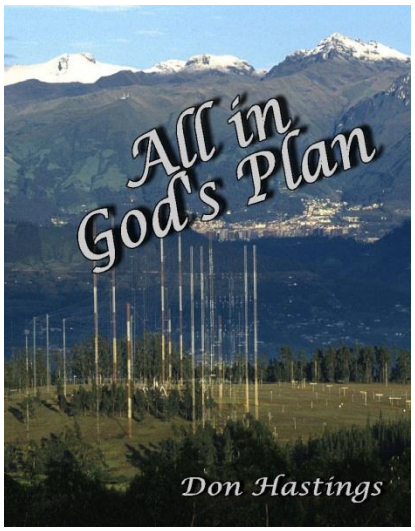

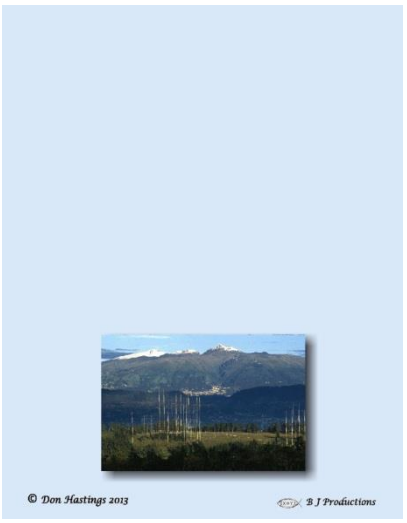

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Front and Back Cover:
HCJB Global Antennas in Ecuador with Quito
and Mt Pichincha in Background
HCJB Global Photo

FORWARD

PUZZLE PIECES

Recently as I was at my desk putting this book together, my eyes caught a glimpse of a painting that we have hanging on the wall in my office. It was made from a puzzle that my husband and I had put together. When we emptied the box of over 1000 assorted pieces on the table each piece didn't look like much on its own, or appear to ever become part of such a beautiful painting. Each one was only a small irregular shaped piece of cardboard with some various colors and unidentifiable patterns on them. Each was distinctly different from each other. No two were alike. After we worked for several days, which seemed like years, our labor had developed into the beautiful masterpiece that we now have hanging on our wall. We had it framed so we could remember the time we had labored together in this project.

As I continued to ponder over the text in this book, the image of the puzzle kept coming back into my mind and made me reflect on Don's life, how he and HCJB Global were each destined by God to be associated for many years in this very vital work of spreading the gospel around the world to those who had never heard it. All the people that Don had contact with; his schooling and the universities where he studied, his time in the Army, the friends he made, all were in God's plan for his life. Each and every person he worked with in the ministry was equally destined to be a significant puzzle piece, each one designed for their equally important place in that endeavor. Even the way he met his wife, Doris, was part of that plan. How he met Chuck, Doris' brother, was not a mystery from God's perspective.

My work on this book was such a blessing to me. I am so grateful to Don and Doris for inviting me to be a part of it. While reading the book, I had a hard time "putting it down" for it truly captured my interest. It was like I was outside the fish bowl looking in. God's magnificent hand was so evident on every page. It made me even more convinced in my faith in the sovereignty of God.

Don is a very intelligent, but humble, man which is evident in the type of work that he has spent his life doing. The gifts that God put into his being were God-designed to do what He had planned for him. His thirst for knowledge as a young man is all a part of this. Why he signed up for the Signal Corps in the Army, his choice of companies he worked for were all part of God's master plan. All of these were necessary for his chosen vocation.

All of us are puzzle pieces. Pieces, when put together, form a beautiful masterpiece of God's kingdom. Right now, we may only look like little irregular pieces that don't amount to much in themselves. But, each piece is very different in God's master plan, each puzzle piece equally important. One day, when we all see our Savior in His kingdom, the big picture will become clear. There will be no cut lines between each piece, they will have all disappeared and blended together in the most beautiful masterpiece imaginable.

We hope that anyone who reads this book will not only enjoy it, but will be able to see that each and every believer has a part in the Kingdom of God , although different for each of us.

Gratefully submitted,
Barbara J Lindeman
B J Productions
Cherry Valley, IL 61016

All in God's Plan

Don Hastings Tells
Stories about His Life

Revised Edition August, 2013

To My Family

My wife Doris,
Lorie and Bill, Jim and Christine, Dave and Kelly;
and grandchildren Michael, Sarah, Lauren, Erin, Kate, Bailey, and Jaclyn

God's most precious blessing was bringing you into my life.

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Preface

Beginnings

In 1928, the year I was born, no one knew that great changes would soon descend upon America, certainly not my parents. They couldn't know that in the next year a stock market crash would usher in the Great Depression and years of struggle and hardship. Nor could they imagine that God would provide me, an awkward farm boy, many opportunities to help protect our country and help to broadcast the gospel worldwide. But God did just that.

My Heritage

My paternal origins go back to the birth of John Haston in 1650 in Scotland. His descendant came to America in the 1700s, settled first in Pennsylvania, then moved to Tennessee. In the early 1800s the family traveled in covered wagons to Washington, Oregon and California over the Oregon Trail. Some decided not to go all the way and my great grandfather settled in West Central Missouri, where some from his family still live. His son, my grandfather, raised his family of eight children in Dade County, where my father, John Raymond Hastin, was born in 1904. The family name changed through the years, no doubt due to faulty spelling on documents, so at times it was Haston, Hastin, Hasting, and Hastings. My grandfather spelled it "Hastin" as did all his children except Dad, who was convinced Hastings is the correct spelling.

My mother's family is traced back to Switzerland where Marti Frye was born in 1521. His descendants went to Germany in the mid-1600s, sailed to America in the late 1600s, and settled in Philadelphia, Pennsylvania. During The 17 and 1800s they lived in Virginia and Illinois, and from there my mother's parents moved to Dade County, Missouri. My mother, Dora Beatrice Frye, was born in Dade County in 1909. She had seven siblings.

My mother was one quarter, and I am one eighth American Indian. My maternal great grandmother was a Native American, most likely from the Cherokee Indian Tribe. In the 1800s the United States government relocated this peaceful tribe to Oklahoma, so we think her husband met her when he worked in the Oklahoma oilfields

Chapter 1

Home on the Farm

1930 - 1946

My father left his father's home in Dade County, Missouri to find work near his brother, Oris and his wife, Pearl, who were living in California's San Joaquin Valley. Pearl and my mother were sisters and, on a visit to their home, my mother met and later married my father. I was the first of ten children, and my brother John Darwin the second, both of us born in Lindsay, Tulare County, California, I on June 19, 1928, and John, who we always call Darwin, on March 21, 1930.

When I was two years old Grandfather Hastin suggested that Dad and Mom return to Missouri from California, and he offered to help Dad buy a farm near his own farm. Mom and Dad returned with Darwin and me in Dad's Model T Ford, but I have no memory of the trip.

Back in Missouri

When they returned from California, they bought a farm on Highway 39 in Dade County north of Arcola, Missouri. Grandfather's house, one of three he built in the area, was close enough that at only three or four years old I often walked by myself along the road to his house. One time I attended a get-together at Grandfather's to send Aunt Zula off to California. Uncle Maurice, five years older than I, was there and I liked to play with him. Maurice decided to mow the lawn and warned me to keep away from the mower blade. The machine fascinated me; I ignored his warning, and managed to get my finger in it. The wound left the end of my finger hanging. My grandmother cleaned it, pressed it back in place and bandaged it, then sent me home. I still have the scar.

LaVerna was born in 1931 when I was three years old, probably at home on Dad's farm. Later when we lived in Vernon County with no hospital nearby, my other brothers and sisters except Billy, the youngest, were born at home with Dr. Albright, my grade school teacher's uncle, attending. Billy was born in Fort Scott, Kansas.

With the Great Depression in full swing, Grandfather could barely manage to keep his farm, and couldn't continue to help Dad with his mortgage payments. Dad lost the farm and we had to move and start over.

The Homestead Act, put into effect in the 1800s, stated that the flat areas of Kansas and Missouri be divided into square miles, each divided into four farms consisting of 160 acres. To give access to the farms, north/south and east/west dirt roads were built at every mile. Settlers who moved to the area filed for a tract, moved onto it, made improvements, cultivated it, and in a few years they owned their claim legally. Some of these families still owned the farms, but many

had been purchased by businessmen in surrounding towns as investments to rent out. And thus it was that Dad rented a small farm in Bourbon County in eastern Kansas where we lived for about a year.

Dad then rented a larger farm located back in Missouri in Vernon County, about a half mile east of the Missouri/Kansas state line and one and a half miles from the town of Garland, Kansas. It was owned by Mr. Huffine, a funeral director in Fort Scott, Kansas. We became "sharecroppers," renting on the basis of sharing the income from the crops with the owner of the property. The rental period was from March first to the following March first, but Dad got special permission to move in during the fall before our year began.

The farmhouse was shaped like the letter T with a large porch on the east side, and a large front yard with a row of tall cedar trees on each side of a flower-lined walkway leading to the road. The tall trees had originally been planted as small shrubs, but through the years had grown. Later when I climbed them I discovered that the top had been cut off from each one, probably to get a Christmas tree each year, since we had to find our Christmas trees in the nearby pastures. Near the house was a place for a big vegetable garden. There was a chicken house, a large barn and barnyard, a small building to use as a garage, and an outhouse since there was no inside bathroom.

