One Room Schoolhouse

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A. Attending the 45th reunion

On August 16, 1966, the 36-year-old mathematician Stephen Smale arrived in Moscow to receive the Fields Medal at the International Congress of Mathematicians. Smale had earned this award, often described as the "Nobel Prize of Mathematics," by bringing a profound new understanding to the subject of higher dimensional topology. Normally there is little interest in the Fields Medal outside the upper echelon of the mathematics community. In 1966, however, Smale's trip to Moscow frustrated attempts to serve him with a Congressional subpoena. On the same day as the Fields Medal ceremony, the House Committee on Un-American Activities began a hearing in Washington to investigate radical antiwar protests by Smale and others. The unusual combination of mathematical achievement and political activity raised the profile of a diminutive mathematician with a distinctive, high-pitched voice. Ten days later, Smale held an ad hoc Moscow press conference in which he condemned the United States involvement in the Vietnam War and compared it to the Soviet invasion of Hungary.

Soviet attempts to control him led to a front page story in the New York Times. Amidst the Cold War tensions, many Americans felt that Smale's speech, in the enemy capital, was an act of treason. Members of Congress were outraged, and Smale's federal research grant was suspended. When the furor subsided, Smale resumed his mathematical work. That research continues today (in 2000), as he

approaches the age of 70. In the intervening years he rose to the top rank of collectors of exotic minerals, became a first-class photographer of these specimens, and balanced all his interests with a love for outdoor adventures. Somewhere at the core of Smale's life lies the genesis of a brilliant mathematical mind, a passionate defender of political rights and freedoms, and an aesthetic consciousness that perceives the beauty in the patterns of both intellectual constructs and natural objects.

At what point in Smale's life did his extraordinary intellect become apparent? Other notable scientists were precocious mathematical achievers. A striking example was Nobel physicist Richard Feynman who was the star of the New York high school math team circuit.[1] John von Neumann, the great mathematician and computer pioneer, was a child prodigy in his native Hungary. At the age of 17 von Neumann completed his first mathematical publication, and the following year he won a prestigious prize, awarded on the basis of a competitive mathematics exam among the nation's high school graduates.[2] Was Steve Smale the *mathematical genius* of the Grand Blanc (Michigan) High School Class of 1948 and, if not, were there any indications of future greatness?

An opportunity to explore these questions arose in 1993 as I was beginning to research this biography. Following up on some sketchy information from Steve, I spoke to his class valedictorian, Jack Scruggs, who had not seen Smale since their college days together at the University of Michigan. Shortly thereafter Scruggs received a notice for his 45th high school reunion. Accompanying the announcement was a plea for information on the whereabouts of Smale and others who had not been in contact with the reunion committee.

After Scruggs informed the organizers of my project, I was invited to attend the reunion and speak at the banquet, even though a prior commitment precluded Steve's participation. I had recently returned from my own 25th reunion and was intimately acquainted with the ritual as well as the mixture of emotions that accompanies seeing old

friends after so many years apart. With Steve's reunion, the 45 years of separation from his peers provided an intriguing ingredient. The recollections of his classmates were largely untainted by knowledge of his subsequent accomplishments. I began to view my Michigan trip as an archaeological dig.

Thus on a Friday evening in October, I arrived in Grand Blanc for the initial function. It was an informal get-together at Little Joe's, a pizza and beer place on the main street. Approximately 30 members of the 104 person class were present. This was my opportunity to receive the recollections of a significant portion of Smale's class. I quickly learned that his classmates knew very little about Steve, either from high school or the intervening years. Some were vaguely aware that Steve had previously engaged in some sort of radical activity, but all seemed surprised that his life was now the subject of a book.

The high school composite of Smale, obtained from several interviews, was of a bright guy who was viewed as somewhat of a loner. Nobody even suggested that he was a child prodigy, but the comments were consistent with his third-place rank in the class. The most lasting impression of Steve was that of an avid chess player, engaged in competition before school and at lunch. In most cases the opponent was Fred Burr, Steve's closest friend and a drowning victim in the fifties. None of the women recalled any contact with Steve.

I returned to Grand Blanc the following morning for the Liar's Club breakfast. The Liar's Club consisted of friends who met for breakfast each week at the local Halo Burger. The group's name was derived from the tradition of exaggerating progress reports during the annual pumpkin growing contest. Among the regulars were Joe Jewett, Steve's high school biology teacher, and Art Leech who had been a few grades ahead of Steve at their small elementary school. Shortly after I arrived at the Halo Burger, a man in his seventies approached and introduced himself. It was Joe Jewett, who brought the news that Art Leech had died the previous night. Despite the saddened mood among

the Liars, Jewett did his best to convey a picture of Grand Blanc High School in the forties.

As I left Halo Burger to explore the Grand Blanc area landmarks of Steve's childhood, I was bewildered by the seeming incongruity of his early life. During his first eighteen years, while immersed in a middle American culture dominated by agriculture and the automobile industry, there was no hint of mathematical genius. Yet in his late twenties, Steve stunned the mathematical world by successively everting the sphere, creating a mathematical function known as the "horseshoe," and solving the higher dimensional Poincaré Conjecture. While the trip to Grand Blanc had given me a sense of the atmosphere in which Steve had grown up, it had left unresolved several questions concerning his intellectual development. The next step was to examine the Smale family life.

