

## **The Manhattan Project in Westfield, New Jersey**

My parents, Marjorie Oliver Allen, Mt. Holyoke class of 1931, and Manson Benedict, Cornell class of 1929, met at M.I.T., where they were working toward their doctoral degrees. Every day my father would carry and chop fifty pounds of ice for my mother's low temperature experiments. The romance heated up, and eventually, after marriage in 1935 and the birth of my sister and myself, in 1940 they built a modern house in Westfield, New Jersey, from which my father commuted to his job as a chemical engineer with M.W. Kellogg Company. Despite having her Ph.D. in physical chemistry (and in the family, at least, a reputation as having had the more brilliant career at M.I.T.), my mother remained at home with the toddlers and expended her very real artistic talents in sewing, knitting, and home decoration.

In 1942 Kellex, a top secret division of the Kellogg Company, was formed by the federal government to build in Oak Ridge, Tennessee what became known as the K-25 plant – K for Kellex and 25 for Uranium-235, the fissionable isotope present in less than one percent of natural uranium. With a sufficient quantity of this rare isotope, the United States could build an atomic bomb. My father, an expert in gaseous diffusion processes, designed the scientific scheme and industrial structure of the K-25 plant. He spent many weeks during the war at Oak Ridge, a muddy boomtown where he caught a life-threatening case of hepatitis from its rudimentary sewage system. When my sister and queried him, he would only say he'd gone to Dogpatch.

We knew that Dogpatch was the home of Li'l Abner and Daisy May, and we were furious with our father for thinking that his little girls could be so easily fooled into believing that a comic strip had a real location. But he had given me the middle name Alice because he had virtually memorized Lewis Carroll's tales; he recited "Jabberwocky" or "You Are Old, Father William" (and stood on his head) with the least provocation. In the same frame of mind, the fact that Dogpatch was the actual

military code name of the nation's secret scientific Wonderland gave comic relief to arduous trips.

My father spent his other weeks in Manhattan, the real-life headquarters of the project to build the K-25 plant, where there were never enough working hours. He brought a fat briefcase home to Westfield, and in the days before computers this meant evenings and weekends of equations worked through with a slide rule. I had inherited my mother's talent in drawing, and I was allowed his spare pencils and discarded sheets of quadrille paper that had mumbo jumbo on the front and a blank back for my projects.

My mother was enlisted for more serious draftsmanship. The equations had to be articulated in graphs, which she, as an undergraduate *summa cum laude* mathematician, could easily calculate and plot. She was aided by a balky old Millionaire, acquired from her thesis advisor, Prof. George Scatchard. The Millionaire, patented in 1892 and in production until 1935, was in the words of Wikipedia, "the first commercially successful mechanical calculator that could perform a direct multiplication." It had hundreds upon hundreds of tiny, individually handmade, brass cogs, gears, levers, shafts, and dials. My mother took it apart, diagramming the location and position of every part. She cleaned, oiled, and reassembled it; her Millionaire, like new, worked perfectly.

Along with the calculator, my mother also had at hand French curves, compasses, triangles, rulers, protractors, a Leroy Lettering Set, bottles of India ink, and rolls of bluish linen draftsman's cloth that she laid onto a wood board with steel thumbtacks – all off limits to my sister and me. We watched with fascination as she drew and labeled elaborate graphs and flowcharts, which were not, of course, so mysterious to her. A problem eventually occurred to my father. His solution? At the Westfield Trust Company, before a bank officer, my mother raised her right hand, swore that she was a loyal citizen of the United States of America, and acquired Top Secret clearance.

On her dining room table Marjorie Allen Benedict laid out the engineering blueprints to build the K-25 plant that would make the fuel for the atomic bomb that would be dropped on Hiroshima. The midcentury modern house still standing at 465 Topping Hill Road, Westfield, New Jersey, can be thought of as the outer sanctum of the Manhattan Project.

Marjorie Benedict Cohn