



Designed late in WWII, the B-36A bomber patrolled the Cold War-era skies in the days before jets. Designed to "...carry 10,000 pounds of bombs for 10,000 miles" this behemoth was powered by six 28-cylinder engines and carried a 14-man crew. Bob Van Tuyl designed part of the 230-foot-span wings [National Air & Space Museum].

Chapter 19

The Age of Air Power 1941 ~ 1985

Although there are surely many interesting life stories about American Van Tuyls in the 20th century, perhaps none tells the tale of our times better than the story of Bob Van Tuyl. Born into a rural American log cabin, raised in the rough-and-tumble oilfields of Oklahoma, Bob Van Tuyl - along with millions of other Americans - felt himself lifted up by the tidal wave of World War II and deposited on the beach of the postwar American middle class. He became the archetypical American husband and father. He designed and single-handedly built his dream house. By the time this boy from the Missouri log cabin ended his working life, he had used his talent to design everything from aircraft, to ships, to guided missiles. At the end of his career, he was designing equipment to transport people to outer space. If ever there was a "man of the 20th century" surely Bob was such a man. To tell Bob's story, we need to start in Long Beach, California on the eve of the Second World War.

War on the Home Front

Nothing in 20th century America was as colossal in real life, or in the retelling, as that short period - less than 4 years - from December 7, 1941 to September 2, 1945 when the United States of America picked itself up from the self-defeating lethargy of the *Great Depression*, beat its plowshares into swords, and went to war in every corner of the globe. At the beginning of the 20th century, America was a nation of small farms. By 1940, Americans had built the infrastructure of cities and highways, feathered their nests with automobiles and radios, and had largely become a nation of factory workers. World War II transformed them once again: from an industrious inwardly-directed nation, to a military-industrial country with the ability - and desire - to use their new-found power around the earth. It was an exciting and frightening time.

When Bob Van Tuyl arrived in Los Angeles on Mother's Day, 1940, he was down to his last fifty cents. Thanks to his Uncle Harold and Aunt Lyda, he was able to survive until he could find work in August at the Vultee Aircraft Company in Downey. Earning fifty cents an hour, he was able to rent a place to share with his sister Wanda, who had fled to California herself soon after Bob did.¹

Starting out in the sheet metal shop, Bob was soon able to move into making *templates*, the accurate patterns used to guide sheet metal cutters.² Wanda attended college in Long Beach

¹ Van Tuyl, Bob, "As I Remember," a personal memoir [unpublished].

² These templates required accuracies of 0.005 inches [0.127 mm], which had to be achieved by eye, without the use of micrometers.

while she kept house for Bob. They were able to save the astronomical sum of \$100, but this was pretty much consumed during a strike and lockout at the Vultee plant in the fall of 1940. As a result of wage concessions after the strike, Bob's monthly gross income was increased to \$100 per month - the goal he had set for himself as a criterion for getting married. In June, after Bob's fiancée Betty Plumer had graduated from college, she headed out to California by train, Bob having sent her his last \$30 with which to make the trip. Wanda headed back to Oklahoma after her school year ended, only to find her folks packed and ready to head to California! Conditions in Oklahoma were truly desperate. Without even unpacking her bag, Wanda joined her parents Ardo and Lola as they headed west. Bob, who had struggled to prepare for his marriage, was none too pleased when his destitute parents showed up:³

Betty had arrived on Saturday by train in Los Angeles...She [noticed that] my Oklahoma drawl had changed and thought I was affecting my speech just to impress her...I didn't want anyone [but the witnesses] at the wedding, especially my parents...Mother had been sitting around all evening in her best dress hoping to be asked to the wedding...Dad arrived at the last minute ...dirty and wearing bib overalls...As we started to leave I saw poor Mother sitting there with her mouth drawn up tight and started to say, "Come on, Mother," but I looked at Dad with his dirty bib overalls and I couldn't ask one without the other so I took Betty by the arm and walked out of the apartment...[headed to the church]

Bob, it seems, had rejected the world of his father once and for all.

With war clearly approaching, the U.S. instituted a military draft. Bob had been called up in late 1940 for a physical exam and found to have scar tissue on the retina of his right eye, an apparent after effect of oilfield welding without proper eye protection. This physical limitation freed him for continued work in the aircraft factory, along with many other men who for various reasons stayed on the home front to build the weapons of war.⁴ By 1942, with war production in full swing, Bob was working overtime, including one 3-month stint of 12 hour days, 7 days a week. Still, compared to the lot of the combat soldier, this was easy duty, indeed.

With trained personnel in short supply during the war, companies like Vultee Aircraft looked for talent wherever they could find it. So it was that Bob and several of his fellow template-makers were asked to join the engineering department as draftsmen. Bob was elated at the opportunity, but dismayed by the working conditions:⁵

...a portion of the floor in the engineering building had been covered with aluminum painted with a type of white paint. A full size inboard profile [of the aircraft being designed] was being drawn on the floor. My job required removing

³ Van Tuyl, pg. 48.

⁴ During the 4 years of WWII, the U.S. put 16.4 million men under arms, about one-fourth of the 1940 total male population of 66 million [World Almanac 1995]. Roughly 40% of the U.S. population is between 18 and 44 years of age. So, perhaps 1/3 of U.S. men who might have been considered eligible for military service did not serve in uniform during WWII, but remained behind to run the country and build weapons.