B. Ancestry

Sidney Smale, Steve's paternal grandfather, was born in England in 1870. One year later he accompanied his parents to the United States, where the family eventually settled in Flint, Michigan. Denied a formal education by the exigencies of the day, the 11-year-old Sidney obtained employment in the Flint store Smith, Bridgman, and Company. During the next 12 years, he rose from the entry position of cash courier to become head of the bookkeeping staff. When the Union Trust and Savings Bank was organized in 1893, Sidney accepted a position as teller.

The following year the young banker married Alice Maud Hughes. Maud belonged to a prominent Flint family and was a direct descendent of a Continental Army officer in the Revolutionary War. The marriage produced four children in its first six years. In 1899 Steve's father, Lawrence Albert, became the third child.

The appealing American story of a self-made and educated young immigrant ended in 1901 when Sidney Smale died of diabetes. His obituary, on the front page of the Flint newspaper, described a man of deep religious commitment, already launched on a trajectory toward social and business success. Maud, who survived her husband by 15 years, attempted to impart the Methodist tradition to her children. She experienced mixed success. One of her sons became a devout Methodist, while Lawrence rebelled after reading the essays of Emerson. The reaction was so profound that his own son, Steve, would later remark. "I was 20 years old when I first set foot in a church. That was Notre Dame in Paris."[3]

Lawrence was a man who never quite found his niche. One year after his mother's death Lawrence graduated from high school and then enlisted in the Navy as the United States entered World War I. After the War he enrolled in the Michigan College of Mines, aspiring to become a mining engineer. In one of several abrupt life changes, Lawrence dropped out of college, intent on seeing the world. The next two years were spent in a sequence of hopping freight trains, working boat passages, and taking odd jobs. During this period his itinerary included San Francisco, Alaska, Hawaii, Yokohama, Shanghai, and Hong Kong. Eventually he reached Manila, penniless and unable to find work. At that point the former sailor successfully appealed to his government to provide passage home.

Following his return to Michigan, Lawrence enrolled in Albion College. Shortly after matriculation he published the first issue of an intended periodical, *The Maelstrom.* Despite printing less than ten pages of text, Smale managed to impudently defy college regulations, present paradoxes on the existence of God, and trash the presidents of the college and the United States (Calvin Coolidge). Perhaps the most provocative piece was a short note suggesting homosexual prostitution as a work study option. The latter led to the charge of distribution

of obscene literature as Lawrence was quickly arrested and expelled from Albion.

Smale returned to Flint where he obtained employment at AC Spark Plug. Working as an assistant in an experimental ceramics lab, his job involved testing spark plug play. Meanwhile Helen Morrow moved from Canada to Flint and became a secretary to the advertising manager at AC Spark Plug. The circumstances surrounding the future Mrs. Smale's departure from Canada were the product of her own unfortunate family life.

Helen's Canadian parents, Archibald and Pauline Diesfeld Morrow, were married in 1889. They settled in Gault, Ontario, where Archibald was a high school classics teacher. Helen was born in 1905, the last of four children. She remembers her father as a "horrible man" who expelled both of her brothers from high school.[4] When Helen was 11, her parents separated with Archibald moving to a boarding house.

Remaining with her mother, Helen completed high school and one year of business college. Helen's brother-in-law was an engineer who worked in a Gault boiler factory. Expecting to lose his job after the War, he and Helen's sister moved to Flint seeking new opportunities. AC Spark Plug provided a job. In 1925 Helen and her mother followed. The two women moved into a Flint apartment supported by the income from Helen's job. A few years later Lawrence and Helen were brought together by mutual friends. After a short courtship the couple married. The union endured, except for a brief separation, until Lawrence's death in 1991.

Family descriptions of Lawrence portray a kind man with highly unconventional views who had difficulty finding contentment. Despite Helen's protests, there were several house moves, ostensibly for economic reasons. Lawrence possessed formidable practical skills and devoted a substantial portion of his energy toward renovation of each new residence. Steve's father was both an atheist and a Marxist. He

Steve and sister Judy in 1934

belonged to a political organization known as the Proletarian Party, a Michigan group that broke off from the United States Communist Party shortly after its formation in 1919. While Lawrence's beliefs were sincerely held, his involvement was substantially more theoretical than action oriented. As Helen recently reflected, "the most we did in the Pro Party was have picnics."[5]

As Helen and Lawrence began their family, it is significant to observe that the environment for their children differed sharply from that of their peers. Although neither parent graduated from college,

Steve and Judy in 1936

both were well read intellectuals of sorts. Lawrence possessed an interest in science and placed a value on independence which he sought to impart to his offspring. Economically, the country was entering the Depression, and it was a time of considerable deprivation and unemployment. Lawrence had a stable job which was adequate to support a family. Conflicting with these mundane needs were his hatred of the job and a burning desire to become a successful writer. Lawrence elected to sublimate the creative for the practical until his children entered college.

C. Youth

Lawrence and Helen's first child was born on July 15, 1930. The son was named Stephen, with no middle name. Lawrence was contemptuous of tradition and determined that his son would not be named in honor of another person, particularly a relative. Many years later, as Lawrence