That first winter we lived in the front half of the farmhouse while two bachelor men, due to move out March first, lived in the back. It seemed like a long time before we could remove the barrier and use the other half of the house. We children had to double up to sleep, and into the high school years Darwin and I slept together in a three quarter-size bed.

We didn't have electricity, running water, refrigeration, or central heating in the house. We used kerosene lamps and lanterns for light. There was a pot-belly stove in the living room for heat, and a cook stove in the kitchen, both fueled by wood and coal. We found the wood in stands of trees in nearby pastures, and dug up coal from just under the surface of the ground. Our drinking water came from a cistern that collected rain water from the eave troughs on the house. Only the livestock drank water from the well because oil contaminated the wells in the area.

Dad milked our own cows. Without refrigeration the unpasteurized milk soured, and we turned it into yogurt we called clabbered milk. We didn't mind that it tasted sour. We skimmed cream off the milk and churned it to make butter. After we children were old enough to milk, Dad bought more cows and a hand-cranked cream separator machine, and he sold the cream for cash money. Since we didn't drink skimmed milk, he fed that to the hogs. Later on we poured our whole milk through a filter into 10 gallon milk cans, placed the cans in water to cool, and a milk truck came daily to haul it to the cheese factory.

Mom washed our clothes on a wash board in the same wash tub where we took our Saturday night baths. She then rinsed them in a separate smaller tub of water, squeezed the soap and rinse water out by hand, then hung them on the clothes line to dry. When dry she ironed them with flat

irons heated on the cook stove. It was very hard work. Since our livelihood depended on the farm products, farm machinery and livestock had to be purchased before labor-saving household items. Eventually Dad bought a gasoline-powered Maytag washing machine. Mom still had to heat the water, carry it to the washer and rinse the clothing in the rinse tub, but the machine scrubbed the clothes and rung out the water.

Dad bought an icebox to put in the kitchen. It was rather crude with a compartment to hold a large block of ice we purchased frequently from a store in Garland. It wasn't very effective and food kept only a little longer in it. We used it briefly, then stopped buying ice and used it for storage. When a neighbor bought a refrigerator using a small flame for the cooling process, it became the talk of the neighborhood, but no one else could afford one.

My siblings and I, like most farm children, went barefooted all summer. In the early spring our tender feet would soon toughen up as we played and trekked the countryside and pastures and later worked in the grain fields. There would be stubbed toes, some cuts, punctures and bruises, but still we wore shoes only when we went to town.

The spring of our first year on the Vernon County farm Dad asked if I wanted to help him plant corn, and I said yes. We went out to the nearest field where Dad used a garden hoe to dig a small hole, I placed two kernels of corn in it, and Dad covered it with dirt. The process was repeated many times as we went back and forth planting rows of corn. I felt proud to be helping Dad and don't remember getting tired. Before Darwin and I were old enough for field work we were assigned to feed and water the chickens and hogs, bring the cows from the pasture, and when we were a little older we fed and milked them. That was just the beginning as, over the years I, Darwin and my other brothers and sisters helped with all the farm work.

Dad gradually purchased equipment for planting corn, wheat, oats and other grains, and that spared us from having to do a lot of the work by hand. Dad started with the old horse-drawn plow with handlebars and walked behind to guide the horses and control the plow. Later we had a bigger plow on wheels with a seat to ride on and we could lower and raise the plow. We started with horses and later purchased a tractor.

The landscape around where we lived might have seemed barren and uninteresting to most, but not to Darwin and me. We explored all over the area, snacking on wild berries we found along the way. We found poison ivy too, with painful results. The terrain was reasonably level but we explored two flat-topped hills, one and one-half miles and the other two miles away. Old strip mines where coal had been dug left open pits filled with water, and we explored and fished in these. Our life was carefree and we could go anywhere without anyone objecting. One early adventure occurred as Darwin and I investigated a building along our dirt road. It contained implements and lots of cans filled with different kinds of grease and oil. Behind the building we saw a small lake with holes along its side, and a steel trap in one of the holes. We had no idea

why the trap was there. We pulled it out by an attached cord, tripped the trap and piled trash on it, enjoying the whole process.

Later, one of the neighboring Linn boys reported to my parents what we had done. He had been trapping a family of skunks in the hole. The skunks couldn't get out past the trap, for each one that tried was caught in the trap and blocked the exit for the others. When we removed the trap all the remaining skunks escaped. Sometimes as we were growing up Mom and Dad disciplined with spankings, but this time they explained that fur pelts of skunks, opossums and muskrats were sold for much needed cash, pointed out that what we did had harmed others, and cautioned us not to do such things again. We felt worse than if we had been spanked.

When I was about four years old and played in the wheat storerooms in the barn, I started to have symptoms of asthma. My parents took me to Dr. Albright at his office in nearby Garland, Kansas. He said there was nothing to treat it and gave me medicine to help prevent it from developing into pneumonia. At first only wheat dust bothered me, but gradually the dust from other grains and hay caused symptoms too. As I grew older I could not work in the grain fields at harvest time although I could do all the other field work. For the rest of my life I have had to avoid breathing airborne dust from grains and hay.

Learning in a One Room School House

I was six years old in 1934, and when I started school big changes came into my life. The school year began in late September and ended eight months later in May. Mom bought a lunch pail, new shoes and school clothes for me, including knickers which ended below my knees. I didn't like the knickers, and was happy when later the kids started wearing overalls to school. Nothing in my life had prepared me for school. I hadn't been around other children much and was very shy. The school was one and a quarter miles away and I didn't remember even seeing it or how to get there. Our neighbors who lived about a quarter of a mile to the east of us included a girl whose brother was entering the eighth grade. The girl, who later became a hair stylist in town, enjoyed cutting hair and wanted to cut mine. She told me my hair was stubborn on one side, which puzzled me — I couldn't understand how hair could be stubborn. The boy rode a bicycle to school and offered to take me on his bike. The first day of school I walked to the neighbor's house and then rode on the handlebars of his bike, with firm instructions to keep my feet out of the spokes of the front wheel, which I did most of the time.

The one-room schoolhouse on a one acre lot had large windows that helped to light up the room on sunny days. On cloudy days we used kerosene lamps. A large slate blackboard and teacher's desk at the back of the room allowed the teacher to oversee the pupils' desks that filled the front of the wooden-floored room. A large wood and coal burning stove near the center of the room provided heat during the winter. Water came from a hand pump outside. Behind the school a small building sheltered the horses and buggies pupils used for transportation to school. A

boys' outhouse stood on the south back corner of the lot and the girls' on the north back corner. A flagpole flew the Stars and Stripes each day, and swings, teeter totters, a maypole and a ball diamond provided activity and fun.

This was the McHugh School, District 84, Harrison Township, Vernon County, Missouri. During my first year around 20 students attended from at least three miles around, some coming by horse and buggy, some walking, and my neighbor and I on his bicycle.

We all profited from the strict discipline of the well-liked and respected teacher, Frank Albright. The first thing I learned was to read from a primer book about Dick and Jane and their dog, Spot. After learning to read I was taught spelling and writing, then arithmetic. I quickly learned to keep quiet and hold up my hand for permission to go to the boys' room outside. The students were given very little homework to do at home, but sometimes I took assignments home for Mom to help me. During recitation I often read and spelled for the teacher, but since each class did that in the one room, no one was given much time. The lessons recited by the older children fascinated me and I learned a lot from them. Possibly I should have concentrated on my own work for I learned slowly at first.

The second year several students had graduated, including the boy who took me to school on his bike. It was no problem for me to walk to school alone, since by then I knew the way along the country roads. My school grades had been about average in reading, writing, arithmetic and spelling, but with fewer older children and fewer distractions I did better in my studies. Part of the school work from second grade on was to memorize Bible verses. We selected whatever verses we wished from the Bibles in the school. Some recited long verses, but I regret now that then I specialized in the shortest I could find, such as "Jesus wept." The teacher didn't seem to mind.

History and geography, added to the curriculum a few years later, gave me real problems. I read the material in the books faithfully, but when my class was called up to review, I just could not remember the answers to the teacher's questions. I tried reading the lesson twice but that didn't help. That all changed after the Custer family moved onto a farm about a mile north of the school. Junior Custer was in my class grade, and his brother Melvin was a year younger than Darwin. Junior could answer the teacher's questions with no trouble at all. As I watched him, I soon could answer the teacher's questions. I can't say why. Maybe competition was involved; maybe I just happened to grow mentally at that time. Anyway, my school grades improved.

We all liked Mr. Albright and wanted to obey the rules, but sometimes we did things we shouldn't and had to stay in our seats during recess. One time three of us boys saw a squirrel in the schoolyard, chased it up a tree and threw stones at it. Mr. Albright told us we were not to do that and I and the others had to miss a few play times. Another time a big flock of blackbirds flew very low over the schoolyard, Junior Custer threw a stone up, and to his surprise it brought down one of the birds. For that he missed some recess time.

Sometimes Mr. Albright missed a day at school, and his brother took his place. The first time it happened while I was attending, an older boy informed me this would be a time of

misbehaving. I was very surprised when everyone in the school acted wild and unruly for the whole day. No one took the brother seriously or obeyed him, to his obvious dismay. The next day when Mr. Albright came back everyone was on his best behavior.

