

# Dr. Louis R. Weber – my favorite teacher

by

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In December of 2005 I retired after a thirty year career in atmospheric science, the majority of which was spent at Colorado State University's Cooperative Institute for Research in the Atmosphere. At that time, I decided to satisfy a lifelong curiosity about the human mind by beginning a slow journey toward a possible degree in psychology. It has been an interesting experience thus far – challenging at times – and one that's transitioned me from a moderately well-known research scientist and teacher, to that of a lowly undergraduate student once more.

It was while I was helping a fellow student with statistics in the computer lab over at the Weber building, that I heard emerge out of the undercurrent of general grumbling the phrase, "Weber ... whoever he was ..." from one of the nearby students. The words hit me with an unexpected impact.

Without thinking much about it, I turned to the young man and said, "You know, Dr. Weber never forgot *any* of his student's names."

The fact was entirely true, though I probably sounded somewhat eccentric to the student. Twenty years after I'd last seen him, and shortly before he died, I ran into Dr. Weber and his wife Gladys at the Fort Collins downtown post office. He had long since retired (or as he preferred to say, had moved to an emeritus position), was in his late 80's,

and was in poor health. Nevertheless, when I approached and greeted him, he said (without the slightest hesitation), “Well, Mr. Weaver! Are you still mixing astronomy and psychology?,” and laughed his loud, signature laugh. With that one sentence, he demonstrated that he had remembered my name, my hobby and my amateurish fascination with psychological process. That day, I had a chance to do what we don’t often get a chance to do – I was given the opportunity to tell a mentor what he’d meant to me. When I’d done so, he put his arm around my shoulder and said, “Why, thank you Mr. Weaver. You were very important to me, too. I remember you very well.” And I knew he meant it.

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Louis Russell Weber was born on October 15, 1901 in St. Joseph, Missouri. He was the fourth son of a police officer named George Weber and his wife, Sarah. There was also one daughter in the family at the time of Louis’ birth. By the 1910 census, there were five boys and two girls in the Weber clan. His father was still listing himself as a cop.

High school records show that Louis Weber graduated from St. Joseph’s Central High School in June of 1919. Following graduation, he left home to attend the Great Lakes Navy Radio School at Camp Perry in Waukegan, Illinois. By the time he completed his two years of service, he had achieved the rank of radioman 2<sup>nd</sup> class<sup>1</sup>. Several colleagues, upon learning of this interesting sidebar in Dr. Weber’s life, have expressed their surprise. With his enthusiasm for physics, they assumed he’d been

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<sup>1</sup> As a part of the Naval Radio School training program, apprentices were instructed in Morse code, as well as in the basic principles of electricity, magnetism, motors and generators – generally, all of the physics and technical details of the equipment involved with radio technology as it stood at the time (e.g., Buzzell, F., 1919: The Great Lakes Naval Training Station. Small, Maynard & Co., p. 122-125). According to his service record, the radio training course lasted about one year.

headed for a career in the field at least as far back as high school. But the parallel with my own, sometimes-convoluted path make it an easy one for me to understand. Before I decided to go on to college, I took a four year hiatus in the United States Marine Corps. I believe that Dr. Weber's reasons were more practical – at least in part – than my own. His daughter Marilyn told me that one of the reasons he'd joined the Navy was to save up money for college. He told another friend that he was very interested in radio. Probably both reasons are true. There is almost never just one reason for a person's decisions, and side trips are common. These early-adult-year diversions are sometimes the very things that add interesting dimension to a person's character.

By the time he left the Navy, Weber had decided he wanted to become an electrical engineer. His interest may have been stimulated by the technological training he'd received at radio school, but that's just a guess. He did enroll at Park College<sup>2</sup> in Kansas City in 1921. Within six months of enrollment, he made application to a campus organization known as the Park College Family, the school's self-help program. Students who had little or no money could work to offset the costs of their educations. It was manual labor for the most part, including chores such as farming, carpentry and ditch digging. Louis' father may not have been in a position to help. He had retired from the police force as a captain before 1920, and tried a stint as a traveling salesman to offset the meager pension he must have gotten. I've been told that one of my own ancestors was a police officer in Cleveland, Ohio in the early 1900's. He had to take another job in order to supplement a ten dollar a month pension after leaving the force as a sergeant. When

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<sup>2</sup> Now Park University. Most of the information concerning Louis Weber's time there, in addition to certain other biographical data, was supplied by Park University Archivist, Carolyn Elwess. Park University has a surprisingly large amount of material on Dr. Weber, since he is a member of their so-called "Top 120 Alumni."

