THE EARLY YEARS

In 1926 a three-year-old lad, familiarly called Richie, of natural curiosity and living on the ground floor of a two family wood frame house on Teller Avenue in the Bronx, was invited upstairs to watch the older boys play with their electric trains. The tenants that occupied the second floor consisted of one teenager Sammy who tolerated the youngster's presence and three adults who scarcely took note of him. While Sammy's attention was momentarily diverted Richie sat on the tracks and was shocked into a fit of crying when he discovered what Benjamin Franklin had known two centuries earlier, i.e. urine was an excellent electrical conductor. Richie's entry into the field of physics was ass backwards.

Richie's first memorable encounter with gravitational attraction occurred but a few years later when his father's model T Ford was parked on the hill outside his home. The six-year old would sit in the vehicle, wiggle the steering wheel, and fantasize a journey along a highway. When he accidentally released the parking brake and the vehicle rolled down the hill, harmlessly stopping at the curbside, he had sense enough to jump clear but he was not clever enough to avoid the thrashing meted out by his father. His rear end was impacted by Newton's fourth law of motion — every irresponsible action had an equal and painful reaction. Between Franklin and Newton and a smarting derrière, Richie began to feel inversely dynamic about physics.

His mother referred to her son's behavior as precocious. Not true — Richie was a brat. At his aunt's wedding he brought confusion to the ceremony when he chased a black cat up the church aisle and then messed up the reception that followed by vomiting on the dance floor. He increased the local entropy well beyond that governed by the second law of thermodynamics. He should have been thrashed outright at the time but the solemnity of the occasion spared him.

In the year he was born the Yankee Stadium opened a few miles from where his family took up residence in the Bronx. Richie was but five when his father took him to see Babe Ruth. The Babe could steal the show in right field by diving forward to catch a low fly ball and then rolling over several times until his forward momentum was dissipated. This dramatic display of the interchange of linear and angular momentum matched the crowd's reaction to the Babe's dynamic appearances at the bat. From that day on baseball assumed a higher priority for Richie than intellectual pursuits.

The large density of youth in Richie's Bronx neighborhood spawned a myriad of games, stickball being one of the more popular. It required a street, everyone had one, a tennis ball or a plain rubber ball — somehow one could always be found — and a broomstick. This last item was more of a problem. The boys frequently approached their mothers with little success. "Mom, do you have any old brooms?" only bought negative replies. The lads broke or lost these broom handles faster than the broom heads wore out and many perfectly good household brooms had been sacrificed in the name of good fellowship. Richie's grandmother took to locking them in a closet — they still had a short half-life since closet doors had to be opened occasionally. But, in spite of these sporadic displays of domestic larceny, Richie was still considered by his mother to be a 'good' boy, although he never remembered using a broom in the manner intended by the manufacturer.

To further demonstrate his unpuritanical behavior during those youthful days, Richie's ire was aroused when the nearby baseball field was closed to hardball (too many windows were being broken). A sign was painted to notify the neighborhood youth of this restriction. Richie and a friend found a can of white paint and covered over the sign one midnight. Alas! The paint was merely whitewash and the rain erased their misdeed, exposing the original warning. Regrettably, softball forever replaced hardball on that field. Since softball was not the national pastime the event presented Richie with an unforgettable period of deprivation and

accompanying mental anguish. He and his friends would have to journey miles to find a grassy playing field.

Broken windows were not the sole peril in playing hardball in a populated neighborhood. On one occasion Richie's mother was walking on the sidewalk adjourning the ball field when a line drive struck her on the right side above the waist. She went down and we all ran to her. Almost unfazed she got up and assured us she was all right.

"Richie, your mother is the iron lady," remarked his friend.

He later learned his mother was wearing her armor plate. When Richie worked for the Army Material's Lab after the war he became interested in defeating projectiles and realized why his mother was unscathed in the incident. Her armor was called a girdle and it distributed the stresses over a large area. Physics will emerge in the darndest situations.

Acoustics played a role in Richie's youth. Mrs. Weiss had the best set of lungs on Teller Ave. When she called out "Richie!" a few times it traveled for several blocks and he'd come a running. His father had a subtler approach by whistling but two notes, an E with glissando up to a B. Why this carried as far as his mother's cry still remains a mystery. There is some interesting physics and physiology there.