Special events at the school were fun and well attended. For the pie suppers, older girls put together boxed meals to auction off for the privilege of eating a meal with the girl who made it. Everyone had a good time, and the money raised helped to purchase supplies and books for the school. At Christmas programs we sang Christmas carols and each student recited a poem or took part in a Christmas play. At the end each of us received a bag of candy and fruit. Each spring we looked forward to a break from our studies when we all went out to a wooded area, lit a large open fire, and enjoyed roasting hot dogs and marshmallows.

Mr. Albright taught more than just the lessons. He stressed morality and kindness as in the events with the squirrel and blackbirds, but also he taught about the evils of alcohol. We were very fortunate that Dad became sick if he drank it, and we grew up with none around us. Sometimes we would see and hear about inebriated people in the neighborhood. Farming was a hard life and often disappointing, and some sought solace in drink. I heard that a man lay in the snow for a long time before he was found, and another was run over and killed by a car. These two incidents greatly impressed me and I promised myself I would never use alcoholic drinks, and I've always avoided them. I've never been sorry for that decision, and it carried me through my years in the army and college. Dad didn't smoke either, so tobacco was never around our house either. Most of the other men in the area smoked and some chewed tobacco. Kids thought smoking would make them feel grown up and sometimes Darwin and I smoked small dried-out pieces of grape vine. We didn't do it very much because drawing air through the passages in the vine brought fire into our mouth and scorched our tongue. Fortunately my asthma prevented me from ever smoking cigars or cigarettes.

As families moved away, new families moved in. One of the first of these, Uncle Oris (Dad's brother,) and Aunt Pearl (Mom's sister,) moved back from California in 1935 with their sons WD (Dub) and Norman. They rented the farm on our section of land just south of the schoolhouse. Dub and Norman were older than Darwin and me and were in higher grades in the school. During recess we often played a game we called anti/over. We threw a ball over the roof of the school, boys on the other side would try to catch it, and if they failed they threw it back over. When someone caught the ball they ran around to the other side to try to tag one of the boys there to put him on the team of the one who caught the ball. On one occasion I was running around the building to escape from being tagged when I met a group of boys at the corner and collided with them head on. I recovered consciousness lying on the grass and the others were sitting in a group staring at me. Dub was the biggest, and I'm quite certain he was the one I hit. We all went back into the schoolhouse and continued our studies as usual.

Frank Albright continued to teach until I was in the seventh grade, when he found a much better position teaching in nearby Fort Scott, Kansas. After he left a young lady came and began

her first year of teaching. Fortunately all the students liked and obeyed her, so we were able to study and recite our lessons in quiet.

New Discoveries through Radio

Lots of things changed over the years as the farm income increased and Dad could accumulate more and more farm equipment and other things. The battery-powered radio became the center of entertainment for the family and opened up a new world to us. We heard great programs such as Jack Armstrong, The Lone Ranger, Fibber McGee and Molly, Bob Hope, I Love a Mystery, Bat Man, The Shadow Knows, Boston Blackie, and many others. Our favorite was The Grand Ole Opry from Nashville, Tennessee. We heard it on a clear channel station via sky wave propagation at night. During the daytime we heard stations from Kansas City, Joplin, Springfield and Pittsburg, Kansas.

Almost all the programs in those days consisted of good moral teaching with the good guys winning and the bad guys losing. This contrasted with the moderately bad language and hot-tempered reactions to irritations that were common while working. The programs showed me the bad patterns of life I was falling into and I didn't like what I was becoming. I didn't change right away, though. On two different summers I went to the Vacation Bible School held at the McHugh School. I remember we were to look up Bible verses, and compete to see who could find and read them first. Those who regularly attended church and Sunday school always won. If there was any mention of salvation through Jesus I don't remember it.

Then I discovered a program on the Pittsburg station that told of the lives of Joseph and David. The program emphasized that they obeyed God, and played God's voice with a very distinct echo-chamber sound that was very impressive. The point was if I lived a clean God-honoring life God would speak to me. I don't remember any mention of Jesus or salvation in Him, so maybe it was a Jewish broadcast.

I decided to turn my life around and live by God's commandments even though I knew nothing about God's Word or His commandments. I knew only what everyone thought in those days, especially non-Christians, that a good Christian was anyone who didn't use swear words, drink, use tobacco, cheat, steal, go to taverns or pool halls, etc.

At first I expected some kind of inner glow, as the program implied would happen. I remember cultivating the corn in a 13 acre field with the horse-drawn cultivator, and I had lots of time to try to pray as I crossed the field back and forth. That didn't seem effective, so I tried singing even though I didn't have a good singing voice. I knew very few Christian hymns so I used parts of songs I knew. That seemed to bring on the inner glow I thought was from God, but when I stopped singing it quickly went away. I experimented quite a bit before I realized it was nothing more than a physical reaction, with nothing at all to do with God. That didn't change my resolve to live a good moral life, even after I discovered I couldn't even live up to my own standards, much less God's. I pursued that path and persevered in it for the next 15 years. Mother and Dad didn't quite know what to make of the change in me, but they didn't criticize me either.

More Memories

Our lives changed a great deal after Uncle Oris, Aunt Pearl, and Dub and Norman moved near us. In those days we used horses for farming, but Uncle Oris bought a small John Deere tractor for both of our families to use. It was a big improvement except it was very hard to start and often the horses had to pull it to get it going. Dad and Oris shared the farm labor so sometimes the tractor was used in our fields too. We enjoyed spending time together, and often we made ice cream. We put a gallon can into a wooden pail surrounded with salted ice to reduce the temperature and freeze the liquid ice cream mixture. A geared crank handle turned the can, which had a wooden paddle inside to scrape the frozen ice cream off the inside edge of the can to get a uniform frozen mixture. The men and boys cranked the mixture until it was frozen so hard it couldn't be turned any more. By that time we were all ready to eat it along with cake and cookies. The ice cream was cold and if we ate it too fast we got a bad headache and had to stop until it went away.

For a few years the merchants in Garland showed free movies weekly during the summer to encourage more business. They set up a large screen on the main street of town, and people came to see the movies from all around Garland. We usually bought a small ice cream cone or candy bar while there.

When the government put in the rural electrical power lines, more changes came about in our lives, but more slowly than you might think. During the time I was in about the seventh grade a power line was installed that gave lights to the schoolhouse, but at least a year passed before our house had power. The old farmhouses were wired for electricity by local people who had limited knowledge about wiring houses, but at least we had some power outlets and lights. Little by little we got a refrigerator, a radio that didn't need batteries, toasters and other household items, as well as power tools for shop work.

Even when we were old enough to help with the field work, as the plants were growing we used those long periods of free time to explore around the countryside. In the summer we played in the water and fished in the small brook that ran through the farm, and in the fall we hunted. Dub acquired a Labrador dog named Blackie and trained him to catch rabbits and take them back to him. Blackie could run faster than our other dogs. No rabbit, not even the large jackrabbits, could outrun him. During the fall and early winter, we not only hunted rabbits during the day, but hunted fur-bearing animals at night. We had hunting hounds by that time and Dad often took us hunting with him. We used a lantern for light and took the hounds to the general area we wanted to hunt. The hounds knew to spread out and search for the scents of the nocturnal animals. When they found a scent, they followed the trail of the opossum or skunk, baying as they went. All the dogs joined the chase, and so did we, trying to keep up with the dogs. Sometimes the dogs caught the animals on the ground, but usually the animal would climb a tree. When we caught up to the loudly baying dogs Dad would shoot the animal, and we continued to hunt for others. We and the dogs frequently became quite odorous from the skunks. Dad taught us how to remove the

pelts in one piece and stretch them on shaped boards he had made. He took the dried pelts to the local market to sell for much-needed cash. Rabbits were plentiful and when I was a bit older I trapped them in the fall to get money for Christmas presents. Dad made a box trap for me. I placed grains of corn leading to the door of the box and more corn in the back of the box. When the rabbit entered to get the corn he had to push against a trip bar that allowed the door to drop down and trap him inside.

During those depression years, farming on the plains was a struggle. After trying it for two years we were sorry when Uncle Oris, Aunt Pearl, Dub and Norman went back to California. The tractor was sold, but they left Blackie with Darwin and me.

About two years after Uncle Oris left, Dad's younger brother Dwight and his wife Helen rented a farm on the north side of our section of land. Uncle Dwight wasn't in the best of health with "heart trouble," a term covering a variety of problems. I remember the time he came out to the field where Dad and I were harvesting oats using a machine called a binder. Dad drove the tractor pulling the binder. I rode on the binder and it was my job to pull on a metal lever with a spring that lowered and raised a part of the binder. I was about 10 years old at the time, and controlling the lever took a lot of strength. Uncle Dwight offered to ride on the binder for me and Dad agreed. I was concerned about his heart problem but at the same time I was glad to be relieved of the heavy work. I finally relaxed at the end of the day when Uncle Dwight was still okay.

Gathering Food

I often helped my mother collect leaves of small plants in the pastures and along the roadside that she knew were good to cook and eat. We called them greens, and included were spinach, dandelion leaves, curly dock and other plants. No doubt this strange mixture was healthful, and tasted good when a generous amount of vinegar was added to it. We raised our own hogs and chickens. When the weather turned cold in the late fall, we always went through the long, tedious process of butchering a hog for food during the winter. Preparing chickens to eat was much easier.