Weber entered college in the fall of 1921, his father was a bank guard. The family probably did not have much in the way of extra money, especially with two kids still living at home.

It was at Park College where Louis finally focused on physics. This change in direction was probably fostered by the head of the physics department at that time, one Dr. Ray Edwards. Under Edwards' guidance (1911-1925), the physics department at Park College managed to turn out a disproportionately large number of physicists who excelled in their field. Dr. Edwards was well known for his personal attention to students and his ability to generate interest in the subject, traits which later came to characterize Louis Weber's own teaching career. Another important event that took place at Park College was that Louis Weber met his wife-to-be, a fellow student named Gladys Zimmerman (Class of 1924).

Weber graduated, with honors, from Park College with an A.B. in physics<sup>3</sup> in the spring of 1925. He left immediately for the University of Michigan to pursue graduate work, earning his A.M.<sup>4</sup> in physics in November of 1926, then immediately began working toward his PhD. In that same year, on September 1, 1926, he married Gladys in St. Joseph, Missouri.

In late 1926, Weber was offered a position at Friend's University, a small college in Wichita, Kansas. His mission would be to develop a Bachelor's degree program in physics. He accepted the challenge, deciding to finish work on his PhD while simultaneously beginning his new career at Friend's. According to an autobiography

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<sup>3</sup> A.B., *Artium Baccalaureus*, Latin for Bachelor of Arts.

<sup>4</sup> A.M., *Artium Magister*, Latin for Master of Arts

written by Virgil E. Bottom<sup>5</sup> (a well-known physicist involved with quartz crystal research), it was Weber who sparked *his* initial interest in the field when he attended Friend's University. Quoting from Bottom's account, "He (Weber) was a man of boundless energy and enthusiasm. He never walked up stairs; he always ran. Time was simply too valuable to waste walking. His lectures were 'rapid fire' and therefore appeared to be unorganized (as they were). His enthusiasm for the subject was boundless and contagious. Students did not so much learn physics from Dr. Weber as they 'caught it'."

Weber took a sabbatical leave during the school year 1930-31 to return to the University of Michigan for work on his doctorate. He hadn't left for Ann Arbor in the spring, since his residence is shown as Wichita, Kansas on the 1930 census which was taken in April of that year. He may have traveled back and forth before the fall of 1930, since he did own a car, but that is unknown. Dr. Weber's PhD was awarded on February 26, 1932. The title of his dissertation was, "The Infrared Absorption Spectrum of Water Vapor Beyond 10 Microns." In the acknowledgements section of the dissertation, Weber expresses his gratitude for financial aid supplied by Friend's University.

Under Weber's leadership, the Physics Department at Friend's became one of the strongest in the college and several of his students went on to become well-known scientists who played important parts in the development of radar, optics, and quartz crystal technology. This was particularly important at that time, since the United States was approaching World War II – a war in which physicists would play crucial roles. From a college of fewer than 500 students, 2-5 graduated with majors in physics each year and most went on to graduate school. Apparently, they were highly sought-after

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<sup>5</sup> See; <http://www.ieee-uffc.org/fcmain.asp?page=bottombio>

graduates. Dr. Homer Dodge at the University of Oklahoma had a standing offer of a fellowship in physics for any graduate of Friends University at the time (op. cit.).