Yet, scientifically naïve as he was, the laws of physics were ever ready to taunt him. A year before the stock market crash of '29, when the economy was still healthy, the family passed the summer on Coney Island. In spite of his mother's warning Richie spent the entire first day playing in the sand and running about on the beach, thus developing an excruciatingly painful sunburn. The UV portion of the sun's spectrum had done its damage. It was so painful that during his waking hours Richie took to sitting motionless in the kitchen. A woman visitor, noting his silence and immobility remarked, "Isn't he a good boy!" Even Richie was aware of the irony.

The huge three and four stack ocean liners that passed Coney Island on their way to and from their Manhattan piers fascinated the lad. It may very well have influenced his later

decision to join the Navy and to write a novel about the Lusitania. Such ships as the Majestic, the Leviathan, the Berengaria, and the Mauretania conjured up visions of adventure and enormity.

Richie's further awareness of the perils of gravity and sudden changes in momentum brought him his first life-threatening encounter when the sled on which he was 'belly whopping' down a hill skidded on a patch of ice and caused him to ram his midsection against a tree. The diminished friction between a steel runner and the ice landed him in the Morrisania Hospital for several weeks. The damage to his liver was agonizingly painful but fortunately self-healing. As he lay in the hospital visions of death haunted him and he wondered what he might have become if he had been given the chance to grow up. He never guessed he'd be a physicist, or a scientist, least of all an 'unpublished' writer.

Before WWII physics was a remote discipline that not one in a hundred fathomed, the other 99 assuming the word to be a generic term for Ex Lax or milk of magnesia. Save for Albert Einstein, a household name for genius, and the Nobel Prize, a household expression for overnight fame and riches, physics and its bare fundamentals were not formally disclosed to Richard until he entered Morris High School at age 16. The early entrance into secondary school resulted from his having been advanced a full grade thrice in elementary school. This was affected when the Assistant Principal Mr. Price decided to redistribute the teaching load by fingering the better students for instant promotion. He entered class in mid term, pointed at several students, and uttered, "you, you, you, you, and you — leave your books and follow me." It was all over in less than a minute. In those days Assistant Principals were intimidating and adept at getting things done. (Richie rarely saw the Principal who he later learned was a serious tippler, preferring to have his assistant do the work).

Only a week prior to one of those on-the-spot promotions Richie was ordered to bring his mother to see Mr. Price. He knew why. There was a redhead named Virginia in his class on whom he had a crush but could never garner the courage to speak to. Passing her on the way home she smiled at him. He was totally tongue-tied

and socked her to relieve the stress. Faced with the acid stares of Mr. Price, the girl and her mother, Richie found the words to apologize and from then on became a good friend of Virginia. She later entered a nunnery.

Experience became the young Bronxite's experimental method — like his first day in kindergarten when he ran into the little girls' room, quickly followed by the teacher who grabbed him by the ear and booted him into the boys' room. With only one bathroom at home he was too young to understand the nature of his 'misdemeanor' but in that brief moment at age five his innocence was wrested from him. He never did it again, the mark of a good experimentalist.

There was a mathematics teacher, Mr. Freeman, who tolerated no undisciplined behavior, rewarding the offender by grabbing his ear and pulling him out to the hall and leaving him there to face the stares of any who passed. Richie discovered that it was impossible to escape a firm hold on one's ear. Mr. Freeman should have realized that it was just such treatment by the conductor on a train that caused Thomas Edison's deafness when still a teenager. Richard's poor hearing would later surface whenever his mother asked him to go on an errand. Otherwise, Richard did well in Mr. Freeman's mathematics class; it was his low pain threshold around the ear lobes that received poor grades.

If anything inculcated in Richard an intellectual curiosity about the world, it had to be the hand-me-down set of 'The Book of Knowledge' that appeared in the house one day. Suddenly his life of baseball, stickball, basketball, and combating the Depression became enriched with cerebral matters such as mathematical puzzles. There were rainy days and the family didn't own a radio so 'The Book of Knowledge' was an awakening to a lore never discussed on the baseball diamond or while hanging around the local candy store.

