

An Interview with Ruth Richmond Gardner, M.E.

This article derives from a two-hour interview with Ruth at her home in Colorado Springs, Colorado, in January 2015. The material from that interview has been condensed and rearranged to create the following narrative. The words are her own, save for those appearing in italics or brackets.

I was born in Seward, Nebraska, in 1930 [to Russell Francis and Alta Cornelia (Carse) Richmond]. My dad was in the Highway Department in Lincoln and he was an engineer. He taught for four years at the University of Arkansas and then, in 1930, they eliminated his job and so we went to Lincoln, Nebraska, and [he] worked in the Highway Department there. I grew up in Lincoln.

Mechanical Engineering at the University of Nebraska

I went to the University of Nebraska [and received a B.S.] in mechanical engineering. I started in the fall of 1948 [and graduated in] 1956. I wandered into something else and flunked a bunch of things because I was interested in something else other than physics and calculus and that sort of thing.

I don't know why I didn't change majors, but I didn't. I took all manner of things while I was getting through calculus and I finally took [that] by correspondence because the typical teacher was a graduate student and he was interested in the bright boys in the front row and those of us in the back never got any help.

Being the first woman to obtain a mechanical engineering degree from the university presented some unique challenges.

I lived on campus for a while and I had to [wear] a dress across campus and find the mechanical engineering department and change my clothes. I did whatever I did, pattern making and foundry practice or something equally interesting, and then I had to put on a dress and go home, on campus.

One thing was kind of funny; we had a senior [class] engineering project. Normally they went to Kansas City or St. Louis or some place and the guys kind of enjoyed the places, but the dean of women would not allow me to stay overnight, so we went to Omaha, we went to Columbus, we went to Beatrice in, of course, several days. But in Omaha we were doing a lead smelter and, of course, I had to have a dress. The guide discovered that I was wearing a dress and he wouldn't want me to [have to] watch my undies. So he would send me to the elevator [to avoid being seen on the stairs from below] and I really didn't know a whole lot about that lead smelter because I spent all my time in the elevator.

The challenges included occasional snide comments about women.

The graduate students in drafting, they were talking about the drafting equipment and I can't remember exactly what he said, but [something like] "Can't we find a nice curve." [But] I ignored all that kind of stuff.

First Job, Kennecott Copper, Utah

On April 30, 1956, graduating senior Ruth Ann Richmond sent an employment application to the engineering department of Kennecott Copper Corporation's Western Mines Division in Salt Lake City. Two weeks later, the department's chief



Ruth Ann Richmond, mechanical engineer.

engineer, S. D. Michaelson, wrote to Richmond in Lincoln: "If you are still interested in employment with our company, I would like you to come out to Salt Lake City, at our expense, to meet some of the people in our Engineering Department, and to be interviewed by them. . . . You should arrange to stay for two or three days so that you would have enough time to talk with our people and to see some of our operations here."

[Upon graduating] I applied for a job in theater lighting in Minneapolis, Minnesota, and I got this answer: "We don't use women for that sort of work." I applied at John Deere. [But] my first job was Kennecott Engineering, Kennecott Cop-

per Corporation, at Salt Lake City. The Western Mining Division Engineering Department covered the four divisions: Santa Rita [New Mexico], and Ely, Nevada, and Bingham Canyon [Utah], and Arizona.

And they didn't know what to do with me. All the men, when they went to Kennecott, they started out in the pit and they usually spent a while in the pit and then they would come to the engineering department and go on there, but they didn't know what to do with me.

I was hired as a technical writer, but they messed around trying to find me a job at various things before I got into that. The mechanical engineering [department] head was very nice. One guy I worked for thought I was a spy for the boss and [another] guy that I worked for was stark crazy and he was blaming me for a lot of things.