⁵ Van Tuyl, pg. 52.

my shoes, putting on special socks, lying on my belly on a flat bed with wheels and rolling around on the floor drawing various components in place to show whether there was an interference...I didn't even pretend to like [it]...

Bob soon got a chance to do drafting on a table, as well as to do some *lofting* and shop *liaison* work.⁶ Although their main production plane was the BT-13 trainer (nicknamed the *Vultee Vibrator*), Vultee was also designing a number of experimental aircraft during the war. Among them was the XA-41, a flying test platform for a bomber engine and the XP-54, an experimental fighter with a propeller mounted behind the cockpit to push - rather than pull - the aircraft.⁷ Bob did some redesign work on the hastily-designed XA-41 while it was being built in the experimental shop, and was then given the task of retrofitting the XP-54 with a cockpit pressure relief valve:⁸

When I finished the design I was asked to work with the test crew in Ontario, California...The plane was located on an isolated...military airfield...We were having trouble with air leaking out of the cockpit...we could only get the pressure up to 3 psi...Finally I suggested that I crawl inside to see if I could find [the leaks] from there. The automatic relief valve was still lying on a bench beside the airplane. When I signaled the crew I was ready, the boys started the compressor...[and] the pressure went almost immediately to 3psi...I was suddenly in terrific pain. I panicked...and kicked the door open. I was suddenly exploded out the door straight as an arrow and landed feet first on the concrete below...There wasn't a drop of air in my lungs and I was desperately gasping to breathe. I finally got my breath under control, then I could feel my ears hurting again...[No permanent injury resulted]...There had been some worry about whether the pilot would hit his head when he bailed out. The chief test pilot was very interested in the fact I hadn't.

But Bob's main contribution was not as a human guinea pig, but as an innovative designer. He did some design for the wing of a new bomber: it would be called the B-36. Also during the war, Vultee was designing its first jet aircraft, the XP-81, and Bob took on the tail control surfaces: the *elevators* and *rudder*:⁹

The greater speed [of the jet] required the covering of the control surfaces to be metal, instead of the fabric we had used up to that time. These were the first metal skins Vultee ever put on control surfaces. Consequently, there was no one in the company who knew how...[so] it was up to me...We couldn't use aluminum [too heavy]...so I used Magnesium [an innovation at the time]...

But by the closing year of World War II, it became clear that jet planes would not actually see combat, even though they were obviously the wave of the future. Immediately after the war, Bob did some minor design work on the XF-92A, the world's first delta-winged fighter plane.

⁶ *Lofting* was the process of designing patterns [in those days, made of plywood] for smooth contours in an aircraft's body. *Liaison* [pronounced *Lye' - uh - zun*] was communicating between the engineering department and the shop floor.

⁷ The XA-41's engine was later used on the famous B-36, in a "pusher" configuration.

⁸ Van Tuyl, pg. 59.

⁹ Van Tuyl, pg. 61.

Some WWII Vultee Aircraft

BT-13



Derisively called the *Vultee Vibrator* by the men who trained in it, this plane was Vultee Aircraft's main contribution to the war. Bob Van Tuyl worked on the assembly line producing this aircraft, which trained hundreds of pilots and earned Vultee a tidy profit.

XP-54



Dubbed *The Goose* by Vultee workers, this ill-conceived craft looked unfit to fly. In fact, it barely got off the ground. Bob was blown out of this plane's cockpit during static tests, landing feet first on the tarmac below, barely able to breathe.

XA-41



A fighter plane powered by the same engine that later propelled the B-36, this was the last - and fastest - of the WWII piston-engine fighters. Jets were coming along at the time, so this craft featuring *empanage* design by Bob Van Tuyl never went into production, despite its superior performance.

They Weren't All "Rosie the Riveters"...

During World War II, women entered the formerly male bastion of aircraft manufacturing in a big way. With their husbands and boyfriends overseas, and with a crying shortage of labor on the home front, it was only natural for women to fill the breach. The most widely known example became *Rosie the Riveter*, the stereotypical production-line "gal". But as Bob Van Tuyl noted:

They weren't all Rosie the riveters. Several of them came into engineering and some of them showed promise for a future in engineering...It had been decided by someone that women worked well for me. I wound up [supervising] eight of them, which was every woman [draftsman] in the department, except one.

In fact, Bob's sister-in-law, Margaret Plumer, joined the ranks of the white-collar women workers in 1943, when she moved in with Bob and Betty and took a job at Douglas Aircraft in Long Beach.

She created quite a stir when she [scored] the highest I.Q. ever recorded [among job applicants] at the Douglas plant in Long Beach. They put her in engineering, sent her to school with pay, and after school was finished she went to work updating drawings.

But difficulties arose in the aircraft plants as a result of having men and women work together on equal terms for the first time in U.S. history. The bright and attractive Margaret, for example, was invited by her boss to take a sailboat cruise. In those days, such activities were unthinkable for moral young ladies, and Bob stepped in to keep things on the straight and narrow. Not that things were always straight...or narrow. According to Bob Van Tuyl:

Many strange people came out of the woodwork [during the war]. I had working for me a man [who claimed] his father was his grandfather. [I also supervised] a nymphomaniac...The night liaison man was having an affair with a local telephone operator and couldn't be depended on to be there when needed.