The poverty of the early 30's left a deep imprint on Richard's psyche. Those days in the 30's, before Franklin Roosevelt and World War II turned the economy around, found many like his father feeling that capitalism had failed them. His

father spent years looking for steady employment and was too proud to accept the dole. Richard would be sent miles to buy day-old bags of Wonder bread and would return embarrassed when the neighbors spied him. In those days, before preservatives were added, stale rolls were a bit like concrete and only dunking in hot coffee made them palatable. Left-wing sympathizers spewed out verbiage during the Depression that captured Richard's imagination. His mother and grandmother, both devout, were brought to tears when he repeated some of the anti-establishment 'party line' he later heard in college.

But in spite of hard times his parents shielded him and his younger brother from its bitterness. His youth was immersed in athletics and, like all normal boys, he dreamed of a life as a baseball player. His close relatives suggested that Richie should have his sights on school teaching, a well-paying profession during the Depression. Attending Junior High School he found himself inspired by the teacher whose principal claim to fame was that the famous baseball player Hank Greenberg used to be in his class and, pointing to where Richard sat, identified the very desk. A classmate of Richard's, Gabriel Pressman was outstanding in English — his compositions demonstrated a professional command of the language far beyond that of anyone else in the class. Yet Richard still felt smug knowing that Gabriel couldn't throw a baseball. Furthermore who wanted a name like Gabriel? Pressman later became a successful reporter whose name would be frequently accredited with a story — who could forget a name like Gabriel Pressman? Still, the ghost of Hank Greenberg made a far greater impression on Richard. He was exuberant when it was announced in his senior year at high school that a baseball team was to be formed. Richard tried out but the coach took him aside and informed him that he was a good ballplayer but was too young for the team — no fault of his own but he was shattered — blame Mr. Price for the promotions.

In his first formal encounter with physics at High School Richard was scarcely impressed with the contents of the course although he still maintains a faint recollection of the instructor's

teaching technique. If it wasn't in the textbook it wasn't right. Richard concluded that the teacher really didn't understand the subject but was smart enough to keep one chapter ahead of the class. What a pity that the physics of baseball was not part of the course — that would have struck out two birds with one pitch. Physics teachers today could well benefit by approaching the subject from home plate.

As a senior in high school Richard felt trapped — there was no money for college and the job market was dismal in 1939. His father felt helpless in not being able to send Richard to college with a flowing green campus. Fortunately New York City boasted CCNY, a free school for the academically gifted. So for a registration fee of $2 he enrolled in that crowded institution, a school that many years later even hired a physicist, Robert Marshak, as President. Having learned in later years that General Colin Powell attended both Morris High School and City College, Richard wrote to him and was pleased with his reassuring reply about the quality of education he had received at that college. He probably never sat at Hank Greenberg's desk, thought Richard, for then he may have achieved fame as an athlete rather than as a military genius!

For two years Richard boarded the 5¢ subway on The Grand Concourse at 170th Street and rode to mid-Manhattan where he attended crowded classes at the campus on 135th Street and Convent Ave. Walking up 135th Street one morning he spied a truck carrying tanks of bottled gas. The vehicle hit a bump and one of the tanks fell off causing the valve mechanism to rupture. The tank careened rapidly and spun aimlessly on the street as Newton's third law of motion came into play from the escaping gas. Richard ran for cover until the 2000 pounds of pressure had been reduced to naught. The sight and sound of such a catastrophe was unforgettable — it was a physics demonstration that presaged the rocket age a decade before its time.

Richard was a terrible student, spending most of his time practicing with the CCNY (Beavers) baseball team. But at the end of his second year he had to declare his specialization to the

academic authorities since degrees were not granted in baseball. Mathematician? He wasn't good enough. Chemist? The laboratory work was too sloppy for him. Biologist? He hated dissection. Physicist? Yes — it was the only scientific subject left and the least messy. Not surprisingly then, he again backed into the subject.

As a junior at CCNY he became a regular on the varsity baseball team, probably proving that he was a better baseball player than budding physicist or that the gifted kids that attended CCNY were not too well coordinated. The lacrosse team also practiced at Lewisohn Stadium under the tutelage of 'Chief' Charles Bender who took Richard aside one day and suggested he take up lacrosse, "A better game than baseball," the 'Chief' declared. Surprisingly enough the Chippewa native American 'Chief' Bender had been an outstanding pitcher for the Philadelphia Athletics from 1903 to 1914 and was elected to the Hall of Fame at Cooperstown in 1953. In 1942 Richard had never heard of him.