I finally went over the middle manager and I went directly to the boss because the middle guy kept throwing me back and I finally just went over him to the head of the Western Mining Division Engineering Department, the big boss. S. D. Michaelson was the boss in Salt Lake. He was the one who hired me in the first place. I was either going to quit or I was going to do something other than [work with the crazy] guy.

I finally got a real fun job. I read all of [Michaelson's] stuff and sorted it out, what was interesting to him and what wasn't. Then I put out a newsletter for the four engineering departments.

One time I wrote about a place where twenty-seven miners were killed in a cave-in or something, I don't remember now what it was, but it was in Africa. The big boss in New York really raised hell [but] my boss stood up for me because the information that I gave was public knowledge. It was [in] *Engineering and Mining Journal* or some place like that, and he backed me up. [But] if I goofed, I heard about it. He backed me up when I was right, but oh, boy, if I was wrong.

I was the only [female engineer in the division]. There were women, secretaries and that sort of thing. We had a [receptionist] and she didn't know where California was. I kind of wrote her off. But I was the only engineer.

At Kennecott they had some wonderful people. There was a mining engineer that was renowned and Royal Stephens was his name and he grew up, I think, in what is now Zimbabwe. And I got interested in mining. They took me out to Tintic [Utah] and it was just being [developed], sinking a shaft, and it was in Eureka, Utah, and Dividend [Utah]. We were trying to find sourc-

Ruth Richmond at her drafting table in Kennecott Copper Corporation's Western Mining Division Engineering Department in Salt Lake City, Utah, in July 1956.



es of water because they had to have water, they couldn't do without it. And so we were looking at springs and everything, trying to find any kind of water that we could get east of Tintic, but not very far east.

And they got me all geared up with the yellow suit and everything to go underground, and it was funny because the pants came clear to my shoulders and the coat clear to my knees. I looked funny, but these [men] were very respectful and nice and kind. I always said when I was underground that if anyone was superstitious or had any problems, why I wouldn't go down, and nobody ever had the guts to chase me out.

And we went down to the bottom of the shaft and the geologist said that [in] maybe fifteen or twenty feet, we'll get ore, and it worked. He was right, and that was my first trip underground, [in 1957]. I got interested in mining because they let me go down.

[They let me apply my training to the mining operations] a little bit. They were working on this Dividend project and Kennecott had no business being underground because they were all surface mining, [but] they messed around and got into it. It was mainly geologists; the Bear Creek geologists were [working] on that. But I enjoyed the mining part and I asked if I could take any classes, [but] at that point you only would have [done] that in the daytime, and they wouldn't let me.

[I was at Kennecott] from [July 19]56 to [June] 1958 and I, meanwhile, got married and was pregnant and so I quit. I quit Kennecott because I had to worry about a baby. I met [Kenneth C. Nolte] making decorations for the YMCA Valentine dance in February 1957. I got married in '57 and got pregnant in early '58, and had my first daughter in November of '58. I had to leave [Kennecott] to have the baby. At that time, oh my, you're pregnant. Nowadays, they do it at the last minute and then six weeks later they go back to the job, [but] my husband didn't want me to work.

Raising Her Family

Ruth Nolte left engineering for the next decade to raise Shannon Kay Nolte and her second daughter, Jean Wyndham Nolte, born in April 1960. Ken Nolte worked as an account executive for J. A. Hogle and Company in Ogden, Utah, until mid-1962, then as a trust officer for a bank in Albuquerque, New Mexico, until tragedy overtook the family. Before he met Ruth, Ken had been a weather observer for the U.S. Army during radioactive testing in Utah in 1952-53.

My husband died when he was thirty-six because he [had] worked in the Dugway Proving Grounds and they put radiation on the ground, but they didn't know whether it would work or not, if they would have problems or not. And they had problems. He was a meteorologist and he was into the weather. And down wind. He died in [Aug.] '67, and then in '68 we moved northwest.