One day, there walked through the mostly-male engineering department a young lady of such extreme beauty that everyone stopped working immediately to stare at the poor girl. Supervisors saw to it that she was safely cosseted in the personnel department thereafter. But not all wartime women looked like Betty Grable:

During the war, Christmas parties were quite the thing. A lot of drinking was done on the last day of work before the holiday and the boys kissed every girl they could catch. The girls weren't very hard to catch. One Christmas we had a girl that was so ugly we called her Queen Kong...when kissing time came she wanted to kiss the boys and they were steering clear of her...A man squeezed right past [my drafting table] and asked me to protect him because Queen Kong was after him. Sure enough, here she came down the other aisle. She came between the [drafting] boards right after him with the men making way. [But] she squeezed right past him and grabbed me...so I hung a great big kiss on her. It made her day and I felt quite noble for the rest of the afternoon. The Christmas parties died at the end of the war.

The reason for this return to holiday sanity probably had to do with the fact that most of the women left the aircraft factories at the end of the war, settling down to become wives and mothers. At war's end, Vultee Aircraft merged and moved to San Diego. The farewell party at the Downey plant was a raucous affair. One particularly hated supervisor was the target of both the mens' and womens' revenge. They got him drunk, and when he fell asleep on a cot, one of the "girls" slipped beneath the covers with him. One compromising photo was all it took to end this guy's career. He was fired the next morning.

This pioneering experimental craft pointed the way to the future in jet aircraft design. A proposed follow-on to the jet-powered XF-92A was to have been the F-92: it would be powered by a *rocket engine*, not a jet engine. Bob designed a pioneering vertical tail surface for the F-92. The whole tail pivoted about a vertical axis, and he designed it with machined spars - another first for his company.¹⁰ Bob had come a long way as a designer by the end of World War II. His first design project had been an oilfield pumping station: less than a decade later, he was designing rocket-powered aircraft! Clearly, Bob Van Tuyl had found his life's work.

A Home of Their Own

By January of 1943, Bob and Betty had become parents. Their first born son, Rory, "*was born a very unhappy child and cried from 10 o'clock in the morning until 10 o'clock at night for a solid year.*" When the baby was one year old [and presumably through with his constant crying], the landlady decided he would be too destructive to her furniture, so Bob and Betty were forced to move. Like so many of their counterparts pouring in to California for war work, the young Van Tuyl family found a tiny "cracker box" house to rent in Whittier, an inland suburb. Like young married couples have often done, they borrowed money to buy furniture, and what they couldn't buy they improvised out of orange crates and apple boxes. At the end of the war, returning soldiers were presented with the well-deserved opportunity to buy homes with only \$50 down payment, whereas non-soldiers would need \$1200 down. But for a \$15 down payment and \$15 per month the Van Tuyls were able to buy a 1/4 acre lot in a rural area outside Whittier, California. Bob moved his family into a crude house on a chicken farm next door to this lot while he began to draw up plans for a dream house. While Bob and Betty were living in the little Whittier house, their second son was born: they named him Stephen Alan. He was blonde and blue-eyed like his dad, and apparently did *not* cry day and night throughout his first year of life. As the family was settling in to their "farm", fate intervened: Vultee aircraft merged with Consolidated Aircraft Co. of San Diego, and all operations were suddenly moved south - a distance of over 100 miles from Whittier. So the Van Tuyls reluctantly sold their Whittier place and moved south to a rented house in Lemon Grove, California.¹¹

Bob couldn't give up his dream of building a house himself. He had grown up in a series of shacks in Oklahoma, and his stubborn pride, if nothing else, compelled him to do better for his family than his father had done for him. So when the lease expired on the Lemon Grove house, Bob and Betty bought another piece of empty land - this one a disused avocado orchard in La Mesa, California, and Bob hit the drawing board once again to create a plan for his dream house. But building a house takes money, something the young family didn't possess. Undaunted,

¹⁰ Van Tuyl, pg. 71. Although the airframe was built, the F-92 was never produced, because the rocket developer failed to produce an adequately-powered motor.

¹¹ The Whittier property was sold for \$3500 - a tidy profit over the \$1500 purchase price. In a few years, the land was condemned, along with all the surrounding territory, for inclusion in a dammed-off flood protection zone. The Army Corps of engineers built dikes, but unlike the low territory in the Bommelerwaard, this Los Angeles Basin polderland was declared off-limits to people.

Betty moved with her two boys¹² up to Long Beach where they had to share a 1 bedroom apartment with her in-laws Ardo and Lola. Betty took a job in a Long Beach drugstore and Bob worked every evening and weekend trying to build his dream house singlehandedly, without the aid of a single power tool:¹³

...I started digging [the foundation excavation by hand]. The ground was decomposed granite and clay...It took me three months to do the required excavation...and [that was for] only half a house! Drainage was so poor in that type of soil that I dug the septic tank drainage ditches twice as long, twice as deep, and twice as wide as the building code required. I lost 14 lbs. in very short order. I had moved into a rooming house near the [factory]. I was so exhausted each night that one night I went to sleep in the bath tub and didn't wake up until 2:00 AM, freezing because the water was so cold...After three months Betty was getting [impatient] so Dad brought her down to see what was going on. She was...sick to see not a single board sticking up. She and I slept under the avocado trees that night.