While some of the outstanding physicists in the world were beginning to concern themselves with uranium fission, and while the war in Europe drove most of that subject underground, Richard wrestled with the Introduction to Thermodynamics course given by Zemansky and with Atomic Physics delivered by Semat. The former course turned out to be almost totally devoted to mathematical manipulation of equations, the real world of thermodynamics escaped Richie's comprehension. Even boiling a pot of water to make tea enflowered no new romanticism or scientific significance from Zemansky's equations. Physics began to lose its appeal, if, indeed, there ever was any. Almost 40 years later Richard suddenly 'discovered' the subject of thermodynamics when Clarence Zener pointed out that the cusp in the specific heat of iron metal could be related to its magnetism. After the Zener lecture Richard remarked that at long last thermodynamics had displayed some usefulness! He went on to publish extensively on that subject.

It was early in 1941 when Richard's father bought a diner in Brooklyn and father and son would spend weekends running the

establishment. With not an iota of help from thermodynamics Richard learned the rudiments of short order cooking. It was one Sunday in December, while clearing the counter, that he heard about Pearl Harbor over the radio, and less than a year later Richard, still bearing memories of those ocean liners passing Coney Island, signed into the Navy V-7 program, permitting him to remain in college until the Navy needed him.

The summer of '42 approached with America gearing up to a wartime economy. In former years Richard had managed to find menial jobs during those summer holidays but this time he got lucky. The State unemployment office sent him to a large unmarked building on Seventh Ave. in downtown Manhattan where he was offered a job as a custodian. Half an hour later he found himself sweeping the floors of the wartime Office of Censorship, a multistory building and former mattress factory with thousands of employees reading and excising foreign mail.

He asked his supervisor, who took a shine to the lad, if there might be something else he could do. The only thing he really knew about brooms was how to saw off their handles for stickball. When he bragged that he was good in mathematics he was reassigned to the Leave Department, calculating by hand the amount of annual and sick leave employees earned, and deducting what had been used by each worker. At least half the employees, expert in their own language, presented a problem for Weiss in trying to explain in English the somewhat complicated system for amassing and using leave. Furthermore, he was seated near the door leading to the Ladies' room and the passing pulchritude imposed an added burden in trying to concentrate on his math. Diplomacy was also required. Employees could only be credited with sick leave if they presented Richard a note from a doctor. An order from on high denied sick leave for all dental visits. When Weiss tried to explain this to someone who had suffered an impacted tooth but spoke only an African dialect his resourcefulness was tested to its limit.

Unclaimed paychecks due to illness were left with Weiss with instructions to only hand them out with proper identification.

One individual had left his badge at his workstation but showed Weiss his last two unnegotiated paychecks! The exercise in explaining the mathematics of leave recording to one unfamiliar with English awakened in Weiss a few adult qualities such as sympathy and patience.

On July 1, 1943 Richard was called to active Navy duty, bidding goodbye to the CCNY baseball team and his fellow stickballers on Teller Ave. His orders specified a semester at St. Lawrence University, a school that claimed Kirk Douglas as one of its alumni.

Richard scarcely remembers the goodbyes he tendered his family when he left for St. Lawrence although he does recall meeting with dozens of other Navy enrollees at Grand Central Station for the day-long train journey to Canton in upper New York State, the furthest he'd ever been away from home. The female-male ratio at the college had been increasing since the beginning of WWII so that the sudden appearance of over a thousand sailors elated the coeds as well as the tars. The underage Seaman Weiss got to know nary a one (Assistant Principal Price take note), his spare time was devoted to playing the bass drum in the marching band, learning to swim in the nearby river, and cramming for exams.

The bass drum presented a challenge since the drummer was responsible for maintaining the marching beat, 120 booms per minute. Needless to say the weight of the instrument produced a steadily tiring effect and a resulting slowing down of the beat. When the Admiral arrived after two months for a grand review of the regiment the long column of sailors found themselves hopelessly out of step with the drummer. Fortunately for seaman Weiss there was no Navy regulation by which a drummer could be court marshaled for an unsteady beat. An erratic frequency was added to Richard's misadventures with the subject of physics.