I was going to try and get to Moscow, Idaho. I wanted to get a job there. I just looked there thinking I could go back to school and learn the mining. But I couldn't, there wasn't any place [to live]. There was one Presbyterian, the preacher's house was there, but it was completely gutted. [And] another house that came equipped with six students up the stairs. One man [said], "Oh, poor widow, 'wider,' woman like you, I'll tell you what, I've got a nice place up the street and it comes complete with 250 chickens." I had raised chickens when I was eleven, twelve, thirteen, and was not interested in 250 chickens.

So we moved on to Spokane, where I knew a friend, and we stayed there. And then I found a place where we could live and got a drafting job. Drafting was the easiest way with little ones; why they wanted water and I would turn it off and get the water and then go back, so it was very haphazard. I went one year for drafting. Because I wanted to be home when the kids came home and couldn't leave until they'd gone to school, the boss said "Well, when can you work?"

In September 1969, Ruth Nolte took a job with E+E Management Corporation, the duties of which she later summarized as “research, report writing, editing, computer program documentation, drafting, record keeping and general assistance to the president.”

I got a job the next year in Scottsdale, Arizona, as a [technical] writer. I was doing letters for people who didn't want to write them. E+E Management, a friend started the thing. He worked in the uranium area in Wyoming and then went to Scottsdale, Arizona, and worked. He had a taste [for] the uranium business and they were, you know, dropping claims and that kind of thing. One of the guys was a metallurgical engineer and they had mining interests, they were trying to rebuild a mill and that kind of stuff.

There were two brothers, one was a dreamer and the other one was practical. I had to keep track of who I was writing for because one fellow worker, I was writing letters for him and he had, “I am yours of the 25th,” very old fashioned letters. And he wanted it [that way] and I couldn't change him. I can't even remember his name, except that he did not like my letter writing.

It really was kind of interesting for the first year because I didn't know anything about the business and then when I figured out how it was going to work, why I couldn't write the letters anymore, because I knew too much. I could say, “Wait a minute, what's that all about,” but if you already knew it, why it didn't work anymore. Also, then I was getting started on computers. I had my first computer thing in '69. It was [a] GE and I spent some time with that.

She left E+E in January 1972 and hired on that summer at Sudbeck Engineering in Scottsdale as an administrative engineer involved in “redesign of administrative procedures, computer subdivision calculations, preliminary water, sewer and paving design.”

The Mackay School of Mines

Ruth Nolte left Sudbeck in August 1973 to enroll at the Mackay School of Mines, at the University of Nevada, Reno. She took her first course, “Mining Law,” that autumn. She then took two or three courses a semester through spring semester of 1976—everything from “World Mineral Economics” to “Rock Mechanics.” She took the three-credit “Advanced Mining” courses “Blasting Methods Design,” “Surface Mining,” “Equipment,” and “General Mining,” as well as the three-credit “Mine Environmental Control,” and “Mine Plant Engineering,” and one-credit offerings in “Mine Surveying,” “Mineral Economics,” “Ore Reserve Estimation,” “Safety,” and “Solution Mining.”

[From] 1973 to 1976 I worked on a master's in mining engineering. I should've probably gone through the whole [program,] beginning, middle and end, but in order to pay for it, I went with a master's. I didn't have to write a thesis. I did a project building a simulated [uranium] mine. Basically it was a model.

During her years at the Mackay School of Mines, Nolte was a graduate research fellow employed at the Nevada Bureau of Mines and Geology from September 1973 to June 1976. As such, her name appears as “student assistant” in such bureau publications as Larry Garside's “Geothermal Exploration and Development in Nevada through 1973” (1974) and Keith Papke's, “Talcose Minerals in Nevada: Talc, Chlorite, and Pyrophyllite” (1975).

A highlight of her years at the Mackay School of Mines arrived in a letter of May 20, 1975, from C. DeWitt Smith, chairman of the Henry DeWitt Smith Scholarship Committee of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Smith's letter informed Nolte that she had been awarded one of the four scholarships offered by the committee every year in the U.S. and Canada.