In reading Virgil Bottom's words on Dr. Weber's teaching style, I am brought back to the early 1960's at the beginning of my own college career at Colorado State. I can see it as if it were yesterday – my friends and I walking into the giant auditorium known as Engineering A100. It was a 265 person capacity lecture hall, nearly filled to the brim<sup>6</sup>. I can still feel the vibrant energy of his classes – his energetic striding from one side of the room to the other, his loud, “haaaaaaa, ha, ha” laugh, and his numerous, almost outrageous, demonstrations of basic principals. With his body in constant animation – always in a suit and tie, equipment often filling the desk at the front of the room – he would demonstrate a wide range of physical principles. He might illustrate quantum energy by throwing different sized rubber balls at different rates of speed. They would bounce around the room, haphazardly. Once, he dropped a very large stone from shoulder height to the floor, then launched into a lengthy discussion on how amazing it would have been to be the one who suddenly recognized the phenomenon as a *mutual* attraction between earth and object. He would use an electrical device to show the class how “capacitance” worked, and volunteers might receive a bit of a jolt for their trouble. He would demonstrate conservation of momentum by calling students to the front of the room, packing them into a tight line, then shoving the rearmost student from behind. Once, a girl at the opposite end of the line almost tumbled over, so Weber told everyone to turn 180 degrees, he joined the line at the end opposite her, then told the girl to push from the other side. She got a little excited and pushed too hard. Dr. Weber was

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<sup>6</sup> Class sizes of over 200 aren't all that unusual at CSU nowadays, but back in those days it was unprecedented.

knocked to the floor and it was later learned that one of his ribs had suffered a hairline fracture. It turns out that wasn't the only injury he received while conducting his energetic demonstrations.

The physical theory in Dr. Weber's classes was nearly always accompanied by practical demonstration. One cold winter day we were given three coefficients of friction – one for ice, a second for a wooden ladder, and a third for a brick wall. The assignment was to calculate the maximum distance the base of the ladder could be set away from the wall without slipping and falling to the ground. After a while we all went outside where Dr. Weber had iced an area next to a brick wall (on the shady side of the building), and we tested our guesses. The ladder eventually slipped and fell, and he issued extra credit points to those of us who'd come within a foot of actuality. And so on. It never stopped, and the vast majority of his class loved it. I can definitely agree with Dr. Bottom's descriptive summary, even though I first met Louis Weber some thirty years later.

Weber continued to chair the department and teach eight different physics classes at Friend's University until 1938, when he was offered chairmanship of the Department of Physics at a much larger school – Colorado State University (then called Colorado State College of Agriculture and Mechanic arts – or Colorado A&M, for short). At that time physics was nothing more than a service department at the school, but it was now ready to transition to a program offering a degree. With the support of the College of Science and Arts, he set about his job with typical enthusiasm. He continued to teach while developing a program that turned out its first Bachelor of Science degree in 1947, its first Masters degree in 1950, and its first PhD in August of 1957. It would have happened more quickly, but the World War II kept pulling students away.

To me, the most extraordinary thing about Dr. Weber's life is that through all of his many administrative duties, he *never* lost sight of his students. I can't say where he found the time. For example, one of the requirements to getting a grade of A or B in his class was that every student had to visit him in his office at least once a week. If you were satisfied with a C, you didn't need to come by. He had exceptionally long office hours, and his office was in frequent chaos as he went about sparking arguments and demonstrating proofs on his little blackboard – laughing loudly and encouraging students (always by their names) to challenge him and one another. His unfortunate secretary in the anteroom would be trying to work, shaking her head and rolling her eyes (fondly) as Weber set up various demonstrations in which heavy objects would slide down inclined planes and off onto the floor, or weird electrical sounds would emanate as sparks jumped to illustrate some electrical principle, or another – all of which was accompanied by the sound of a half dozen voices trying to talk at once.

How much did he care? Perhaps as much as any teacher can, and definitely as much as I've personally seen. His students were always first. He would assign homework each week and grade every paper himself. That was rare, even back then, but he really wanted to know how each of his students was doing and spot any who might be falling behind. If they were, he would set aside time to help. Generally, he seemed to find time for everything he felt to be important to physics. One sentence in a 1957 letter from Dr. Ray Edwards to the Dean of Park College, Dr. W.F. Sanders, sticks in my mind. After noting that Dr. Weber had just agreed to serve as president of the Colorado-Wyoming Academy of Science (a very active organization back in the day), Edwards

says, “I do not see how he (Weber) can engage in so many activities.” You could have engraved a plaque with those words to go over his door.