Towards the end of term the school announced a dance but no band was available. In a short span of a week seaman Weiss had discovered enough talent amongst the sailors to put together a respectable ensemble of piano, trombone, trumpet, drums, clarinet,

and his own guitar, which his father had brought up from the Bronx on a weekend visit. Alas! The Saturday night shindig faced disaster when the piano player broke his wrist at football that afternoon. Without a piano every member of the band quit — a human chain reaction. How seaman Weiss managed to find two accordions to add to his guitar he scarcely remembers. Visions of rebuke from the commanding officer haunted him all afternoon but somehow there were enough decibels emitted by the three pieces to satisfy the dancers. Weiss was even complimented for the effort — everyone knew that one made sacrifices in wartime.

St. Lawrence was followed by a '90-day-wonder' course in marine engineering at Annapolis. Richard had actually requested an assignment in physics but the officer in charge couldn't accept the notion that physics and marine engineering differed. During his three months as a midshipman at the Naval Academy Richard was immersed in regurgitating Naval engineering regulations for the weekly exams. He frankly understood nary a thing about the engines that propelled a ship and any physics he had retained from his CCNY days was by now virtually forgotten. He managed, though, to survive the Annapolis military discipline and on April 26, 1944, not having reached his 21st birthday, a young ensign was sworn in at the Naval Academy and assigned to engineering duty on the CVE 100, a baby aircraft carrier being commissioned on the west coast. When he left for Seattle to join his ship Ensign Weiss felt important, the conviction of being an officer and a gentleman deeply entrenched in his psyche. But on the flight to the west coast he became airsick and repeated his performance at his aunt's wedding — he made a mess of his confidence and his uniform. How rapidly the high and mighty can fall, he thought.

To one who had never been on any marine vessels other than the Staten Island ferry and a rowboat in Central Park, the baby carrier was grandiose. Accorded a private stateroom the new ensign was elated. He even volunteered to play the portable organ for church service and was permitted to keep the instrument in his cabin. But placed in charge of the main engines because of his rank presented a sticky wicket! It took Ensign Weiss a year

to fathom what most seamen had learned from long service in the Navy, i.e. how to use a monkey wrench, how to read a pressure gauge, and how to avoid seasickness. If Zemansky's course on thermodynamics had any meaningful relationship to the reciprocating steam engines that propelled the aircraft carrier, it failed to make any impression on the young ensign that had just reached his majority. Yet, the faith that Assistant Principal Price had in accelerating Richie's education was at last coming to fruition.

After a year his understanding of the functions of the machinery on board ship began to surpass that of most seamen. He discovered amongst the ship's assigned paraphernalia an indicator gauge — a small device that recorded steam pressure versus time within the main propulsion cylinders. He managed to record this information but Zemansky hadn't given him a clue what to do with it! Perhaps physics was too deeply imbedded into his subconscious to be useful!

His principal memories of those war years were boredom and fatigue. Floating around the endless South Pacific, the sea varying slightly from day to day as it responded to the winds, and the flying fish occasionally soaring thirty feet, Ensign Weiss found little to commend the scenery. Even standing well off shore during the invasions of Iwo Jima and Okinawa seemed like just another boring day. The pedal driven organ provided some relaxation although it hardly enamored him to his fellow officers trying to catch some shuteye during the day. That entire expanse of the ocean seemed like one huge bath tub, the hourly recorded readings of 85° Fahrenheit never varying for weeks at a time nor the 100° engine room temperature where he stood watch. Weiss witnessed windless days when nary a ripple appeared on the sea, although on one occasion when the entire fleet sailed through the eye of a typhoon off Okinawa he looked up at waves at least 150 feet in height. The aerologist (weather man) reported record winds over 150 miles per hour. The morning after the storm the entire five dozen place settings laid out the prior evening for dinner in the wardroom were haphazardly strewn in one corner.

Only one picture of man's might stands foremost in Richard's wartime memory. When the 8th fleet amassed before the Okinawa invasion there were men-of-war as far as the eye could see. Perhaps 500 ships of every description dotted the skyline. But what a way to combat boredom — two years of ennui for one day of spectacle!

There was another memorable episode that relieved the tedium. The carrier developed a list of several degrees, perfectly normal as oil and ballast are respectively used up and taken on. While on duty in the engine room the OOD called down to advise him of the list and asked how long it would take to bring the ship back to an even keel. Weiss conferred with the appropriate seaman and advised the bridge it would be completed in two hours. It actually required five hours and Weiss was ordered to the bridge where he was given a dressing down by the captain.