Bob hired next-door neighbor Howard [Tred] Treadwell to pour the cement slab foundation, which saved some time, then he set to work like a madman framing the house:¹⁴

The roof was quite a problem. It was flat, and tar paper had to be laid with hot tar. I found a barrel somewhere and set it over the septic tank ditch and put tar into it. I built a wood fire in the ditch. That melted the tar very well. I tied a rope to a 10 gallon paint bucket and used it to hoist the hot tar to the roof...Every time I emptied the bucket I had to go back down the ladder to the tar barrel, put some more wood on the fire, dip some more tar into the bucket, dash back to the ladder and hoist the bucket with the rope.

This was oilfield technique at its best...or worst! Full speed ahead, and damn the consequences!

On one occasion I put too much wood on the fire and the tar caught fire. There I was on the roof with a half bucket of hot tar and a barrel full of flame right under the eaves. I calmly kept mopping tar until the bucket was empty. By that time the flame was reaching above the roof and the house was about to catch fire. I slid down the side of the house without using the ladder, grabbed a water hose and turned it on the barrel. The barrel exploded. As I saw the flame coming at me I turned my head sideways and caught it on the left side of my face. For some weeks I went around with no left eyebrow or lashes and that side of my face was absolutely black. I presented the fellows at work with lots of conversation.

Despite all the difficulties and near-disasters, Bob was able to complete a barely-habitable shell of a house in 5 months.¹⁵ Betty and the boys moved down to join him in the fall of 1948. The inside of the house was completely open - only the 2x4s were in place. Rory and Steve enjoyed short cutting through the walls at every opportunity. With no wall insulation, and but a single gas heater for the whole house, the family faced the coldest winter in memory:¹⁶

¹² Steve, born in 1946, was about 1 year old at the time; Rory was 4 and in kindergarten.

¹³ Van Tuyl, pp. 72-73.

¹⁴ Van Tuyl, pp. 73-74.

¹⁵ Key to this was a loan of \$2000 from Bob's formerly destitute father, Ardo. Although loaning Bob the money set back Ardo's plans to get a place of his own, he was more than happy to do it.

¹⁶ Van Tuyl, pg. 74.

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It even snowed, and the school kids were turned out to experience [this unheard-of event]. The gas company was unprepared, [so] there wasn't enough [gas] to heat even a snug house. Betty nailed tar paper all over the cracks. Rory and I would go to school and to work and Betty and Steve would stay in bed until it was warm enough for them to get up.

Just as the winter of '48 drew to a close, difficulties developed at work. Postwar slowdown created a shortage of work in San Diego, but there were some opportunities at the company's Ft. Worth, Texas plant. With no money to continue house construction, and with the prospect of a layoff staring him in the face, Bob accepted an assignment in Ft. Worth. He packed Betty and the kids off to Perry, Oklahoma, where they moved in with her parents, and for the next four months Bob worked in Ft. Worth doing production modifications to his old wartime project, the B-36 bomber. Betty and the kids enjoyed their stay with the Oklahoma grandparents, and everything worked out well. Rory Van Tuyl recalls:

By the time I got to Perry, I had attended kindergarten and first grade in 5 different schools: Whittier, Lemon Grove, La Mesa, Long Beach, and La Mesa again. The California schools were overcrowded and non-demanding, and as a result I had still not learned to read by the time I was half way through first grade. This was remedied in short order by an old-fashioned Oklahoma schoolmarm named Gertie Croka, who took me by the scruff of the neck and applied an old-fashioned dose of the "Three Rs". By the time I left Oklahoma, my ambition to read was fulfilled, and I knew I had a knack for it. The nomadic life we led during my early school days was, surprisingly, a very positive experience.¹⁷

At the end of the 1949 school year, the Van Tuyls headed west to California in their 1947 Studebaker. They had some money saved to resume work on the house, and were looking forward optimistically to a peaceful life. At that very moment, however, the United States and the Soviet Union were engaged in a war of nerves called the *Berlin Blockade*. Had Bob and Betty been able to see into the future, they could have projected this incident in Berlin into a picture of what the next decade would hold for them. It was the 1950s, the decade of the *Cold War*.

The 1950s

Soon after Bob returned to San Diego, the struggling Consolidated-Vultee Aircraft Company [*Convair*] was bought out by an early conglomerate called *Atlas Corporation*, and its product line expanded to include *guided missiles*. Bob and long-time friend and co-worker Howard Jenkins were assigned to a ship-to-air intercept missile project code named *Bumblebee*. Since this would be Convair's first electronic guided missile, and since electronics was a brand-new innovation, a test rocket was needed to check out the guidance system. Bob was chosen to head this project: a solid-fuel rocket powered intercept missile test vehicle called *STV-4*. At what turned out to be the peak of his career, the 34 year old Bob was given overall responsibility for this project, including something he knew nothing about: electronics.