I took several classes from Dr. Weber. There was one (I forget which it was at this late date), in which we were asked to pick topics for a term project. Of the three possible choices, I picked optics. He, knowing of my amateurish fascination with the ideas of psychology, proposed that I study a phenomenon that I’d mentioned to him months before in passing (and he’d remembered) – the fact that the foothills to the west seemed further away on hazy days when compared with clear. The experiment would document the fact that the actual “distance” remained the same, that the perceived distance changed, and that the difference could be attributed to visibility. I set up a transom on the top (then deserted) floor of engineering A, and made twice daily observations of angles to and between known features on the nearby hills. The purpose was to show that none of the optical angles changed. I then measured the visibility, and estimated a perceived “closeness” of the foothills on a scale of one-to-five. Very late one afternoon, as I was making my observations before heading off to my part time job, Dr. Weber appeared and talked with me about the experiment for what must have been twenty minutes. He agreed to allow me to revise the experiment to incorporate a number of volunteers in order to make a more objective set of subjective judgments (if that makes sense). I didn’t want my own, preconceived notion to dominate the results. Then he laughed, and said in his very large voice, “Weaver, you’re a natural born scientist! It’s your passion.” He whacked me on the back and left. The words ring in my ears even today. Later I learned that he’d given that sort of individual attention to many other students.

Another aspect of the man was that he was completely taken with world travel – not to see “things” so much as to meet people from other cultures. He loved people without qualification, and had not a drop of prejudice in him. If he would hear a student make a negative comment based on race or culture, he would take time to pull the person aside and quietly speak with them. This was long before the era of mandated diversity<sup>7</sup>.

In the summer of 1958 he went to the University of Peshawar on an exchange program where professors from the United States traveled to Pakistan, while students from there visited here. He stayed for two years (though I’m not sure it was full time), returning in December of 1960. His job title was “science advisor.” Activities included teaching, helping define curricula, and assisting with setting up physics laboratories. While in Pakistan, he met a man named Jafar Naqvi who ended up emigrating to the United States. For a couple of months after he arrived, Weber took the young man with him everywhere – introducing him to friends and colleagues alike. Dr. Naqvi earned his PhD at Colorado State University and spent much of his career as a superb teacher of physics at Rocky Mountain High School in Fort Collins. When I interviewed him, his admiration for Dr. Weber was palpable. He recounted many stories, not only of his mentor’s kindness, but also of his unusual teaching techniques and was able to confirm at least two times when Dr. Weber broke bones in attempting to simplify some difficult concept for his class. Naqvi says that Weber was never discouraged by it, but rather would laugh and begin again just as soon as he healed. The list of places that Dr. Weber

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<sup>7</sup> For a bit of the rationale on how this attitude came to develop in Dr. Weber, the interested reader should read, “Weber, L.R., 1953: A Fulbrighter in Baghdad. *Physics Today*, 6, 4-7” in which he describes some aspects of his upbringing.

visited as an advocate of his beloved physics is long, but among the most notable included Manila in the Philippines, Medellin, Columbia and Baghdad, Iraq.

A couple of more classic Weber stories, then I'll wrap it up.

While teaching at Friend's University back in the 1930's, Louis Weber would often load up his own car with physics equipment from his laboratory and drive around to various high schools in and around southern Kansas. In so doing, he inspired dozens of young high school students to pursue a career in the sciences. One such young man was Lawrence Hadley, who – inspired by Weber's demonstrations – set his career goals that very day. Hadley later remembered helping Dr. Weber carry his equipment back out to the car, chattering enthusiastically all the way. After high school, Hadley earned a Bachelor's degree in physics at Friend's University, then went on to earn his Master's from the University of Oklahoma and a PhD from the University of Michigan. He became a very well-known scientist and scholar, making his mark in solid state physics, thin films, optics, and acoustics. He also became a professor at Colorado State University and chaired the physics department for three years following Dr. Weber's retirement. It had been just one presentation in high school, but it had been enough.