The trust began awarding these scholarships



SPARKS GRADUATE STUDENTS Ruth Ann Nolte and Noel Finnigan (right) of the Mackay School of Mines, University of Nevada, Reno, receive certification of Henry DeWitt Smith scholarship awards, presented annually by the American Institute of Mining, Metallurgical and

Petroleum Engineers to four "outstanding graduate students in the mineral engineering field" throughout the U.S. and Canada. Presenting the certificates on behalf of the AIME is Dr. Arthur Baker III, Dean of the Mackay School of Mines.

Nolte, Finnigan get UNR mining awards

Arthur Baker, dean of the Mackay School of Mines, presents graduate students Ruth Nolte and Noel Finnigan certificates of award for their Henry DeWitt Smith scholarships at a meeting of the Northern Nevada Section of the A.I.M.E. in 1975.

in 1967 "to assist worthy students in the pursuit of their graduate education in the Mining, Metallurgical, Materials, or Petroleum Departments of leading universities and colleges." Nolte was the twenty-fifth person and first woman so honored.

Three years later, in 1978, she became the first woman to earn a master's degree in mining engineering from the University of Nevada.

Uranium Mining in the Gas Hills of Wyoming

The Gas Hills Mining District is located in the center of Wyoming, about fifty road miles from Riverton, to the west, and one hundred from Casper, to

the east. Prospectors discovered uranium in the area in the early 1950s and soon miners staked thousands of claims and dug numerous small open pits in the region. By the end of the decade several mills had been erected in the Gas Hills to process the district's ores, and both large-scale and underground mining had begun.

In the 1970s three main companies operated in the Gas Hills, each with a mill and living area. The U.S. government's Tennessee Valley Authority, working through Federal American Partners, one of those companies, undertook both surface and underground development and production. Extraction continued until the early 1980s, when low uranium prices ended operations.

I still had a year to go, basically because the kids were growing up and I had to watch them first. I still had a year to finish off the master's, but I needed to get a job and so I went with Tennessee Valley Authority [as a] mining engineer [in July 1976, doing ore-reserve calculations, log editing for computer input, equipment evaluation, and cost studies]. They had uranium [mines] in the Gas Hills, and they were trying to use uranium reactors. I was working in uranium and I spent some time taking out trucks and [determining] how to use them and all that kind of stuff.

I worked for a year with Tennessee Valley Authority—to the day—because at that point, the geologist that was my boss didn't think that engineers were much good, and so I spent most of my time figuring out whether the computer could add. And I really didn't want to stay there because the Tennessee people didn't know anything about mining, but they were producing programs and so after they got the program, they gave [it] to us, and so I had to find out whether the computer could add or not to make their programs work.

And then I worked for Mullen Engineering and that was kind of another technical writing thing [in 1977 and 1978, doing environmental studies, mining permit acquisition, mine planning, uranium treatment and process evaluations, and research]. Mullen Engineering was out of Seattle. It was a fairly small company.

On April 27, 1978, Ruth Nolte and two other Mullen employees visited Federal American Partners' operation in the Gas Hills. The following day she wrote that “while they were going through the mill, I spent most of my time talking with several of the FAP people, primarily Ken Crymble, Chief Engineer. A number of items came out of our discussion.”

In her report she noted that “things are really moving at FAP. After TVA approval, equipment has been purchased and the dirt is beginning to move. FAP has planned for five open pits and one underground mine. . . . The shovel to be used

on the Buss Russ [pit] is arriving and should be in operation by August. Until then a large front-end loader will load the 100-ton trucks now being assembled. The shop is under construction and mine offices will be moved to the shop in 30 days. The underground mine . . . surface area is being prepared. The shaft area is being dewatered. Bids for the shaft sinking will go out next week. Mill expansion is being planned. . . . The present mill handles 950 TPD. Future expansions are considered for 2000 TPD and 3000 TPD. Housing is being expanded in the mill camp and more trailer space will be available in a camp near the shop.”

