

Chapter 6

Argonne National Laboratory

Argonne National Laboratory is one of the four national laboratories built as part of or an offshoot of the Manhattan Project which produced the atomic bomb during the second world war. These include Oak Ridge National Laboratory, Los Alamos National Laboratory, and Brookhaven National Laboratory. I have experience at all four, having done my Ph.D. thesis at Brookhaven, my sabbatical year at Oak Ridge, and giving a talk and having a job offer from Los Alamos. At the time Argonne was the leading reactor developer in the nation, having built 14 reactors on site and 14 more at the Argonne research station in Idaho Falls, one of which produced the world's first electricity. My own work the first two summers was on the Chicago Pile 5 (CP-5), the last of the CP series which began with CP-1, the world's first reactor.

As significant as my appointment to Argonne was professionally, perhaps even more significant was its influence on my social life. At the first Church of the Brethren Youth Fellowship (CBYF) meetings I knew my new "sister", Nancy Royer, and several other young people from camp. However, some one who caught my eye, who I did not know, was one of Nancy's best friends, Joyce Maier. She was very attractive and quite friendly. She was to become my wife and life long companion. I checked with Nancy to get her name and telephone number and called her for a date later that night. She agreed and, as they say, "the rest is history".



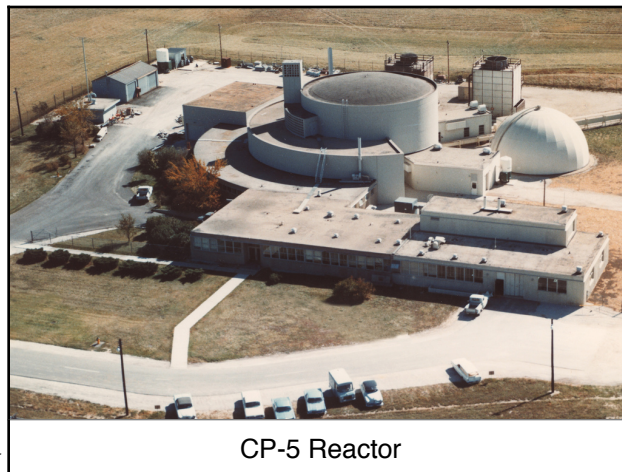
Me, Joyce, Audrey, and Douglas

This photo was taken early in the summer in which Joyce and I, and Audrey Bessert and my brother, Doug were married. Joyce was visiting our family on the farm, and it seemed like a good time for the picture.

I met Joyce right after my Sophomore year in college, and we dated summers until our marriage on June 26, 1960.

My first two summers were spent under the supervision of Dr. Bradley Burson of the Physics Department. Dr. Morris had worked in Dr. Burson's group the year before I joined. Dr. Burson had his Ph.D. in physics from the University of Illinois and a law degree. He was also blind.

The research of our group was to determine the decay schemes of radioactive elements in the rare earth series (cerium - yttrium). The tool we used was gamma ray spectroscopy, identical to that we had done in the Radiation Lab at Manchester. The difference was that the Manchester lab used a single channel analyzer, whereas the Argonne lab used a 256 channel analyzer developed by Argonne engineers and housed in the basement of the CP-5 reactor.



CP-5 Reactor

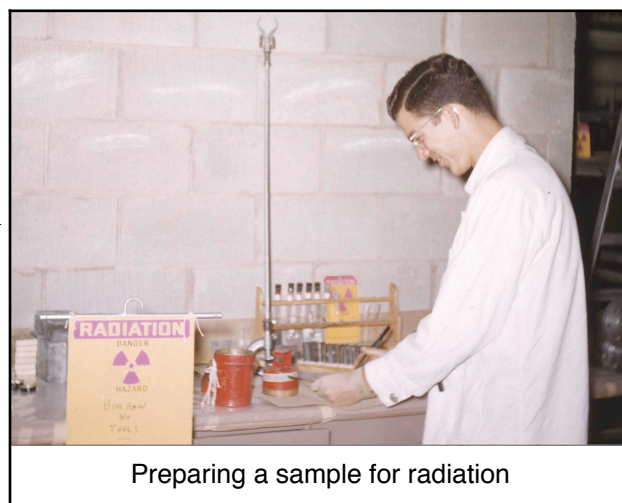


Control Room of the CP-5 Reactor

We would obtain a sample of rare earth, wrap a gram or so in tin foil, place the tin foil in plastic containers, and insert the container into the heart of the reactor using pneumatic "rabbit tubes". After a few minutes - a few weeks, depending on the half life of the sample, we would eject the now radioactive sample from the reactor, place it in a lead "pig", race through the two airlocks on the reactor to get to a chemical fume hood where I would remove the sample from the radioactive plastic container and tin foil, place it in new (non-radioactive) tin foil, and finally, put the sample in front of the gamma ray detector.

I would watch the data grow in on the CRT and, when the statistics were adequate, print out the spectrum on the chart recorder. This provided the basic data from which Dr. Burson and his lab associates could determine the decay scheme for this isotope.

For safety reasons I always wore both a dosimeter and film badge. These were read a regular intervals to determine



Preparing a sample for radiation



Joyce at Tennis

and good set of girl friends in the CBYF. In addition to Nancy, there was Haven Palmquist, sister of Joyce Palmquist who was my age. Since Joyce Palmquist was pretty serious with Jerry Royer at the time, I



Joyce Ready for the Beach

if I had received too much radiation. When ever the samples were over 2 Roentgen/hour I would wait till they were less, and then hurry to complete the sample transfer.