Another example of Louis Weber's ability to inspire young minds began when twenty-one year old Don Hammond, having just returned from World War II, found himself searching for his scientific niche back in 1948. He had tried a year-and-a-half as a chem major, and a year at math. Now, he was at a loss as to what to do, though he did know he wanted a career in science. Following a single meeting with Dr. Weber, Hammond decided on physics. He earned both a bachelor's and master's degree at CSU. At one point the young student was running out of money and nearly quit the program to

get a job. Dr. Weber didn't want that – Hammond was too promising. He told him that he would consult with his wife, Gladys, to see if *they* could help out a little with money. Fortunately, Hammond was able to secure his own financing from an uncle and did complete the Master's program. He was later presented with an honorary PhD from Colorado State for his important work in the sciences. Hammond spent four years working for the U.S. Signal Corps (1952-56) on quartz crystals, then opened his own quartz crystal manufacturing company in Colorado. In 1959, he went to work for the Hewlett-Packard Corporation in Palo Alto, California and, in 1966, became the director of research for the behemoth's brand-new calculator and computer division.

Don Hammond has since left HP. He was with them for 30 years. In his 80's now, he still serves on the board of two technologically-oriented companies in California's Silicon Valley. Within minutes of learning that I was compiling a short biography on Dr. Weber, he called me at home. An important and successful man, with continuing responsibilities in the corporate world, he wanted to talk as long as I was willing to listen. He wanted to make sure that his mentor and friend was well remembered. I was entirely impressed and deeply touched by Dr. Hammond's enthusiastic input and by his personal love for science.

Louis Weber retired as chair of the physics department at CSU in 1965. In his wake he left a fully accredited physics program, with degrees from Bachelor of Science to PhD. He was honored many times during his life, some for his research, but mostly for his inspired teaching. He received a number of Fulbright scholarships to teach physics in places all around the globe. He received the Oliver P. Pennock distinguished service award in 1963 from CSU, then was awarded the National Association of Physics

Teachers distinguished service citation in 1965. In research, he was elected a fellow of the Optical Society of America in part because of a landmark paper on the far infrared spectrum of water vapor. Furthermore, his PhD dissertation is still being referenced by the global climate community<sup>8</sup>. He is frequently remembered for the help and support he provided for Virgil Bottom's critical quartz crystal work. Bottom's research had widespread application – the use of quartz crystals for frequency control in communications and precision timing devices.

For his overall contributions to physics, Friend's University named its physics laboratory after him in 1973 (the Weber Laboratory of Physics), Park College presented him with their Distinguished Alumni Award in 1975, then, in 1996, named him one of their 120 Top Alumni. In 1981, Colorado State renamed the old chemistry building on the west side of the historic Oval Drive after this great physicist and educator. At that time, the first floor was occupied by undergraduate physics laboratories. After a 1999 expansion of the physics portion of the Engineering Building, the Weber Building became the Department of Mathematics (with a couple of computer labs on the second floor). It was there where I met the young, disgruntled student.

I graduated from CSU with a BS in Mathematics in 1968. I had failed to achieve my hoped-for double major in math and physics. After years of 18-20 credit hours and 30-50 hours a week at various part time jobs, I had temporarily burned out and just wanted to be done. During the next four years I tried a variety of jobs, but never found anything that came close to satisfying my personal hierarchy of needs. I would often think of Dr. Weber during those dark years – his happiness and enthusiasm, his boundless

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<sup>8</sup> For example, in "Historical Perspectives on Climate Change" by James Rodger Fleming, 2005, Chapter 9 – Global Warming? The Early Twentieth Century, Oxford University Press.

energy, and especially his words to me on that late and lonely afternoon, “Weaver, you’re a natural born scientist.” I remembered those words frequently and eventually found my way back. I headed off to graduate school – became a scientist and taught classes at various levels over the next thirty years. One of the things that I was consistently told was that my style of teaching inspired the students in various classrooms around the country – made them enjoy the experience of learning.