Her analysis of FAP's operations included recommendations for ore recovery. “TVA would consider a consultant, but I don't think they will initiate it. FAP has a real need for more help. We need to find out how to approach them and show that we can do the best job for them.”

She believed that “one of the primary problems for FAP is that they are growing too big, too fast. . . . FAP has no new overall program for the Gas Hills. Much more drilling needs to be done. . . . FAP has not found a manager. . . . The engineer is trying to hire two mining engineers but it is very difficult to find engineers that are not either overqualified or underqualified. . . . FAP needs a lot of engineering work now. . . . We could give them everything from an interim manager and full-blown engineering study down to one engineer to help.”

Mullen did provide FAP with a mining engineer: Ruth Nolte.

I left Mullen because my job didn't exist anymore. The company pulled back. [For] Federal American Partners, [I did] a little of everything. They had sunk a shaft and were trying to work at it. We were checking wells, and I had to check out a lot of these wells [to] find out the water table. Needing to get water, they had sunk wells but they had to keep track of these wells. At one point, I was trying to put in a road to Union Carbide, but the sage grouse was a problem [environmentally].

The living area was fifty miles from Riverton and people raised gardens and did all kinds of things and then all of a sudden they couldn't do anything anymore because they supposedly had picked up uranium from the mill. The mill was right next to the living area.

They had got a whole trailer for me and somebody else in some other company that worked in the area and they decided that I had this trailer and so I had to share it with somebody. Funny little, almost a cubbyhole kind of bed, just a real bad spot for her, and I had the bed, so when I went home on the weekend, boy, [my bed] was fair game, I guess.

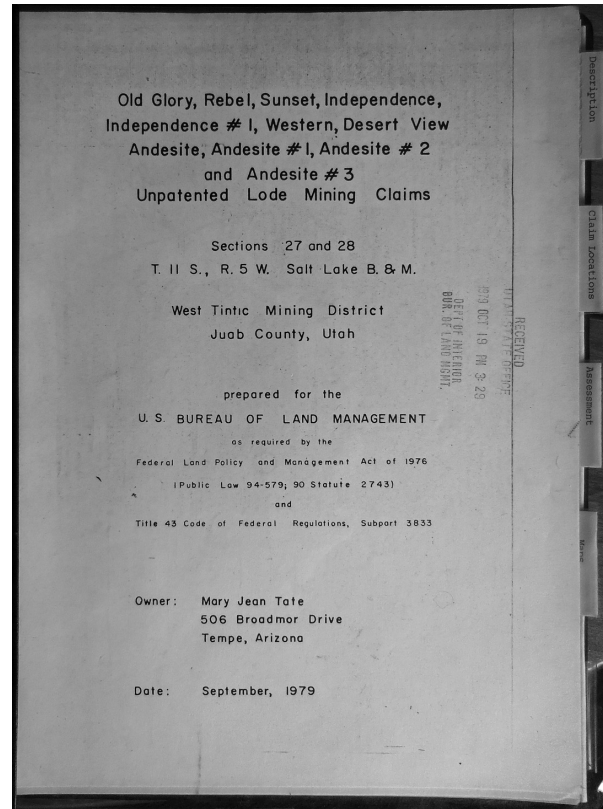
She worked out of the office at Riverton during the week, and drove home 120 miles to her family in Casper on the weekends.

[Because of the region's isolation] you always helped anyone that needed help. I know I picked up a guy, a young man, that was stuck in the snow and I was going home [to Casper] Sunday night and he was just down the road not very far and I said I'd take him to his house and he said, "Oh, no, I'll walk because it's really rough," and so I didn't. But I got him to where he needed to go anyway.

[In 1979] Granddad Nolte died and I assumed that I didn't have to worry about providing [an] education for [my] kids and so I quit.