"Don't you realize that there is a war?"

"Yes, sir."

"Orders must be carried out with precision."

"Yes, sir!"

"This could lead to a court martial. Understand?"

"Yes, sir."

"Dismissed."

He later learned that the captain had emerged from his cabin at the start of Weiss' watch for his daily sunbath but the ship's list had caused the shadow of the bridge to shade his favorite spot. He returned in two hours and 'hit the roof' at Weiss' failure to bring back his sunshine.

Worse than boredom was the fatigue experienced in the forward combat area when duty cycles of four hours on, four hours off, completely screwed up his circadian rhythm. His very being revolted at this abuse of his natural biology. One never managed enough sleep!

The movies shown every evening on the hangar deck did relieve the monotony and on one occasion a destroyer providing escort in case of submarines challenged the carrier to a game of basketball. In no time their team was hauled on board via breeches

buoy and the canteen was opened to sell ice cream, cigars, and sweets to the cheering spectators. Still, boredom, lethargy, listlessness — call it what you wish, its only conquest appeared to be booze and broads. All officers aboard ship were provided with a small combination safe to store their classified papers. Richard's safe contained two illegal bottles of Johnny Walker and a service pistol that he was too frightened to use. One bottle of scotch disappeared during the basketball game but no broads, not even a few mermaids could be netted as cheerleaders.

Richard's baseball passion was aroused when Johnny Mize, Hall of Fame first baseman for the New York Yankees, joined the ship as an athletic director. Richard and 'Johnny' spent hours talking about baseball — what else was there to do? This encounter even surpassed the elation Richard shared in his tenancy of Hank Greenberg's desk.

Richard's division had an old time warrant officer, recalled to service after Pearl Harbor. He suggested to Richard that they have some target practice with their 45 caliber pistols during a few idle hours in San Diego. And so waving off ear plugs and never having fired a pistol Richard shot off hundreds of rounds of ammo and spent three days stone deaf, five days half deaf, and several weeks with a slight buzz in the head. That presented an interesting bit of psychology cum physiology in demonstrating the ability of the body to ignore certain stimuli when experienced in excess. Modern high decibel stereos have been known to permanently impair hearing but in Richard's case subsequent hearing tests years later revealed no impairment from that one encounter. For a time, though, Mr. Freeman had his revenge!

When the war ended with the atomic bomb dropped at Nagasaki physics was skyrocketed to its zenith of importance. Suddenly his family and friends took a second look at young Richie, equating him with Oppenheimer and Lawrence. He was questioned about physics, the bomb, neutrons, etc. He actually had scant knowledge but he had found it easy to answer with authority — like his high school physics teacher he was one chapter ahead. Baseball was soon forgotten.

In 1946 the G.I. Bill appeared as a gift from the sea and Ensign Weiss registered for graduate work in physics at the University of California at Berkeley, a school with such distinguished staff members as Oppenheimer, Lawrence, McMillan, Segré, Serber, etc. Suddenly his ignorance of physics struck him between the eyes when he attended his first classes. It became a long, hard pull to catch up with the mainstream of students and to convince his academic advisor, Francis Jenkins, that he belonged at Berkeley. Indeed, after two years of hard work he had made considerable impact on the subject and even courted original research. This part of the story is worth repeating.

It all started when Grant Fowles, later a professor of physics in Salt Lake City, and Weiss teamed up to perform some spectroscopy for Francis Jenkins' laboratory course. Fowles had read an item in Richtmyer's book on modern physics that cited an experiment by Williams at King's College London (later to have Richard for ten years as a visiting Professor) in which he noticed an anomaly in the spectrum of hydrogen — one of the lines appeared to be split, but only barely. Fowles correctly deduced that the splitting for helium would be 16 times greater and therefore easier to observe — except for one thing. The line was in the far ultraviolet and the entire experiment had to be performed in a good vacuum. This technology wasn't simple for young graduate students in 1946, even for one who knew how to wield a monkey wrench. The two graduate students approached Professor Serber, theoretical leader at the former Manhattan Project, asking his opinion whether the Williams' experiment could be correct. He shook his head and assured them that quantum mechanics was accurate. The pair remained undeterred and went ahead. Years later when Weiss ran into Serber and asked about the discovery, he received but a shrug of Serber's shoulder. Physics is always full of surprises.