I think often of the vagaries of fate that sometimes start a chain which transcends generations. Did Dr. Ray Edwards at Park College inspire young Louis Weber to become the excellent teacher and physicist that he later became? What role did the Navy play? What would have happened with American radio technology had not Dr. Weber inspired Virgil Bottom, and others, to pursue physics as a career? Would anything have changed in the war effort, or in American industry later on? And how about Dr. Hammond? What would have changed at Hewlett-Packard during those glory-years of American computer dominance had he not been a part of it?

How many people’s lives did Louis Weber change? I know of dozens of prominent physicists that were created directly through his inspiration, but also know that there must be hundreds of other former students whose lives were changed by his enthusiastic, unabashedly passionate love for science. Dr. Weber inspired people to reach higher – to become more than they were. He inspired me.

Dr. Louis Russell Weber died on May 18, 1989 in Fort Collin, Colorado. He left behind a wife, Gladys<sup>9</sup>, two daughters (Marilyn and Margaret) and a legacy of top notch physicists spread around the country and across many generations. He was the greatest teacher I have ever known.

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<sup>9</sup> Gladys Weber died on October 22<sup>nd</sup> of the following year.

Way back at the beginning of this article the young student's implied question was, "Who was Louis Weber?" Hopefully this helped.

## Sources<sup>10</sup>

Page 1: a) the author. b) Dr. James Sites, Associate Dean, College of Natural Sci., CSU

Page 2: a) the author, b) U.S. census data\* 1900, 1910, 1920, c) Central High School, St. Joseph, Missouri, d) Park College, General Student Information Card\*, e) Buzzell, F., 1919: The Great Lakes Naval Training Station. Small, Maynard & Co., p. 122-125 (book available online at Google Books at the time of this writing).

Page 3: a) the author, b) telephone interview with Louis Weber's daughter Marilyn Oline, December 2008, c) Park University, Kansas City archives, d) 1920 U.S. census data\*, d) the St. Joseph News-Press, August 30, 1933\* .

Page 4: a) ) the St. Joseph News-Press, August 30, 1933\* . B) Park University archives, c) commencement brochure, Park College\*, d) the University of Michigan\* , e) Buchanan county, Missouri clerk and recorder, f) University Relations, Friend's University.

Page 5: a) Virgil Bottom autobiography [available on line, see footnote page 4], b) a brief handwritten biography by Louis Weber submitted in response to his nomination for the Park College Distinguished Alumni Award in 1975. c) 1930 United States Census data\* , d) University of Michigan\* , e) University Relations, Friend's University\* .

Page 6: a) the author, b) personal interview with Dr. Jafar Naqvi (retired).

Page 7: a) the author, b) University Relations, Friend's University, c) Development Council Newsletter, February 1964, "A Quarter Century of Physics at CSU", a pamphlet written by Louis Weber\*, d) Virgil Bottom's autobiography.

Page 8: a) The author, b) personal interview with Dr. Jafar Naqvi (retired).

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<sup>10</sup> Source documents annotated with an asterisk "\*" are available from the archives of Colorado State University (Fort Collins, CO), Park University (Kansas City, KS), and Friend's University (Wichita, KS).

Page 9: a) The author, b) Dr. Jafar Naqvi (retired).

Page 10: a) Dr. Jafar Naqvi (retired), b) CSU Press Release<sup>\*</sup>, October 13, 2000, “Pendulum Honors Professor Emeritus, Puts New Spin on the World.”

Page 11: a) CSU Press Release<sup>\*</sup>, October 13, 2000, “Pendulum Honors Professor Emeritus, Puts New Spin on the World,” b) Multiple telephone interviews with Dr. Don Hammond, Los Altos Hills, California.

Page 12: a) the author, b) CSU Dept. of Physics, c) obituaries – Fort Collins, Coloradoan newspaper, May 21, 1989<sup>\*</sup>, d) Physics Today, October 1990<sup>\*</sup>, e) Virgil Bottom autobiography (available on line, see footnote page 4).