Darwin and I often went with Dad to hunt for rabbits and squirrels to take home to eat. We helped carry the game home, and always had enough for a good meal for all of us. There were no deer or larger game animals in our area at that time. Sometimes we went fishing with Dad, using fishing poles cut from tree limbs, and worms for bait. Dad often took us by horse and wagon to Dry Wood Creek or the west fork of Dry Wood, a larger stream a few miles away. Catfish were our favorite because they had fewer bones in the meat. We also caught perch, croppies, and sometimes bass.

Meat and fish were not the only things we gathered from the wild. Gooseberry bushes were plentiful in the area. In the spring we all went out with pails and gathered five to ten gallons of green berries from the very thorny bushes. The hard part was stemming the large, plump and very tart individual berries. They made very good pies when plenty of sugar was used. Mom made some pies right away, but she canned most of the berries for use later through the winter.

Wild strawberries ripened next. After that black raspberries ripened, and we ate them from the vines since there were never enough for anything else. Mulberries also ripened about that time, and we climbed the trees to eat them. We liked the dewberries when we could find them. Blackberry time was a big event. They were plentiful and again we all went out to pick. We gathered about as many as we did of gooseberries, but these didn't have to be stemmed. Most of them were canned for use later, and we always ate them all before the next crop.

Blackberries were a great favorite and most people around the area had their secret berry patch. The location was kept secret or everyone in the area would descend on the patch and clean out all the berries. There were many small patches in pastures and some larger ones in the rows of dirt piled up from the strip mines. One fall while Dad was hunting he found the best patch of all. When we checked it at blackberry time, we saw the biggest, sweetest berries we had ever found. We picked and canned all we could use that year and the next, but that second year one of us made the mistake of telling someone living on the section below us where to find the berries. When we picked berries we were always careful to protect the new canes that would bear fruit the next year. That wasn't easy because of the thorns all over them. When we checked the patch later it had been destroyed by people trampling down and killing all of the new growth. After that it never came back.

Next came pecan gathering. There was one tree in a field that grew large, very good nuts, and other trees had smaller ones. After the pecans we gathered black walnuts from a grove of trees. We also enjoyed picking from wild cherry trees, and later in the fall persimmons, very good after they were fully ripe. Opossums liked the persimmons and we often found them in the trees. A few old apple, plum and peach trees in the area provided us with snacks during the year. I enjoyed eating the plentiful wild grapes in the fall that came in two varieties called fox grapes and possum grapes.

Fun and Adventure, Snakes and Bees

I was about eleven years old, and Uncle Oris and Uncle Dwight had both moved away before the Custer family came and Darwin and I became special friends with Junior and Melvin. By that time we owned a 22-caliber rifle and Dub's dog Blackie. Junior and Melvin also had a 22 rifle and Cutie, their Labrador dog. We roamed the countryside hunting rabbits and exploring. We fished together, and in the warmer months we shed our clothes and swam in the brooks and strip pits. None of us could really swim, but it didn't matter because the water was not deep enough for us to drown.

One time our adventures went too far. We roamed anywhere we chose, and never imagined anyone would be concerned about us. We decided to go fishing on Moore's Branch, a larger stream about three miles from home. We planned to catch fish and cook them over an open fire, then camp overnight and fish more the next day. We caught a few fish, built a fire, cooked and ate the fish — not nearly enough to satisfy us — and prepared to sleep near the fire. When it started to rain, we were not prepared for the cold drizzle. As we looked around for some type of shelter we saw a large straw stack with cattle eating from it. We found that the cattle had eaten back into the stack, leaving a cave-like tunnel which we crawled into, covered ourselves with straw and cold as we were we eventually went to sleep. In the middle of the night we woke up, surprised to see our fathers peering in at us. They had been frantically searching for us along Moore's Branch, found our camp and our fishing poles and where the fire had been, but we weren't there. They were sure we had all drowned, but saw the straw stack and decided to check it. We deserved some discipline but they were so relieved at finding us they only laughed as we came out of the straw and heard my teeth chattering from the cold. We learned an important lesson. Although we had a lot of freedom our parents did get concerned about us, and we needed to check with them before staying out all night. Anyway, we never did anything like that again.

In the hot summer days we sometimes played in the water of a small brook in our pasture. There was never anyone around, so we could remove our clothes, jump in and pretend to swim. We liked to "mud crawl." All along the brook there were clay deposits of some amazing colors. We would paint up like Indians with the blue, yellow, orange, reddish orange and even some purple clay, and then wash it off before getting dressed again. It was only years later that I realized that those layers of colored clay were actually mineral deposits. Blue could have been silver, the reddish orange could have been mercury, etc.

During the time the Custer boys roamed about with us I finally learned to swim. I was the first to learn, and one time when we were "swimming" in one of the strip pits I proved it to my skeptical companions. I offered to swim across a deep part of the pit water, and they challenged me to do it. I swam across without trouble, but when I approached the other side, a big poisonous water moccasin struck at me from the bank, and sprang into the water after me. I spun around, flailing, splashing in the water, and swam back to the side I came from. We searched my body but didn't find any marks of a snake bite, only some gummy blue stuff on my back which must have come from the snake. Darwin cleaned it off and washed the spot well with water. That's the closest I ever came to being bitten by a poisonous snake.

We didn't like snakes and would kill them when we could. Water moccasins were the only poisonous snakes in the area. There were black snakes, bull snakes, spread adder and one we called blue racer. The spread adder was harmless, but because it spread its head like a cobra we feared it and killed the few we found. Black snakes were killed because they killed chickens and birds and any small animal. I heard a lot about poisonous copperhead snakes but never saw one.

One day, barefooted as usual, I walked along the path to the pasture to bring the cows in for milking, and felt my foot slide over something that felt like a snake. I didn't dare look until I walked on a few paces and looked back. Sure enough, there was a bull snake all coiled up on the path looking right at me. I was so glad not to be bitten that I went on my way without killing it.

Field Work, From Planting to Harvesting

President Roosevelt and Congress started New Deal programs to stimulate the economy, such as the REA (Rural Electrification Agency), WPA (Work Projects Agency), and the CCC (Civilian Conservation Corps). They were not effective and the economy was still very depressed by the end of the 1930s. Farmers were at the mercy of the weather. If they could, they planted a variety of crops so at least one or two would survive a drought year or one with too much rain. They normally had no cash reserves, so to buy seed for the crops, farm implements, and fertilizer or have money they needed to live on, they borrowed money from local banks. At harvest time they carefully selected the landlord's share from both the high and low yielding areas to ensure his one third was of equal quality as the remaining two thirds. Then they sold their two thirds to pay their bank loan and the 6% interest they owed. With some of the remaining money they bought livestock, such as horses to use and hogs, cattle, and chickens to raise for food and to sell. Normally by March first it was necessary to take out a new loan. In our case our family grew, and while there were more expenses we helped with the work and some years we didn't need to take out a loan.

Even with my allergy I could help with most of the work on the farm, such as plowing, disking, harrowing, planting, cultivating and even some of the harvesting. Some work I did with horses, but later when I was older I worked much more with a tractor. In late summer or early fall Dad would start the plowing in a field to locate where to begin and end a section of the field, and then I would continue and finish it. Next the rough, plowed surface was smoothed by disking, and then smoothed even more by harrowing. The next step was to plant.

The crops were rotated, so we usually planted corn in the field where wheat had been harvested, and we plowed that field right after the community threshing machine came to each farm to separate the wheat and oats from the straw and chafe.

We planted winter wheat in October, after the wheat-attacking Hessian fly season was over. To plant the wheat we used a machine called a drill (not for drilling holes) which could be pulled by horses or a tractor. The wheat would sprout and grow, somewhat like grass, through the winter months before growing tall and producing ripe grain by late June or early July.

We harvested corn in late September through November and used it for grain only. To do it we took the horse-drawn wagon out to the corn field and, as the horses slowly pulled the wagon, Dad, Darwin and I each took a row of corn, and using a husking peg, we husked — we called it shucking — the dead and dried out husks from the ears of corn, broke the ear off the stalk and threw it into the wagon. Picking corn in those days taught patience and perseverance as we stuck with it until the harvest was finished.

After the corn was picked Dad let the cattle into the cornfield to eat the dried leaves from the stalks and any ears that had been overlooked or dropped. When the cattle finished, we plowed the field, or if Dad planned to plant oats in that field, it was only disked.

We planted the oats in late February by a spreader attached to the back of a wagon. As the horses pulled the wagon, whirling blades on the spreader scattered the grains of oats over the field. We covered the grains of oats using the disk so they would not be eaten by birds. The ripened wheat and oats were gathered in bundles with a binder, and then made into shocks by hand to be threshed later.

Each summer threshing the grains was a big community event. The threshing machine was moved from farm to farm. All the farmers in the neighborhood gathered with their hay wagons and horses at the farm where a steam engine had been hooked up to power the thresher. Each farm wife helped feed the men their noon meal, so it was a social event as well as a lot of work. Because of my asthma I couldn't help with the threshing, but I helped plow the fields after the harvest in preparation for planting the next crop.

This was in the earlier days, but before I finished high school Dad had a mechanical corn picker to husk and pick the corn and a combine harvester to gather the fields of standing stalks of wheat and oats. With the new equipment Dad was able to farm more land, so he rented the large field across the road from our house which was part of the Biggles farm. When that family moved away Dad rented that entire farm along with the Huffine farm. We then moved to the Biggles farm house and left the Huffine house empty. I worked in all of the fields of both farms. I still remember all the special features of each field; the wet spots, the clay spots where nothing grew well, the old ash tree stump that persisted in sprouting up each year, and the streams of water that flowed through the fields.