The famous spectroscopist R.W. Wood visited Berkeley. He had fabricated the diffraction grating employed by Fowles and Weiss in the experiment and related a few humorous and bawdy

stories for Fowles and Weiss' benefit. Only years later did Weiss learn that Wood was renowned as a showman. His book *HOW TO TELL THE BIRDS FROM THE FLOWERS AND OTHER WOODCUTS* is a classic.

While Weiss was grappling with physics he still bore in mind the prewar encouragement he had received about teaching. He enrolled in the sequence of classes given by the Education Department for a teaching certificate and terminating with a term of practice teaching at Oakland High School. The unruliness of those teenagers convinced him that teaching would be an unwise choice and he never considered it again.

After a number of false starts the experimental results with helium became clear — the spectral line was indeed split! What a triumph for two grad students! Alas! Two weeks later Professor Willis Lamb at Columbia reported in the Physical Review the same observation but measured in a more elegant fashion. He had beaten them to it! It took some years for theoreticians in physics to explain that the effect was due to an unexpected behavior in the electron's magnetic moment. Lamb's discovery received the Nobel Prize in 1955.

In those days Professor Oppenheimer was the physicist's superman. The gaunt cadaverous figure had lost considerable weight during his Los Alamos days but his smooth delivery mesmerized Weiss. 'Oppie' could convince you that you understood his exposition — only when you tried to work out the rationale for yourself did the unanswered questions cloud the issue. Oppenheimer chain-smoked, frequently interchanging chalk and cigarette. He deftly avoided placing the chalk in his mouth or writing with the cigarette.

Segré was the opposite. His Italian accent, spectacles, and informal demeanor, made him look and act like everyone's uncle. Richard walked away from Segré's lectures with clear pictures about nuclear physics. Between lectures by McMillan, Seaborg, and invited speakers like Felix Bloch the entire panoply of famous characters in the era of nuclear physics left Richard with distinct impressions as to how one spoke and acted if one were to be part

of this elite physics community. Funny, Richard thought, none of the lecturers ever mentioned what they didn't know.

In 1947 Richard decided to return to New York with his University of California Master's Degree and to complete his graduate work at Brookhaven, a new laboratory on Long Island dedicated to the nuclear physics that emerged with the bomb. At Berkeley he had sat in on courses given by those associated with the frontiers of science in reactors, radioactivity, and cyclotrons. Brookhaven would afford him the opportunity to actually work on an atomic reactor.

Physics was now equated with glamour. Physicists were viewed in society as the golden-haired boys — they were patently geniuses. Whenever someone discovered Richard was a physicist they immediately apologized for their lack of knowledge of the subject. "That's alright," Richard assured them, "I won't quiz you."

To save money on the journey east Richard joined a car pool, the other passengers expecting him to share the driving. The last disastrous time Richard held the wheel of a car was in a Model T Ford parked on a hill in front of his home in the Bronx. His youth and the rush of events had deprived him of the opportunity to learn to drive. The Navy had taught him to run the main engines on an aircraft carrier but not to drive a car. After all, Einstein had learned to sail a boat but did not drive — Richard was in excellent company. The other passengers in the car pool were dumbfounded to learn that Richard was a non-driving nuclear physicist. Queer ducks these physicists!

The journey through Washington's apple country, Montana's Glacier National Park, the endless plains of the Midwest, and the smoke of Pennsylvania, provided a striking contrast to Richard's life of stickball on Teller Ave. and his endless views of the South Pacific. Before entering the Navy he neither smoked nor drank. But scotch and cigars came easily. He still remembers the drinking fountain just outside the main bar in Canton, NY, home of St. Lawrence University. Carved on the granite bowl was:

GIFT OF THE W.C.T.U.

The Women's Christian Temperance Union may still exist, like teetotalling Baptists, but Benjamin Franklin provided ample proof that man evolved to drink. The position of the elbow is precisely placed to bring the goblet to the lips. If closer to the wrist the hand would not reach, while if closer to the shoulder it would overshoot the mark. 'Poor Richard' Weiss had been lured into following the precepts of America's first physicist, never dreaming that someday he'd run a colonial tavern circa 1780.