Page 13: a) University Relations, Friend’s University, b) Park University, Kansas City archives (copy of award available)<sup>\*</sup>, c) Colorado State University “Comment” newsletter, June 18, 1981<sup>\*</sup>, d) Dr. James Sites, Associate Dean, College of Natural Sci., CSU e) the author.

Page 14/15: a) the author, b) Obituaries: Louis Weber, Fort Collins, Coloradoan newspaper, May 21, 1989<sup>\*</sup>, Gladys Weber, October 24, 1990<sup>\*</sup>.

## Acknowledgments

The author would like to mention a few of the many individuals who provided significant help in putting together the material for this account. Without their assistance, this project would have been a lot tougher, if not impossible. When I first began, I spent a week gathering together everything I could find on the CSU campus about Dr. Weber. I ended up with a half dozen pieces of paper – drips and dribbles – containing a few miscellaneous facts, as well as a source for official CSU archived photos. I knew that I could learn some genealogical information from the census data and figured I could find an obituary. But things looked pretty bleak. Then, one-by-one, I began to stumble upon some amazing people who helped turn the drips into a steady flow, then finally a flood of information. It is they who made this account possible.

First, and foremost, is Park University Archivist, Carolyn Elwess. She is a true historian, with a passion and perspective for the importance of remembering the past. Park University already has a large amount of material on Dr. Weber – mostly from his time spent there, but also a bit of material that provided further trails for me to follow. Mrs. Elwess displayed a nearly infinite amount of patience in dealing with what must have seemed an endless stream of questions via e-mail. She was able to provide a beginning point, along with numerous leads. Thanks are also due CSU archivist, Patty Rettig. She was able to find what limited material did exist at CSU, and helped me access some excellent copies of several old photos of Dr. Weber from his days here. Patty is also anxious to archive whatever material I come up with in this search – a fact which makes the whole project seem even more worthwhile.

A special thanks to Dr. Weber's daughter, Marilyn Oline. Though in the midst of moving from Utah to Colorado, she took the time for a couple of pretty lengthy phone conversations, and managed to locate several photos of her father from boxes already packed. She delivered them to Fort Collins on her way through to Golden one blustery December day.

As noted in the article, both Dr. Donald Hammond and Dr. Jafar Naqvi provided insightful and informative interviews. Both men were willing to not only spend time talking about their mentor, but also reviewed manuscript details to help assure that the parts they were familiar with were reflected accurately. Dr. James Sites, Associate Dean, College of Natural Sciences, CSU, also knew Dr. Weber. He reviewed the manuscript for me, though he was right in the middle of one of those administrative shuffles that happen sometimes when someone in the university's administrative stratosphere departs for another job. I would also like to mention Dr. Hervey Wright, director of University Relations at Friend's University who helped fill in some of the details of Dr. Weber's time there, and Amy Kretzer at Central High School in St. Joseph, MO who supplied a bit of high school data.

There is a special place in my heart for Simone Clasen who is the director of the College of Natural Sciences here at Colorado State. She saw the worth of this project from the very beginning, offering help and support whenever she could. She paved the way for me a couple of times when the going might have gotten a bit rocky. Finally, thanks to Bonnie Gillmore, Program Assistant, Department of Physics, CSU, and to the many members of faculty and staff at Colorado State who took time from their busy days to answer what questions they could.

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- \* = have printed abstract (often a conference abstract), or book review
- \*\* = have copy of full paper

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<sup>11</sup> This bibliography was constructed (initially) from two, incomplete lists that I found – one at Colorado State, and the other at Park College. I filled in a few more references from the internet and from physics data bases accessed through interlibrary loan. The bibliography is most certainly lacking at least a few papers and presentations that I wasn’t fortunate enough to stumble upon.

<sup>12</sup> Dr. Weber’s original dissertation title “Some Infrared Absorption Bands,” and appears as such on an the original copy of his dissertation stored at the University of Michigan library. However, the graduate school gives the title as, “The Infrared Absorption Spectrum of Water Vapor Beyond 10 Microns.” That is also the title used in formal reprints of the work supplied by U. of Michigan, and was the title used in the peer-reviewed version which appears in *Physical Review* with his faculty advisor as a co-author.

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