¹⁷ One sad bit of learning took place in Perry when Rory learned that "colored people" were not allowed to use the public restrooms or drinking fountains. He later realized that although he had an Indian classmate, there were no black faces to be seen in his class: the schools, too, were strictly segregated.

Bob Van Tuyl in the 1940s - 50s



Proud young father Bob Van Tuyl holds his first son aloft. It was 1943, WWII was in full swing, and Bob was designing warplanes in Downey, California.



Postwar California saw Bob - complete with suit, hat, and 1947 Studebaker - posing with sons Rory [left] and Steve [right]. The Van Tuyls were living in Lemon Grove, California, and Bob was commuting to work at Convair in San Diego.



Bob Van Tuyl meticulously constructs the centerpiece of his dream house - a fireplace wall of flagstone. He would later install plate glass in the opening on the left, to enclose an indoor planter.



Bob became active in community affairs during the 1950s. Here, he presides as Cubmaster of his son Steve's Cub Scout Pack. Bob also served as president of Rory's high school band parents' organization.

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The missile was assembled and fired at White Sands Proving Ground in New Mexico - a top-secret facility. The first shot worked so well that the guidance concept was proved out. The test crew then decided to remove the *canard wings*, the little stabilizing surfaces in front. Even this flew well, according to verbal reports. Convair decided to adapt the solid-fuel electronically-guided missile concept into a ship-to-air defensive missile called the *Terrier*. Bob did the structural design using his favored magnesium material for the members, integrated the prototype, and even did the shop liaison work. This *Terrier Missile* turned out to be a great success.

The creative energies of men like Bob Van Tuyl had been harnessed during the war to produce a postwar world that was both secure and frightening. On the one hand, the U.S. was more prosperous than it had ever been. People were leading better, more secure lives. Almost everyone had a car: the Van Tuyls had their *Studebaker*. Household labor-saving appliances were coming into use: Betty was able to forsake her old ringer-type washing machine for a modern automatic type. Television entered American homes: the Van Tuyls got a 12-inch RCA console TV. People never had it so good. But in the back of their minds they knew that the *Strategic Air Command*, flying B-36 bombers (on wings Bob Van Tuyl had helped design), was on constant alert, ready to deliver atomic bombs as needed against their arch-enemies, the Russians. Schools installed blackout curtains, and children were trained in how to duck beneath their desks and not to look at the atomic blast. Scientists determined that post-attack *radioactive fallout* could kill millions, and this led to the construction of public and private shelters - stocked with provisions for weeks of survival - standing ready should doomsday occur. Children, especially, were thoroughly indoctrinated with the "them-vs-us" spirit of deadly competition with the Russians. Steve Van Tuyl recalls the "space race" between the two countries from the viewpoint of an 11 year old boy:¹⁸

October, 1957 will remain in my memory forever as the month when the Russians launched Sputnik, and "got ahead of us" in the "space race."...I was bitterly disappointed as I watched our Vanguard rocket blow up on the launch pad soon thereafter, and noted with some shame that the payload was only 3 pounds anyway, whereas Sputnik weighed 7 pounds. I was thrilled when a Redstone rocket finally delivered an American satellite into space.

As the 1950s progressed, the Van Tuyl family's life normalized. Bob continued to build the house, with substantial help from Betty. She drove to the lumberyard to pick up material, sanded the the finished product, and painted or varnished just about every square foot of interior and exterior wall in the house. A bank loan negotiated by her provided the financing for the house's second wing: a living room, family room, and garage. Bob spared no expense on materials for this part of the house. He framed it in short order, and this time had the help of his wife and two boys when it came to tarring the roof. The finishing details were truly spectacular: plate glass windows, birch and redwood walls and room dividers, interior planter boxes, and the crowning

¹⁸ Elia [Steve] Van Tuyl's written recollections, October, 1995.

glory: a flagstone fireplace occupying an entire wall. It was undoubtedly the most aesthetically pleasing design of Bob's life - a technical, as well as artistic, success.

For many Americans - including the Bob Van Tuyl family - the 1950s was a "golden era" of peace, prosperity, and joyful family life. Like many families of the time, these Van Tuyls took summer vacation trips to see and enjoy the country's natural wonders like Yosemite and Sequoia National Parks. The San Diego backcountry held special appeal for Bob and family - they took several rock-collecting trips to the Anza-Borrego desert, or often just day trips to see the still-unspoiled scenery. After seeing slides of a co-worker's hiking trip to then-uncrowded Mount Whitney, Bob set his sights on this quest and promised the enthusiastic boys that they would do it someday.¹⁹

Rory and Steve joined the *Cub Scouts*, with Betty serving as a *Den Mother* and Bob as a *Cubmaster* in this quintessentially-1950s-America organization. Bob's natural talent for leadership and organization came into full focus for his role as leader of the Cub Scout pack. He spent endless hours on the phone cajoling parents into participation, and still more hours practicing his newly-developed public address skills ("*We are happy to welcome you into the pack with your son...*"). Rory's later participation in the high school band led Bob into his ultimate role as a community leader: president of the *Band Parents' Club*. Bob had never been given the opportunity to become a manager of people in his work environment, but as a volunteer he excelled. He and his volunteer parents - and the band members themselves - raised thousands of dollars for the cause, with Bob providing the unswervingly confident leadership for the whole enterprise.