New Challenges

Uncle Dwight and Aunt Helen had moved back to Cedar County, and a year or two later we received word that he had died of a heart attack. By that time he and Aunt Helen had a young daughter, Carol. We immediately loaded up in the Chevy Dad had bought by that time and made the 70 mile trip to their house. It was the first death in the family I had experienced, and I didn't know how to act. I kept quiet and solemn, and when the adults stayed up through the night I tried to stay up with them. I remember Grandfather Hastin, who lived ten more years, complained of his heart giving trouble. When I woke up, I found I had been put on the couch to sleep through the night. I don't remember much about the funeral, but my life was changed a bit by this event of Uncle Dwight's death.

Uncle Dwight had a hired man who did the heaviest farm work and lived in the house with them. After Dwight's death the hired man was needed even more, but it wasn't proper for him to live in the house with Aunt Helen. Dad and Mom asked if I would stay with Aunt Helen for the summer to help with the work and be a kind of chaperone. I was glad to help, and as soon as the school year ended (it was sixth or seventh grade) I was taken to Aunt Helen's home. I helped

with the chores, milked the one cow, and helped watch after my cousin Carol. It was a very different summer for me, and everything went very well. Still I was glad and ready when Dad came for me that September and I could integrate into my own family again.

One event at Aunt Helen's was important for my later life. A tall windmill on her farm used wind power to pump water for the livestock. It had a steel ladder on the side leading up to a mechanism at the top, which I climbed to about 30 feet so I could see the surrounding area. My feet were on one rung of the ladder and my hands firmly gripped another about shoulder high as I scanned the surroundings with my eyes. I made an important discovery. As I watched the clouds drift by my body moved with them until I reached the limit of the length of my arms without even realizing I was moving. I suddenly felt a sharp tug on my hands, and realized I'd have fallen if I hadn't been clutching the bar tightly. I climbed down quickly and understood why I was warned not to climb or I would fall. That incident helped prepare me for later when I worked up high on antenna towers.

During the fall and winter of 1941 and spring of 1942 I was in the eighth grade, my final year in grade school. By that time Darwin, LaVerna and Betty walked with me to school. Later Lorene, Joan, and Gary attended McHugh School before it was closed, and then Jo Ellen, Robert and Billy attended a different school in the area. I was 13 years old and World War II had started December 7th of that school year. War seemed far away at the time and I concentrated on getting good grades on the state final exam, which I passed, but the grade was not outstanding. I went to an eighth grade graduation ceremony at a large school where all those from the smaller schools gathered to receive their certificates. The next step was high school which began in the fall after my 14th birthday.

High School

Near the time to start high school the principal visited. We didn't expect him and wearing my oldest overalls with the knees out I looked very shabby. He mentioned that I would need to take a lunch, buy books, pencils, etc. When he told about the bus schedule we were careful to ask if the school would be on standard time or the new "war time" (1 hour earlier, like "daylight savings time") President Roosevelt had begun so everyone would be involved in the war effort. He assured us that it would be regular standard time. On the first day I went to the crossroad where the bus would pick up students and waited, but no bus came. I went home and Dad drove me to the school. The principal simply shrugged it off, saying that after all the bus went on war time and had missed many students. It was a traumatic way for me to begin my studies at Bronaugh High School. Students from miles around attended, but even so the freshmen class only numbered about 20 students and the classes were small.

It soon became routine to catch the bus and study the lessons. The courses were quite limited; math, social studies, literature, and physical science. There was also physical education, which

seemed ridiculous for farm boys who had lived a physically active life almost from birth. I rarely had homework, because I completed all the class assignments during the study hall periods. That was necessary because I still had my farm chores to do at home. I took the class work seriously and always completed the assignments. The result was my grades were always near the top of the class, for many students spent a lot of time goofing around. My favorite subjects were math and science. I didn't do as well in literature and writing compositions. When I took typing I didn't achieve the skill at all, and to the present time I can only "hunt and peck."

In the higher grades I took algebra, geometry, and trigonometry, but none were very advanced. I did well in them, and even impressed the principal, who told the whole class that he had been wrong when he first met me at home on the farm, and thought it would be hard for him to get me through high school.

Sports never interested me much, but I did join in softball games during recess time in grade school where we played workup so everyone had a chance to play all positions. I did the same in high school and also enjoyed shooting baskets, although I never played in games. Our school competed with other schools in basketball, so the boys who played were very competitive. For that reason physical education classes were entirely devoted to serious basketball, and those of us who were not involved considered that period to be free time. I used the time to finish class assignments when necessary, but frequently went to the local candy store for a candy bar. Since I rarely had money, I bought the candy using plastic Missouri sales tax tokens which I found on the ground. Later one of the boys acquired an old Indian motorcycle which we rode on during free class time, once even going nine miles to Liberal, Missouri.

I remember being involved in two plays. In Dickens' Christmas Carol I was Scrooge. Because of the setup of the stage I had to pretend to sleep during the intermission and until the next ghostly visit, and I clearly remember how difficult it was to remain still so long. Later our senior class put on the play "The Importance of Being Earnest" to raise money for the yearly senior trip. I don't remember the part I played, but I do remember that right after the play I had to go to northern Missouri with the local livestock hauler to pick up a special boar Dad had purchased. The hauler took a load of hogs to the Kansas City market, and then stayed overnight before going on north. I was very confused when I heard the hauler and a friend say they would spend the night at St. Louis. It turned out to be the St. Louis Hotel in Kansas City. The next day we went on and picked up the large hog, then returned home. I learned that the play had not raised enough money for the senior trip and it was to be presented two more times, the first being the night of the day I returned home. I had only one set of good clothes and I had worn them on the trip north so they were quite rumpled. There was no time for Mom to wash them, so I had to wear them in the play that night.

For the senior trip we went to a resort area in the Ozark Mountains south of Joplin and near the Arkansas state line. We traveled in individual cars, and I drove our family Chevrolet. (All farm boys learned to drive horses, tractors and cars of all kinds so I had been driving for quite a while. I never got a driver's license until I returned from serving in the military). Other seniors

rode with me, and the group of cars formed a caravan to the place we stayed for the two days we were there. Two teachers served as chaperones. The first day we rode on speed boats on the river and visited caves. On the second day we went into Arkansas to a small town built on the side of a mountain so steep that we went into a building on the first floor on one street and went up to the seventh floor and out to another street at that level. We had a great time.

The next day we returned home, and each carload chose its own route. Those in my car chose to return through Pittsburg, Kansas. On the way past the Pittsburg airport we saw a sign offering plane rides for three dollars, so we capped off the senior trip with a plane ride in a small Piper Cub. I really enjoyed it.

Book Learning Applied

My greatest interests in high school were the science classes, and I began to apply around the farm what I learned. By that time we had a tractor that had no battery, lights or starter on it. To start the engine we spun a large round flywheel by hand which turned the engine crankshaft, and a special magneto mounted on the side of the engine rotated to produce a high voltage spark that ignited the fuel. In my science class I learned a little about magnetic fields and generating electricity, so I decided to fix the magneto on the tractor because the engine was very hard to start. I removed and disassembled it, then baked the wire coil in the oven of our cook stove for several hours at a moderate temperature. After it dried out I carefully painted the outside of the coil with a waterproof coating to completely seal it. When the coating was dry I reassembled the magneto and put it back on the tractor. From then on the tractor started easily. That success encouraged me to try more things, but much later I learned how risky it had been to take the magneto apart. The permanent magnets in the magneto have iron cores which can lose much of their magnetic field when removed, ruining the magneto. Fortunately that didn't happen.

A large part of my adult life I worked with antennas, and I think my science class inspired my first antenna experiment when I added extra lengths to the external wire antenna of our radio. Of course, that increased the received signal, even though it was not directed toward anything.

I also learned about conversion factors in school. On the farm Dad was good at estimating the weight of grain. One time when a neighbor ran out of corn and we had extra corn, we offered to sell it to him at a very reasonable price and needed to determine how much we could sell. It was piled at one corner of the room and spread from there across the floor of the room. I had learned that a bushel of corn could be determined by a specific cubic feet value. I measured the depth of the corn including the height of the conical part in the corner, came up with a volume, and converted it to bushels. The number of bushels seemed too high to Dad and the neighbor, but Dad's price was so low the neighbor accepted my estimation. With the corn loaded into the neighbor's wagon, even I could see that the volume was less than my calculation. I didn't always get things right, but I did gain experience as I tried to apply what I learned in class.

A Dilemma

Very few of the rural high school students planned to go to college, and I didn't see any way I could either, since the farm just didn't provide enough money for it. Most of the boys expected to farm, find jobs in the local towns or drive trucks. Most married right after graduation and started their families. As I considered my future I faced what seemed to be an impossible problem. All I knew was farming, but I couldn't be a farmer because of my allergies to grain and hay, which seemed to get worse instead of better. I couldn't picture myself working in stores in town, because I hadn't developed any social skills during my carefree roaming days or my farm work out in fields alone. I realized early that I must avoid relationships with girls, because for me, the only reason for such a relationship was marriage and starting a family. I did not see any way I could earn money to support a wife and family after high school, so I avoided all romantic involvement throughout high school.