Of course the summers held more than work. We dated at least once a week during summers I worked at Argonne. Our first date was to the Wheaton swimming pool. As you can see, our outings included tennis playing and trips to the beach.

Ivan, Joyce's dad, was a fisherman like me. We went out on the Fox River and got this carp. It was a tough fish to land, taking nearly a half hour to reel in. I forget whether we ate him.

Joyce had a very supportive asked Haven out a time or two. But one of my worst dating *faux pas* was committed during one summer at Argonne but one that proved to be of unexpected good luck.



Joyce's Dad with Carp

I had asked Janet Luke to see the play, *My Fair Lady* in Chicago with me. For some reason she couldn't go. So I asked Joyce, "Janet can't go, so will you see *My Fair Lady* with me?" Since it starred Julie Andrews, she swallowed her pride and said "Yes". That was my last contact with Janet Luke and led to a much closer relationship with Joyce.

One of my colleagues in Dr. Burson's group was Bob Godwin. Bob was my age and would later

become a classmate at the University of Illinois. The year before his Argonne appointment Bob had worked at the lodge in Yellowstone National Park. Each weekend he and his friends would drive down to the Grand Teton National Park for climbing. We became good friends, and we invited him for a slide show of climbing in the Tetons. We were so enthralled, the next year, and for many years afterwards, Joyce and I went to the Tetons.

Here Bob has his back to the camera, Loren Schmidt has his arm up, Herb is standing and the fourth is some visitor. Next is a picture of the 256 channel analyzer on which I spent a great deal of my time the first two years at Argonne.



Bob Godwin and office mates



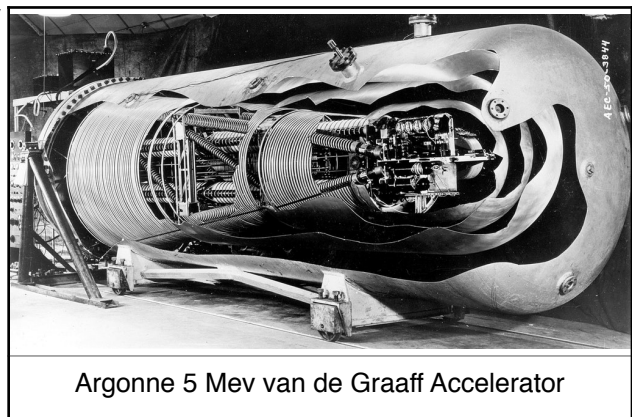
The Argonne 256 Channel Analyzer

helping set up an experiment on the van de Graaff for measuring the cross section of a neutron interacting with an oxygen isotope, as I remember. My second summer I spent as a "calculator", reducing the data collected on this experiment, subtracting background counts, dividing by the detector efficiency, and about eight other computations on a single line to get a single number on a Marchant mechanical calculator.

This was the last year that Dr. Mooring's group used a human calculator - they got a computer to do data reduction. I was relieved, because it certainly was a brain-dead job!

In order to broaden my experience it was decided that I spend the next two summers working in Dr. Paul Mooring research group on the Physics Department's 5 Mev van de Graaff accelerator. Dr. Mooring had a Ph.d. from the University of Wisconsin and, as I learned later, was an active environmentalist, serving as President of the Illinois Prairie Path and the Illinois Audubon Society. He died at age 95 in 2016.

My first summer's work included helping set up an experiment on the van de Graaff for measuring the cross section of a



Argonne 5 Mev van de Graaff Accelerator

Among the highlights of my summers at Argonne were two. First, Argonne had a very active program to introduce student assistants to much of the research that was going on there. We toured the biology department, observing the million mouse cage where mice were subjected to radiation in a spiral ring with a



Manchester Friends Touring Argonne Physics Building

Co⁶⁰ source at the center till they died of radiation poisoning. We toured the chemistry building observing the many experiments with radioactive sources. We toured the reactor engineering building and used the remote manipulators to write our names behind six foot lead glass for handling plutonium. It was all a wonderful learning experience!

The second highlight was the visit of my family and friends to Argonne. The security at Argonne was reasonable tight. One had to have either an employee's pass or a visitor's pass. In the photo above I toured several of my Manchester friends through Argonne. They include (from left to right) Virgil Huber, Dick Slabaugh, J.D. Masterson, Carol Hiller, Paul Masterson, and Emmert Johansen. Vergil, J.D. and Carol were Seniors - Dick, Paul, and Emmert were Juniors as was I.

There were only two disappointments during my Argonne summers. The first was that I missed meeting that giant of physics, Enrico Fermi. He did a lot of work at Argonne, but died the year before I came. The second was that, as a physics student, I was not prepared to make the contributions to our research which would justify putting my name on the papers our groups published.

However, the Argonne experience helped establish me as a *bona fide* physicist. I'm sure that it was a consideration on my acceptance in graduate schools, my application for a Woodrow Wilson Fellowship, and my eventual receipt of job offers at three major universities and Los Alamos. It also had the unintended consequence of introducing me to Joyce, my future wife.