Like so many of their contemporaries, the Van Tuyl boys had activities of their own - activities strongly supported by their parents. Steve joined a *Little League* baseball team and did quite well as a pitcher. Rory drifted into solitary experiments in chemistry, physics, and engineering - not all of which were successful, but most of which taught him a lesson.²⁰ Both boys studied piano, and it was time well spent. Rory went on to play a horn in the high school band, and bang the piano in a dance combo. Steve developed a love for music which was to blossom in his adult years, when he became a composer and teacher, as well as a builder of children's musical instruments. Neither Rory nor Steve suffered the deprivation and insecurity that had so scarred their father. There was always plenty of food. The family was well provided-for, even though there was little money for luxuries. Life was good. Bob took time from his house project - he was slowing down anyway - to help Rory build *Soapbox Derby Racers*. These were coasting

¹⁹ Finally, in 1960 - just before Rory headed off to college - they made the ascent. Lifelong smoker Bob made it to the top on sheer guts and determination, gasping for breath all the way.

²⁰ His hand built telegraph quickly depleted its dry cell battery power supply. His chemistry experiments ranged from turning solutions from one color to the next, to lashing up jungles of test tubes, flasks, and so forth, to the ultimate "experiment": "*How to Produce the Smell of Rotten Eggs*" [hint: it was done with sulfur].

cars designed for a national competition sponsored by General Motors. True to 1950s form, of course, it was open only to *boys* - and many got lots of help from their dads. In effect, Bob taught Rory a greatly simplified version of the airplane builder's trade. Just as Ardo had taught Bob rough carpentry, Bob taught Rory the spirit and technique of good workmanship. It was a precious experience for them both.

The Bob Van Tuyl family of La Mesa, California had become a prototypical postwar American family of the 1950s. Dad worked, mom kept house and managed family affairs, and the whole family enjoyed the fruits of unparalleled prosperity. For Bob Van Tuyl, who had dreamed his whole life of being part of the middle-class establishment, this decade had been a period of joy and fulfillment. But like the country as a whole, the Bob Van Tuyl of 1960 had no clue as to what the next decade held in store. For Bob - as for the country - it would prove to be a rocky time.

The 1960s : Domestic Unrest and the Vietnam War

The time period in America normally referred to as "The '60s" probably began in late 1963, after the assassination of President John F. Kennedy. For the United States - and the Van Tuyl family - the 1960s would be a trying time of change and social unrest, with the war in Vietnam as the number-one issue.

In 1960, 17 year old Rory Van Tuyl headed off to college in Berkeley, California, where he - like his dad before him - had determined to study engineering. Rory, like many of his contemporaries, had been an idealistic, if naive, Kennedy supporter. But in early 1963, he heard a speech on campus by Barry Goldwater, a conservative senator from Arizona. Goldwater's talk - a generic "stump" speech used to test the waters for a 1964 presidential bid - impressed Rory, who became an instant Goldwater fan. The only negative note of the evening was a somewhat testy question from the audience - which Goldwater deflected easily - about U.S. involvement in Indochina. But at the time, few people showed any interest in Southeast Asian affairs. That would soon change.

By the end of 1963, Rory had met and married Patty Poucher, a U.C. coed who would be his wife for the next 25 years. The military draft, which had continued throughout the *Cold War*, was taking young men at about the age of 23, if it took them at all. There was little real need for soldiers, so marriage was sufficient grounds at the time to effectively exempt one from military service.²¹ Rory settled down for a serious academic and work regimen in electrical engineering, and when he turned 21 in 1964, he voted for the conservative Goldwater. At about that same time - the fall of 1964 - the first of a long series of American college student protests erupted at

²¹ Like his dad, Rory received a 1B classification. Men with children were granted even lower classifications, as were those with even the most minor physical impairments. The other common practice for those wishing to postpone military service was the *student deferment*, or joining the *Peace Corps*.

the Berkeley campus of the University of California. The politically conservative Rory Van Tuyl viewed his University's *Free Speech Movement* [FSM] from a non-participant's point of view:

Many people associate the first student unrest of the period - Berkeley's FSM - with Vietnam protests. This is an incorrect view. Vietnam was one of many political issues at the time, but was not yet a major issue with students. After all, there were no drafted U.S. soldiers in Vietnam in 1964, so the issue had not been personalized for the students.²² The disruptions were a result of a power struggle between the campus administration and a restive student body. Though disruptive, it was generally peaceful. What really disturbed me most about the FSM thing was the student who came into my engineering lab and tried to get the instructor to cancel the class. I and all my lab mates really wanted and needed that lab time. Fortunately, the instructor declined to cancel the class. We were grateful to him.²³

Protests and violence swept U.S. college campuses - and the nation - over the next few years. There were race riots, political assassinations, and power-based student demonstrations throughout. But increasingly, protests centered on the Vietnam issue. And more and more, these protests involved mainstream Americans - not just the radical left. While Americans grew less and less pleased with Vietnam, not all had the courage to speak out against it. Rory Van Tuyl, who had no direct fear of conscription, kept a low profile and kept his mouth shut, despite his growing disillusionment with the war. As the years wore on, more and more citizens, from grandparents to college students, joined the protest against the war and the conscription that made it possible.²⁴

Among the war protesters was Steve Van Tuyl, Rory's younger brother:²⁵

[At the] time I was 19 years old, and a junior at Stanford University ...encounter[ing] articulate and informed dissent against the war and the rationale on which the war was based. And of course...I might well be forced to participate in this war if I ever got in a position of no longer having a [student] draft deferment.