Near the end of my senior year, the school principal met with our class to ask what each of us planned to do after high school. Most had plans for local things they wanted to do, but when my turn came, I said I wanted to get into some kind of radio work, using the only word I knew that involved the field of science. (I had a vast amount to learn. To me, engineers drove trains). The principal said for that I'd have to go to college. I knew that was what I wanted to do even though I couldn't imagine how. Later an Army recruiter visited Bronaugh High School to encourage us to join the Army. He showed a film presenting all the fun and adventure soldiers had, but I wasn't interested until he told about the government's offer to pay our way through four years of college for two years of service. That was the solution for me! When the recruiter asked for a show of hands of those interested, I put my hand right up. I was surprised that no other hands went up, and the others tried to discourage me. I didn't argue with them or discuss it further, but I knew what I had to do.

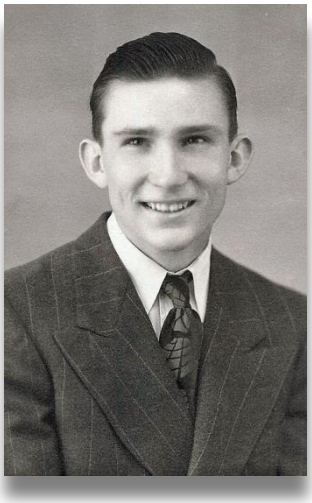
When the year ended, my grade point average was just barely below that of one of the girls in my class, putting me second highest in my class of seventeen students. I didn't rush off to the recruiter's office in Joplin because I hadn't yet reached my 18th birthday. Instead, I helped Dad plant a field of corn, which turned out to be my last work on the farm. Dad rode the corn planter, and I drove the tractor pulling it. The planter planted two parallel rows of corn each time we went through the field. An arm on the side of the planter marked the path for the next double row when we returned through the field, and this spread the rows evenly. This field had brush piles along the side and the first double row had to curve around the piles. Since driving the tractor was a bit boring, I decided to straighten the rows gradually, making each row as straight as possible. I didn't mention that to Dad, for it wasn't important at all, but later, when the corn grew, people driving along the road noticed the unusually straight corn rows. They asked Dad how he got them so straight, but he could only tell them that I had driven the tractor. It was an interesting finale to my agricultural life.

Grandmother and Grandfather Hastin

Mom and Dad Hastings

One Room school first row second and third from left: Darwin & Don, second row first and fourth from left: Betty & LaVerna

Don at about 2 years old



Don's HS senior year photo

Piper Cub J-3

Communications set up outside Tokyo

Checking radio in Tokyo

Don relaxing in barracks

Don installed military antennas on the anti-aircraft towers in Tokyo

Chapter 2

In the Army

1946 – 1949

Enlistment

A few days before my 18th birthday I visited the Navy recruiter in Joplin, but when he learned I had asthma he rejected me. Then I went to the Army recruiter's office in the same building. He wasn't concerned about the asthma, and wanted to know what branch of the Army I wanted to join. I asked if the Army had anything like radio, and he said that would be the Signal Corps, but I would have to enlist for three years instead of two. That was fine with me, so I signed up.

After choosing the Signal Corps for three years I told the recruiter I didn't want to just wave flags, but wanted to get all the schooling possible. He agreed to that, and asked if I wanted to serve in Europe or Japan after training. I had read an article in the newspaper about the U.S. Occupation Army in Japan, so I asked for Japan. I wasn't joining for a good time, but to do my duty and earn the privilege to attend college later. He asked if I wanted to take two weeks at home before leaving for Fort Leavenworth, Kansas to be inducted into the Army. I said no, I preferred to leave as soon as I could get ready and pack for the trip. I signed some papers and received bus tickets to go from Nevada, Missouri through Kansas City to Fort Leavenworth, along with directions and a meal ticket to use when changing buses in Kansas City.

When Dad took me to the bus station, he handed me $35. This surprised me. I had not thought at all about money as I expected the army to take care of my needs. I left near the middle of the day, and I and the others on the bus arrived at Fort Leavenworth near midnight. We recruits were taken to a barracks, assigned bunks, slept the remainder of the night, and the next day given physical exams and issued a uniform and fatigues. There were soldiers everywhere who constantly called out to us "you'll be sorry." I was sure many of them were new recruits also.

I passed the physical without problems, got shots for all kinds of illnesses (I had never been vaccinated as a child) and changed into my uniform. I was now a soldier. We waited for the paper work to be completed and orders issued to proceed to basic training. During that time I had to do KP duty, and even served as a waiter in the officers' mess hall. The newness of everything and my nervousness caused me to spill coffee on the table a few times. The officers were gentlemen about it though, and they seemed to be used to new recruits.

Basic Training at Fort Dix

When the orders came, I learned I was to travel with a sergeant and a few other recruits to Fort Dix, New Jersey for six weeks of basic training. We went by train on what seemed like a roundabout route up across Iowa and east through part of Minnesota, then down through Wisconsin and Illinois to Chicago. From Chicago we traveled a more direct route to New Jersey. I enjoyed seeing more of the country. I had never traveled very far north of Kansas City before. At Fort Dix we were assigned to a barracks and a bunk, and became part of a company of raw recruits to be trained. My rank was that of private, and I had a place in one of four squads of soldiers in the company. The corporals, sergeants, lieutenants and captains all did their best to make us into real soldiers.

First they took us to a beer hall and passed out cigarettes and pitchers of free beer, I assumed to convince us that we were real men now. I simply sat and watched the others and didn't smoke or drink anything. The others, busy smoking and drinking, didn't notice. I was glad no one ordered me to participate.

Life became regulated with a fixed time for everything — for lights out, to be in bed, to wake up with a bugle call, get dressed, make the bed just so, then fall out for formation and roll call. From there we went to the mess hall for breakfast, and then back to the barracks to prepare to fall out again and begin the tasks of the day, which included taking turns doing KP and guard duty.

We trained to march in formation, called "close order drill," and I learned to keep in step — left, right, left, right etc., and how to shuffle my feet to change when I got out of step. There was "column left" and "column right" and "about face" repeated endlessly. We learned "attention" and "parade rest" and "at ease" for a rigid position with eyes forward or half rigid and then a more relaxed stance but still in formation. We spent a lot of time at that kind of drill, and I wondered what it had to do with combat. Then I realized it was all about developing unquestioned robotic-like obedience to the orders of those of higher rank.

Next we learned to dismantle and clean M1 semi-automatic rifles until we could do it in the dark by feel. The mechanism was rather simple, and I put my rifle back together before the others and ahead of the instructor's directions. He ordered me to operate my rifle, and it didn't work right. I then had to take it apart and reassemble it without the instructor's help. I found the obvious mistake I'd made and corrected it, but I had learned not to rush ahead of the instructor.

Each day in calisthenics we bent, flapped our arms, moved our legs, did push-ups and sometimes pull-ups. I enjoyed the exercise where I moved the rifle into different positions. On an obstacle course we climbed over walls, went hand over hand suspended from pipes, climbed ladders, etc. This was no problem for those of us in good physical condition when we enlisted.

After this simple training we went to the rifle range where we were given live ammunition and taught to aim and fire our rifles. We learned the standard prone position, and the approved way to hold the gun braced with the shoulder strap. Since I'd been using guns for years, I had no problem with this. When we began firing the old, used rifles, I learned mine wouldn't

automatically reload after firing. I had to reload by hand with a lever on the side of the gun, which ruined my firing position and made it impossible to keep up with the schedule of the others. Another soldier had to operate the reload to speed up my rate of firing, but my aim was spoiled when he hit the lever each time. Nonetheless I did get my Sharpshooter medal.

At the end of target practice we made up our packs, including K-rations for food, went for a 10 mile hike, and then set up our pup tents to camp overnight. To practice for combat we dug foxholes for shelter in the soft, sandy New Jersey soil. The next morning we packed everything back up and marched ten miles back to the barracks.

Finally, we played at mock warfare, where we separated into two groups, went out into open wooded land, and guarded our territory from invaders. Then we tried to invade the other side. We had blank ammunition for our rifles, fired at the "enemy" from cover and were fired at in return. It was rather ridiculous because we pretended we hadn't been shot, as did the other group. I never learned who won the mock war.

That ended the six weeks of basic training, and we were off to Signal Corps School at Fort Monmouth, New Jersey. I had learned something about Army life, including that I had an Ozark Mountain accent, and could detect the accents of those from other areas such as New York City, Boston and Maine.

Signal Corps School

I travelled 30 miles on an Army bus from Fort Dix to the Signal Corps School at Fort Monmouth, New Jersey, and was assigned to a new group, Company N. When I arrived at Fort Monmouth I still had the $35 Dad had given me, but I'd not received any pay from the Army. To receive my pay from then on I had to sign on payroll papers each month.

It was still Army life, with fixed times for lights out, wake to the bugle call, fall out for roll call and breakfast in the mess hall. After that all was different. There were no close order drills and only occasional calisthenics to keep us fit, but intense school work kept me busy. During the year and more I was there I learned a vast amount about everything I really wanted to know.

It started with the simplest things, but they were things I knew nothing about. Electric current in wires was simply electrons flowing through the wires driven by voltage. I learned about field telephones and how to string wires to connect telephones between different groups of troops. Next taught was communication by radio and how radio worked. There was a completely new vocabulary to learn, such as all of the component parts in radios, their names and what they did. Finally we progressed to radar, and how it worked to track targets and provide direction for shooting down targets.

