of weeks before moving into my own apartment. Larry treated me as a family member — he lent his beautiful, big new Mazda to me, and I had never driven a car bigger than a VW Beetle! He invited me to cook dinner — I had never cooked a big American dinner! He also lent me his surfboard, with his own special surf gloves, to go windsurfing on the lake in Connecticut — I had never done windsurfing before!

Larry had such an enormous sense of humor and always made me laugh! This is how I remember him in the lab, at home, at meetings, wherever — he made me laugh so much. Many times I could not stop laughing. He was one of the funniest men in the world. Can you imagine how funny he was when he acted like a ballet dancer in the lab? Imagine his twinkling eyes and the picture is complete. Larry loved to write poems, and he was extremely good at it. I also got one when I left Connecticut. His poems are really beautiful, colorful, and heart-touching. Larry Raisz has been a great friend. I feel that I am one extremely lucky person to have known him.

Jenneke Klein-Nulend

Larry's love of expressing himself in rhyme was not lost upon his beloved Helen, with whom he shared his life for 62 years. On the occasion of her 80th birthday, Larry wrote this touching rhyme to her:

To Helen, Noble Sagittarius, From Her Humble Scorpio

On this momentous day, perhaps you should be spared
From the doggerel of this bard
But like the Scorpion who stung the frog and drowned in
the river
It's in my per-verse nature
And anyway I feel compelled to deal with the remarkable find
That this Archer must have been blind
But that once her arrow made its fateful hit
She stuck to it
So now Scorpio must comprehend another fact, quite
weighty,
Sagittarius will be eighty
Perhaps it should just be considered a second sortie
At being forty
Whatever it's called, her fans throughout the nation
Are full of elation
For the Helen who launched a thousand ships just had looks
But our Helen has that plus a 1000 books
From Sociology to Peace to Poverty to Film
She's expanded her realm
And has taken on other roles with much aplomb
As the greatest Mom and Grandmom
So let this Scorpio bask in her reflected glory

And end his story
With a wish for many years of love and laughter
Together forever after

Happy Birthday & Love from Your Humble (!) Scorpio
November 27, 2006

When I was a young postdoc in Gerry Aurbach's lab, a man unknown to me began coming to the Wednesday Bone Rounds. He was exuberantly interested in all matters bone, and altogether friendly. I asked Gerry about this visitor. "Don't you know who he is? His name is Raisz, Larry Raisz. It would be in your interest to get to know him and to get to know him well. He is simply great." Aurbach was right. That moment is etched in time because it began a four-decade-long friendship with Larry. I remember him with joy, because he was joyous. I remember him for his intelligence, because he was very smart. I remember him for his willingness to go that extra mile for anyone at any time: he was unique. I remember him for teaching me about science, about organizational challenges, about editing books, about being a mentor, about pursuit of goals. Most of all, I remember Larry for what he was to us all, with literally no exceptions: a friend.

John Bilezikian

In addition to his stellar scientific achievements, Larry was also a superb clinician who was highly dedicated to his patients. He greatly enjoyed his time in the clinic, and until most recently, when his cancer and failing health limited him, he would see patients at least two half-days per week. Perhaps his greatest role in the clinic was as a teacher. He had the rare ability to take complex patient problems and break them down into easily understandable endpoints of pathophysiology.

Joe Lorenzo

Although I was only in Larry's lab in Rochester for a short time, less than a year, Larry remained a friend and mentor for the rest of his life. On his travels, Larry would often have to change planes in Chicago at what he called "the dreaded O'Hare airport," because of delays or missed connections. He frequently would use it as an opportunity to call. We would talk about research, family, books, and the state of the world until his flight was announced. Sometimes I would be away from my desk and when I retrieved my messages, there would be his voice: "Hi, it's Larry. You can guess where I am." Just as "Raisz, Connecticut," will be missed by all of us in the bone field, I will personally mostly miss "Hi, it's Larry"

Paula Stern

**Larry and The Latter Days:
How to Face The End**

Larry's diagnosis with gastric cancer and its grim prognosis accelerated his urgency to work on his scientific and public policy projects. In fact, at the age of 82, he complained to some of us about the outcome of an NIH grant instead of dwelling upon the dreaded diagnosis he had just received.

The Old Scientist's Lament

Here we sit miserable and grantless
Which is worse than being shirtless or pantless.
Scientists who worked for years,
But were not as flashy as some peers,
Doing research that we all think
Is worth more than the printer's ink
Expend on writing grants by the score
That didn't make it to the fore.

.....

So here we are caught in a swing of the pendulum
We hope that some day there'll be an end to'em
And that research in our country will be able to grow
So that all of us can reap what we sow.

Raisz

Larry carried on for well over a year, despite debilitating side effects from chemotherapy, all the while sharing glimpses of his reality with occasional limericks sent out to friends and colleagues. A few days before his death, in a phone conversation with one of us (JPB), he asked Helen to check on a PubMed article! Even in his illness, Larry showed us how to deal with disease and death with honesty and dignity. Throughout his illness, he sent email updates, sometimes with poems, to a mailing list of more than 60 of his friends. For example:

What a Fright Is Mucositis

What's it like when your oral mucosa
Feels like it has been run over by a bulldozer?
You bemoan your dreadful condition
And drink through a straw to maintain nutrition.
But the most unkindest cut of all
Is that your mouth can't tolerate alcohol.
For mucositis the only feature that redeems
Is that while the pain in your mouth and throat seems
To be lasting forever and ever
After a week or so it starts to get better.
Now with the help of dexamethasone and local anesthetic
I can drink again and all is copacetic.

When to Say When in Two Thousand Ten

Who knows what two thousand ten will bring
Will we sadly cry or gladly sing?
Let's hope that birth and health win out
'Cause that is what hope is all about.
One hope that I had for the year
... ..
Let's hope each season brings renewal
All I must do is find the fuel.
So give us a cheer and raise your glass
For a year that is better than the past.

Larry, December 2009

In prose, on August 18, 2010

Your friendship and support through the years has enriched my life. I hope you will all continue to help

further the things I care most about: bone and mineral metabolism, awareness and care of osteoporosis and other metabolic diseases, collaboration and increased understanding among researchers and clinicians and the public.

Yours, Larry

Final Comments

Larry was an infectious agent, for good. No one ever came away from an encounter with Larry, however small or seemingly trivial, without feeling better for it. He lifted you up when you might have been feeling down. He lifted you higher, if you were already up. He bounced through life with an exuberance that could not be matched or equaled.

The mark of a true leader is not one who calls himself a leader, or leads with authority, but one whose actions inspire others to do what they do best, with passion and conviction. Larry was that kind of leader, and those of us who knew him are now carrying on that work, drawing strength and inspiration from having known and worked with him. He has become part of the essence of our souls.

Besides leaving his great family in the bone world, Larry leaves his other great family: Helen, his beloved wife, and their five children, Pancaratna, Matthew, Jonathan, Katherine, and Nicholas, as well as six grandchildren and one great-grandchild.

Watch over us, dear Larry.

Acknowledgment

We are indebted to Helen Raisz who helped to collate some of the information, particularly Larry's rhymes and remembrances over the decades of their wonderful life together.

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