Deciding in early 1967 that the war was "...foolish, arrogant, and grotesque to the point that I could not live with myself if I became a participant..." Steve Van Tuyl sent his draft registration card to his local draft board, along with a letter explaining that he would refuse to cooperate with

²² There were 15,000 professional-soldier U.S. "military advisers" in Vietnam at the end of 1964. On 24 February, 1965, Johnson ordered the bombing of North Vietnam, and on 8 March, the first American combat troops landed on Vietnamese soil. By the end of 1965, nearly 200,000 U.S. troops - including draftees - were in Vietnam. By the end of Johnson's regime in 1968, 540,000 American soldiers were serving in Vietnam. [Karnow, S., "Vietnam, A History," 1983, pp. 681-682].

²³ For more details about the Berkeley *Free Speech Movement*, see: *The Report of the President's Commission on Campus Unrest*, U.S. Government Publication, 1970 [L.O.C. Cat. No. 74-608779].

²⁴ In 1967, with 475,000 U.S. troops in Vietnam, some 50,000 people demonstrated against the war at the Lincoln Memorial in Washington, DC. By 1969, the year the troop count peaked at 543,000 in April, anti-war demonstrators in Washington numbered 250,000 on Nov. 15.

²⁵ Elia [Steve] Van Tuyl written memories, October, 1995.

the Selective Service System. But the draft board continued to process Steve - and countless other draft resisters - throughout that tumultuous year. In early 1968, they sent Steve his induction notice. He was required to report to the Army Induction Center in Oakland, California forthwith:²⁶

The American Friends Service Committee (a Quaker organization) recommended cooperating with the law up to the point of actual induction, for reasons of legal defense. I was certainly not the first draft resister to show up in Oakland, so the Army guy in charge hardly batted an eye. He just sent me off to the waiting FBI agent for an interview... I remember the FBI agent as being middle aged, friendly, and smug. He was trying to find out if I was a political threat or just a nut. In any event, he promised me, with a good deal of satisfaction in his voice, that I would soon be in jail, and I had no reason to doubt him.

One afternoon in 1967 Betty Van Tuyl, upon returning home from her teaching job, found 2 well-dressed, polite men at her house. They were FBI agents. They wanted to know where Steve was.²⁷ When Bob returned home, the agents grilled the couple for an hour or so. Finally convinced that Bob and Betty knew nothing of their son's whereabouts - which in fact they did not - the agents left. For the act of returning his draft card, Steve was being investigated by the federal police. In the worst-case scenario, he would be facing a jail in a Federal Penitentiary.²⁸ For Bob and Betty Van Tuyl, typical Americans, the foundations of their world had started to tremble.²⁹

The year 1967 held more shocking developments for Bob Van Tuyl. In addition to his fears and emotions about Steve, Bob suffered probably the biggest blow his pride and self-esteem would ever sustain. "I don't think he ever really recovered from it," commented his wife Betty years later. His Depression-era experiences with poverty and unemployment had scarred Bob deeply, and he always swore that he would "...get a job and stick to it." This he had done. From 1940 until 1967 he had worked for the same company.³⁰ But in July of that year, just short of his 52nd birthday and his 27th anniversary with the company, Bob Van Tuyl lost his job. He picked up a couple of temporary assignments over the next year, but for 6 months there was no work at all. The humiliation of collecting the weekly unemployment check was perhaps the hardest task he faced. Bob was not alone, of course. Many, many of his fellow *aerospace* workers regularly

²⁶ Elia [Steve] Van Tuyl, written memories, 1995.

²⁷ This visit occurred after Steve returned his draft card, but before he was ordered to report for induction.

²⁸ At least one of Steve's fellow Stanford students, former student-body president David Harris, did serve prison time for draft resistance.

²⁹ The FBI had initiated a domestic surveillance program - called COINTELPRO - after WWII as an anti-Communist measure. By the 1970s, the program was out of control, with each perceived new threat becoming the target of domestic surveillance [Gentry, C., "J. Edgar Hoover - The Man and The Secrets," 1991, pg. 444]. On June 10, 1975, a "blue-ribbon" commission headed by Vice President Nelson Rockefeller revealed that the CIA had illegally spied on domestic black, anti-war, and political movements, and accumulated records on 300,000 Americans [World Almanac, 1995, pg. 448].