We also learned practical things, such as how to strap on pole-climbing spikes to climb up poles to repair or add telephone lines. We were trained to detect problems and repair radios and radar. We learned some about codes and how messages such as SOS were produced and

detected. Fortunately I wasn't expected to become proficient in that. Some who didn't want to go further in technical studies finished at that level and were sent to their assigned place to serve.

We learned from books, and when we finished each assignment we met with the instructor for an oral quiz and graded, the number 5 being highest. Then we went on to the next study assignment. I did well on the oral tests and moved along only at average speed, for I had so much to learn. Transistors had not been invented yet, so we learned about how vacuum tubes worked and how all the parts of radios were put together and tuned up. Many of us bought inexpensive radio kits, assembled the radio, did the circuit alignment, and had our own personal radio.

Life at Fort Monmouth was much freer than it had been during basic training. The Class A pass allowed us to leave the base any time we were not in class. One soldier even took weekend plane trips to his home in St. Louis, another rushed home when his wife gave birth to their first child.

Soon after arriving at Fort Monmouth, Sid Drake, one of the men in the barracks, asked if anyone would join him to take flying lessons at the local Red Bank airport. No one seemed to be interested, but I remembered the brief flight I had taken at the Pittsburg airport, and decided to join him. Sid was from northern New York State near the Thousand Islands section of the St. Lawrence River, and he wanted to fly a float plane on the river. I had no special goal in mind, but thought learning to fly might be useful later. We went to the small airport and made arrangements for flying lessons. It cost about $10 per hour for the instruction.

Sid and I trained most weekends, and I began to learn to pilot the small Piper Cub J-3 airplanes. They had a top speed of about 80 miles per hour, but some of the older ones would only go 65 or 70. First I learned to start the engine by turning the propeller by hand, then how to taxi out to the gravel runway used for takeoff and landing. Sid and I did not fly together; we each had our own plane and instructor. I learned how to take off and land as the instructor assisted and gave advice. It was simple, just open the throttle and the plane flew itself off the runway. He taught me how to hold the joy stick and rudder pedals to make smooth turns, and how to fly straight with the wind blowing from the side. After a little experience he taught me how to do the harder things. To recover from a dangerous tail spin, I had to force the plane into a spin and then make the right counter-moves to recover from it. The instructor could recover after losing only 200 feet of altitude, but the best I could do was recover after 600 feet. I would not ever want to try it without being at more than 1000 feet altitude!

I learned how to lose altitude rapidly by turning the plane onto its side and doing a side slip, then how to do a forward slip, which was more useful for landing, and much less dangerous. It was more difficult to land the plane. There was a specific landing pattern at the airport, and I learned to enter a counter clockwise circle around it, and then gradually lose altitude until the correct height to turn to approach the runway for landing. That took a lot of practice. The engine was throttled back and the plane set into a glide steep enough to prevent stalling but not so steep that the speed increased during the glide.

Flying was a lot of fun, and Sid and I practiced it nearly all the time we were at the Signal Corps School. We couldn't fly every weekend since it frequently rained in New Jersey. When we wanted to go flying, we looked at the cloudy sky. Predicting rain on the farm was important to plan the day's work correctly, and I was practiced and good at it. I would say to Sid it would rain that day, and it did. Other times I would look at the cloudy sky and say let's go, it will not rain, and it didn't. I don't remember ever being wrong, so I became the official weatherman.

When we became more skilled at flying we were given a license to fly solo, without the instructor. I often rented one of the planes to practice for an hour, and sometimes did things I shouldn't, like chase crows and race trains coming out of New York. I kept records of my practice flying in a log book, since that was needed to qualify for a full license to fly private planes. Sid was more serious than I about going that far with flying. One time I went with him to his home, met his parents, saw the Thousand Islands for the first time and enjoyed a boat ride on the St. Lawrence River. It was the first river I had seen where the water was completely clear.

On some weekends I joined groups going to New York City, Philadelphia and Washington D.C. In New York City I marveled at the tall buildings and the sights from the Empire State Building, rode the subways, and took the ferries to the Statue of Liberty and Staten Island. Philadelphia was less impressive, but I saw the cracked Liberty Bell and other historical sights. Washington D.C. was special with all the memorials, the Capitol and White House, plus a trip to George Washington's home on Mount Vernon.

The Washington trip was on a three day weekend, and we stayed in a fairly nice room with bunk beds. I put my wallet under my pillow for safe keeping. One in the group awakened in the night to find a man in our room and when asked what he was doing there, he said he was looking for Haynes. We ordered him out of the room, for my street-smart companions knew he was a thief. I looked under my pillow and my wallet was not there — I found it on the floor with the money gone. I still had my train ticket back to Ft. Monmouth so I planned to go back. One of the others offered to share his money with me until I could repay him later and I accepted gratefully. Even so we were so short of money the final night we had to leave our small room and stay in a larger room with 50-cent cots. Actually I did not lose very much, because we had been encouraged to put our money in a safe in the Company Commander's office, and only take enough to meet the expected cost of the outing.

During July and August of 1947 when our studies were the most intense, most afternoons we boarded Army buses to ride to the beach on the New Jersey shore. It was the first time I actually saw an ocean and waves pounding on the beach. We couldn't wait to dive in and swim in the warm, pleasant water, though it felt cool at first. It was the first I had tasted salty ocean water. My favorite sport was to dive into the big waves as they rose up and pounded down onto the sand. When timed right I could dive through the leading edge of the wave and ride the crest to a soft landing on the sand. If I missed the timing sometimes the wave threw me back and pounded down on top of me. Either way it was great fun. I think the Army's idea was that it was good exercise and a way to relieve the tensions of the intense study program.

I enjoyed the off duty adventures, but the real reason for being at Fort Monmouth was to learn the technical things taught there. Toward the end of the schooling we studied radar most of the time. We trained on World War II radars that were used to detect, track and shoot down German planes and V1 rockets sent to bombard England. These radars were 80% effective when they directed the guns against the V1 rockets. After learning the details of how radars worked, the instructors installed various faults to give us experience in finding and repairing them. The problems were usually not too difficult to find. The radars were also demonstrated for us as a plane flew around our area and the radar tracked the plane. That was done at night, and a searchlight, rather than antiaircraft guns, was directed at the plane, following it wherever it flew. The pilot of the plane threw aluminum strips from the plane to confuse the radar, but the radar locked onto the strips instead of the plane only once.

I completed my schooling in October 1947, and to my surprise my grades for all the oral tests were straight 5s. I was now ready to ship overseas to my duty assignment. I was one of the few who had chosen Japan; the others had requested service in Europe. However, nearly every one of us was assigned to Japan where the Army said we were most needed.

Visit at Home

The Army ordered me to go from Fort Monmouth to the Army base across the bay from San Francisco, and allowed three weeks of travel time, including vacation time at home. I had been away for more than a year and it was good to be back. It was the last week of October. Darwin and LaVerna attended high school and Betty, Lorene, Joan and Gary still attended the McHugh one room grade school. I relaxed and visited my cousins who lived nearby. I decided to fly using my solo pilot's license since the Fort Scott airport had Piper Cub J-3 planes to rent. They accepted my license, and let me rent a J-3 after an instructor took me up to verify I could really fly it.

I did some solo practice flying near the airport, and observed that the Great Plains hot dry air caused the plane to be more sluggish than in coastal New Jersey. The slight difference this made in flying was not a problem, so I made plans to demonstrate (and show off too) to my family some of the things I had learned. I told my sisters and brother Gary when I planned to fly over the McHugh school house, and told my mother, Jo Ellen, Robert and Billy, who were at home, when to expect me over our farm house. I rented the plane again and flew the 10 miles to the farm house and did some typical turns, glides, and even side and forward slips to change altitude. Then I flew on to the McHugh School and flew over it. Everyone came out to watch, and I repeated some of the maneuvers. When I got home after returning the plane, I found, to my surprise, I had frightened Mom terribly. She thought the plane was falling out of the sky and wanted someone to call an ambulance to come for me. I assured her that my maneuvers were things every pilot had to learn to do. The kids at school had fearlessly enjoyed the show.

Voyage to Japan

The visit at home passed all too quickly. I went by bus to the San Francisco base, boarded the General M.M. Patrick, a World War I ship used by the Army to transport troops, and found my hammock-like bunk, one of many suspended throughout the compartments. It sailed out of San Francisco Bay under the Golden Gate Bridge and into the Pacific Ocean. My first voyage by sea was not pleasant. We were crowded closely together for the entire trip and given duty assignments. Thankfully we were allowed some free time on the deck, and could often see whales in the distance and porpoises swimming alongside the ship. One night someone stole my wallet while I slept, and I never found it. There was not much money in it, but I hated to lose my pilot's license and the other papers in it. I didn't have an opportunity to replace the license after that and never piloted a plane again. The voyage took almost two weeks as we went north on the great circle route near the chain of the Aleutian Islands. The weather was good all the way, but the sea was rough. The small troop ship constantly pitched up and down, nearly everyone became seasick, and I was sick the whole way to Japan. It was a welcome sight to finally see the coast and mountains of Japan. We landed at Yokohama and went by train to Tokyo.

Tokyo

General Douglas MacArthur, in charge of the Army in the Pacific, had his headquarters in Tokyo, and the Signal Corpsmen serving there proudly wore the General Headquarters (GHQ) patch on their uniforms. When we arrived at the main Tokyo train station, crumbled bricks and concrete littered the caved-in station. A great amount of damage from the war was evident throughout the city.