Her Second Marriage

She also had to contend with health problems and had married again. Ruth Nolte and John Darrell Gardner met while working for Mullen Engineering. In 1979 they moved to Utah, where John Gardner pursued his Ph.D. in mining engineering, and served as president of the Tintic Western Mining Company, headquartered in Salt Lake City, in which he had once held an interest. In summers during the 1980s John and Ruth also worked on the company's claims.



The dossier Ruth Gardner prepared in 1979 to satisfy the U.S. Bureau of Land Management's requirements for information about the Tintic Western Mining Company's lode claims in the West Tintic district.

Years earlier, John thought [that this] gold property was no longer relevant, so he disclaimed any of those claims. The patented claims then went to Daniel Sullivan, a cousin, and later to Mary Jean Tate, another cousin. We worked [on the] patented claims for Dan Sullivan and later [for] Mary Jean Tate. West Tintic is about twenty miles west of Eureka. We did a lot of assessment work there. There was a shaft that had been vandalized and burned and we mainly covered the terrain thing for assessment work. We had a mobile home [a recreational vehicle]. We did some every year and we [encountered] a lot of rattlesnakes out there.

The University of Utah accepted John Gardner's Ph.D. dissertation, "Concepts of Mine Evaluation and Design Optimization," in 1981. That August, the University of Wyoming hired him as an assistant professor of mining engineering. John and Ruth organized and conducted mine rescue contests at the University of Wyoming.

We did several years of the mine rescue contest. They had to solve a smoke problem and all kinds of stuff. I also worked as a volunteer in the University of Wyoming American Heritage Center. I worked with the wonderful ink-on-linen drawings of the Joshua Hendy Machine Works, an outstanding mining company.

The drawings had been stored near the railroad tracks in Laramie [before being] moved to a different (cleaner) warehouse. I had to dust each drawing and organize them in chronological order. I would like to have done more research on where and when the drawings were used, but that was not to be.

Retirement

After John Gardner died in 1989, Ruth retired in Laramie—but not for long.

When I lived in Laramie, I thought this has got to be the coldest place on earth. I looked at the television and Powell [in northwestern Wyoming] was warmer and everything seemed to be warmer. So I thought, well, it's another college town, and I think I made five trips to Powell and then couldn't find anything to live [in] and I was heading back for Laramie and I stopped in Meeteetse for a cup of coffee. Just coffee on a Sunday morning.

There was a fellow who had dated a cousin of mine, and anyway, he told me that, "Oh, well, I know the mayor so why don't you call the mayor?" And I said it's Sunday morning. "Well, never mind, don't worry about that." So I called the mayor and the mayor said his clerk knew more about it than he did. So then I went to the clerk



Ruth Gardner's certificate as a charter member of the Mining History Association, 1990.

and she knew about a couple of houses, one of which [maybe] somebody's brother wanted, and then this certain other one. And so I finally found this other one, and that's where I stayed for twenty years [from 1991 to 2011]. Laramie was windy and Meeteetse was not.

I am [still interested in the profession], and I started [with] the Mining History Association [in 1990] because of [my] several strokes. I wanted to re-learn and that's the whole reason why I went [to the Leadville conference in 1991]. That was my first one, and after my husband died, I ventured out. At one point I couldn't drive, but after he died, I figured out that I could drive and so this was an adventure, going to Leadville [from Laramie].

I'm a member of the Klepetko chapter [of the Society for Industrial Archaeology] in Montana, [and of the Society for Mining, Metallurgy, and Exploration of the A.I.M.E. for] forty years. I should have started [with A.I.M.E.] at Kennecott. I didn't get started until later. ■



Ruth Gardner at home, January 2015.

Ruth Gardner was also a member of the Society of Women Engineers during her college days, and is a member of the Australasian Mining History Association. With her daughter, Jean, she visited the Tyrconnell Mine, in Queensland, west of Cairns, in 2012.

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