³⁰ The company had metamorphosed from Vultee Aircraft to Consolidated Vultee, to Convair, to General Dynamics Convair Division, but it was still the same outfit, with many of the same people as during WWII.

found themselves in the street, moving from company to company in pursuit of government contracts. Ironically, the nation was at war and the *Space Program* was in full swing, but engineers in the San Diego aerospace and weapons industry were reduced to driving milk trucks. Finally, in September of 1968 Bob found work halfway across the country in St. Louis, Missouri. As it turned out, the old warhorse designer had quite a few good years and good ideas left in him, and though he had to change employers and move again, the experience was probably a good one in the long run. By 1973, Bob and Betty Van Tuyl found themselves in Slidell, Louisiana, a suburb of New Orleans, where Bob designed military hovercraft, and later worked on the external fuel tank for the *Space Shuttle*.

Steve had continued to actively participate in the draft resistance movement, including some protest demonstrations, right up until the end of 1969. By that time, he had tired of the growing contentiousness of the student antiwar movement at Stanford. In December of 1969 he and Sara Wolfe, a Stanford student he had met a couple of years earlier, decided to marry. Steve finished the required work for his philosophy degree from Stanford, and he and Sara were both graduated in June of 1970. Three days later, they were married by the Stanford chaplain at a mountain retreat above Palo Alto, in an non-traditional, but beautiful, ceremony. It was a moment of great relief and joy for the Van Tuyl family.

A Happy Ending

As it turned out, due to a complex series of events, Steve was never arrested for his draft resistance.³¹ He and Sara went on to enjoy a wonderful marriage that produced four girls who would be a joy to all: Rosalind, Rosana, Nerissa, and Penelope. Rory and Patty, married for 25 years before divorcing, would produce two great kids: Jocelyn and Ian. By 1996, all the Van Tuyl cousins except for Penelope, who was still in high school, were attending - or had graduated from - college. Sadly, Bob Van Tuyl died in 1985, too early to see any of his grandchildren earn their degrees. For this man who always felt that he had wasted his own opportunity to get a college diploma, and had transferred his ambitions to his children and grandchildren, the knowledge that all of them were (or soon were to be) college graduates would surely have been the most fulfilling experience of his life. His branch of the family, which had begun with his own birth in an Ozarks log cabin, had, by the last decades of the 20th century, moved to the place in society Bob had always strived for. Knowing this, he must have died a happy man.

³¹ Steve Van Tuyl had been illegally and punitively inducted into the Army without the requisite physical exam. Because the U.S. Supreme Court had ruled such action illegal, and because of the enormous backlog of cases facing the Federal Government in the wake of wholesale protests by Steve and his contemporaries, they never pressed the case. After his marriage, Steve - never a pacifist - opted to join the U.S. Marine Corps Reserve as a practical alternative to active military service. He was not alone in this. Former U.S. Vice President Dan Quayle did the same thing at the time. His joining the Marines was in no way a reversal of his basic and profound opposition to the Vietnam War. By 1975, the U.S. - having retreated painfully from the misadventure - suffered the final humiliation: being forced to evacuate its last remaining personnel by helicopter as the victorious side overran the U.S. Embassy in Saigon.

Chapter 19

Bob Van Tuyl finally retired in 1981, having designed everything from propeller-driven airplanes to jet fighters, solid fuel rockets to ICBMs and Space Shuttle fuel tanks, with levitating boats [hovercraft] thrown in. All in all, it had been an amazing career. After all the adventures, misadventures, accomplishments and wanderings he had experienced during the heart of the 20th century, Bob Van Tuyl still held on to a piece of his Ozarks heritage. Despite his nearly lifelong separation from the southern Missouri of his birth, Bob Van Tuyl died the owner of 12 acres of land in Edwards, Missouri: the land on which the Van Tuyl log cabin once stood; the land to which he was born; the land from which he had travelled so far.

Bob Van Tuyl in the 1960s - 80s



In 1960, Bob and his sons Steve [left] and Rory took a long-planned hike to the top of California's highest peak, Mt. Whitney. The 14,494 ft [4418 m] elevation took its toll on lifelong smoker Bob, who made it to the top on sheer determination.

Four years later, Bob became a grandfather. In the 1964 photo at right, he joined his son Rory and parents Ardo and Lola in admiring the first Van Tuyl of the new generation: Jocelyn Christine. By 1984, Bob and Betty [below] had 4 more granddaughters: Rosalind [standing] and [l-r] Rosana, Penelope, and Nerissa.



In retirement, Bob put his design experience to work to plan a 2-story structure for tennis fans at Betty's tennis club. At right, he supervises the volunteer builders as they construct what was later to be named the *Bob Van Tuyl Tennis Pavilion*



[Pinewood Club, Slidell, LA].

2000-Ton Surface Effect Ship



Bob Van Tuyl's late-in-career projects were undertaken in New Orleans, Louisiana. The 2000-ton surface-effect ship [above] was slated to be part of a "100-knot Navy" by its builder, Bell Aerospace. The project never progressed beyond the testing stage. For Bob, it was one of his most rewarding engineering projects nonetheless. The Space Shuttle External Fuel Tank [below] included design contributions by old-time missile designer Bob Van Tuyl, who had worked on both the *Terrier* and *Atlas* missiles during the 1950s and 60s. Although the Space Shuttle suffered from faulty solid-fuel boosters, this liquid fuel tank performed well on every mission. The tank was a project of Martin Marietta Corporation, the fourth - and final - major employer of Bob Van Tuyl's remarkable 40-year aerospace industry career.



Space Shuttle External Fuel Tank