We went to our assigned quarters in the San Shin building, several stories high with rooms much like a hotel. Army cots and foot lockers filled my fourth floor room and we had access to modern showers and bathrooms up the hall. We ate and took turns doing KP duty in the mess hall on the second floor. Located in the middle of the city with its canals and streets, everything was within easy walking distance. General MacArthur's offices were in the Dai Ichi building, considered the political capital of Japan. (Dai Ichi means number 1 in Japanese.) Sometimes we went there to practice and maintain the teletype machines, but they were not near General MacArthur's office so we didn't see him.

The Japanese people felt great respect for General MacArthur. He defeated them in the war and for that reason they considered him to be a great man. Crowds of Japanese came to see him every morning when he went to his office in the Dai Ichi building. We marveled at that, but accepted it as only one example of the cultural differences we encountered. Due to our young age I and most of the other soldiers didn't appreciate the opportunity to study this vastly different people. I remember only one, named Keeler, who made friends with some of the Japanese people, and adopted their practice of bowing elaborately whenever they met friends and

acquaintances. They did that in the middle of crowded sidewalks, which always caught me by surprise. I would almost trip over them.

Bicycles, a few cars, and many rickshaws pulled by Japanese men carrying passengers along at a good rate of speed crowded the streets. They did that all day long to earn a living. The few taxis were old Chevrolet cars from the United States converted from using gasoline to running on wood as fuel. A charcoal fire burned in a round metal barrel mounted in the trunk. Short pieces of wood placed on top of the burning charcoal gave off smoke and fumes that were drawn into the carburetor through a three or four inch pipe over the roof of the taxi. The engine ran on these fumes. It was a common sight to see taxi drivers stop to put fresh wood in the "tank" when the earlier wood had been reduced to charcoal. We didn't use the taxis because the Army had jeeps and trucks for us to use.

We frequently saw Japanese on the streets and sidewalks wearing their formal colorful kimonos. The men's work clothes looked very baggy. The workmen carried mostly rice to work and they ate it with chopsticks from flat metal cans. Their rest room consisted of a hole in the floor. The waste went into a can below to be collected by a man with a two-wheel cart loaded with "honey buckets." They took it to the farms for fertilizer. For that reason we were strictly forbidden to eat Japanese food even in restaurants for fear of contracting some disease.

After the eight hour work days we found plenty of activities to amuse us. Three movie theaters in Tokyo showed American movies for the troops, and I managed to see almost every film that came through. I also spent time reading after I checked out the quarters' library. Zane Grey westerns were my favorite.

Shortly after arriving in Tokyo I became friends with Chuck Rose, who worked in the same group as I. He would play a crucial part in my life from that time on. I had seen Chuck at Signal Corps School, but he was in a different company and I didn't get to know him. He liked active pursuits and I enjoyed going places with him in the city. We often went to the business section of town where we could buy parts for building a radio or amplifier for record players. We could even make our own records. We funded these purchases with money from selling cigarettes the Army supplied to all of us whether we smoked or not. I gave them away at first, but soon learned that American cigarettes were quite valuable. The Japanese workers in our building bought them for a substantial amount. The Army did not discourage this. Chuck even bought a boat with an on-board Diamond T truck engine, and we cruised on the canals in the city. Since there was nowhere else to go, he soon sold the boat.

I never forgot my plans for college. The Army ran a night school for any who wanted to continue their education, and since I needed more high school-level math and science courses I attended classes during the entire time I was in Tokyo. The teacher I liked best came from India, and he taught me a lot that helped later in college. I sent home postal money orders for 70 or 80

dollars each month to be put into a bank account for college later. We didn't use U.S. dollars in Japan. The Army printed its own paper money and changed it every year so the Japanese couldn't collect it, so we had to turn in the old script for the new or we would lose it.

The Japanese accepted us being there among them and posed no danger as we walked from our quarters to the transmitter site every day. A Japanese man, Mr. Yabushita, lived on the site and watched over it. We did have guard duty around the San Shin building to guard against theft. When my turns came up I carried a carbine rifle without any ammunition, but nothing ever happened anyway.

Many American civilian employees worked in the General Headquarters building near General MacArthur's offices. They took care of the communications needs there including the teletype machines. That left only the FM transmitters for Signal Corps troops to maintain, and they rarely gave trouble. We operated and maintained the radio link equipment that sent and received communications, plus several high power shortwave transmitters on the coast of Tokyo Bay, a short way outside the city. That included other equipment, such as big teletype machines that processed the signals to be sent by the relatively small FM transmitters.

Our radio link transmitters were located in a cluster of thick concrete bomb shelters that had survived the bombing with minimal damage. The war caused extensive damage to most of Tokyo, including the electrical system. Many times we got power from a large main power line sticking out of the ground by hooking up a long extension cable to it alongside several other extensions that ran to it. To make connections we formed our bare wires into hooks that we draped over the bare power line — the line just hung there. The 100 volt 50 cycle power usually was a bit weak, so we had to use variable transformers to boost it up to the voltage our transmitters required. The antennas for our broadcasts were located on steel towers about 100 feet tall that had supported anti-aircraft guns during the war. I did most of the work with the antennas, since I had lots of experience with heights from climbing trees at home and climbing the tall ladder at Aunt Helen's farm.

It got boring at times with little to do, but occasionally technical work came our way. The Army officers didn't want to miss the Army–Navy football game broadcast via radio, so we assembled a completely new communication link for it. We took an FM transmitter and an FM receiver with an antenna for each to a field outside Tokyo and set them up. We received the football game on one antenna, and then retransmitted it to headquarters on the other. All went well during the game, and then we took it all down and returned it to the transmitter site in town. Another time we went further out of town with tents and supplies for a longer stay, to set up the transmitters and receivers as if for an emergency. We proved to be prepared for such events, even to being able to cope with mosquitos at night. A few other times we went to the overseas shortwave site

to work with the big transmitters, and that involved starting big diesel generators for power, but we managed it well.

The most interesting work for my group turned out to be a temporary duty assignment in Okinawa following typhoons that devastated the communication systems. It was interesting to me to travel for the first time on a plane larger than a Piper Cub as about a dozen of us flew to Okinawa on a military transport plane. The flight was fairly smooth most of the way, and most unbuckled their seat belts to relax more in the canvas bucket seats attached to the walls of the plane. Suddenly we flew into a tremendous downdraft that blew us downward faster than the speed of gravity, and everyone rose up off their seat and floated in the air, except me with my seat belt still fastened. Some grabbed onto me for some stability. We quickly flew into more stable air, and continued to our destination with no more excitement.

We spent about a week on Okinawa replacing damaged equipment. Salt water filled things not broken by the winds and had to be replaced. We were happy that the typhoons blew the mosquitos out to sea. I and one other, assigned to the communication system in the small town of Maschinato, replaced wet cable and tuned up the equipment. Then we had time to look around the immediate beach area littered with American equipment from the war such as landing crafts and tanks. I saw a helmet filled with rifle ammunition that looked like someone was killed trying to take it to the front line. I saw devastation everywhere and concrete underground fortifications the Japanese had used all over the countryside. In one special area we saw a high place with a cliff on one side where the American troops had landed and fought to capture the high ground. It looked impossible. A short way from the cliff, we inspected a wide deep hole where the Japanese had dug down to find water. In one especially interesting place a lot of American military equipment had been assembled. We were allowed to take anything we wanted, but I found nothing I could use. Left there after the war, and meant to go to China for Chiang Kai Shek's army to use to fight the communists taking over China, the U.S. government chose not to send it. At that time the U.S. believed the communists were great agricultural reformers, and wanted them to take over countries.

Going Home

Chuck's and my enlistment period drew to a close. By that time I knew Army life was most definitely not for me, and I looked forward to engineering as the field I wanted to enter. Chuck and I planned to get together after we got home and apply to the same college. My three year enlistment ended at two years, nine months and seven days, because I did not take any leave time during my service in Japan. Chuck and I didn't leave at the same time since my orders came earlier.

I traveled on a nicer ship than the old M.M.Patrick. The better food included snacks of ice cream and other treats during the day. We went south to pick up passengers from Guam and

Hawaii. I still had to do some guard duty, and I was seasick at first. The first night out I had guard duty in a hallway between the troops and the families on the ship. The first few hours I felt so ill I could hardly stand up. As I was clinging to a railing on the wall of the passage, my sickness suddenly vanished, and I felt completely well the rest of the voyage.

Upon arrival at San Francisco Bay I went to the same Army base I'd shipped out from, and after a few days received my discharge papers. I was honorably discharged from the Army with the rank of corporal and given a draft card with a 5A rating, meaning I could not be drafted and did not have to serve in the reserve forces. I was FREE.

Chapter 3

Summer Interlude

1949

Since it was only the end of March and school didn't start until fall, I decided to visit some relatives in California before returning home by train. While waiting to change trains in Kansas City, a man tried to sell a fake diamond ring to me. This reminded me of the cultural differences of Japan and America, since no one in Japan would do that.

Early spring had come when I arrived home in 1949. My brother Darwin, out of high school, hauled milk from the local farms to a cheese factory. My sisters LaVerna and Betty attended Bronaugh High School, with LaVerna finishing her senior year. Lorene, Joan, Gary and Jo Ellen attended grade school at McHugh, the one-room school, and only Robert and Billy were at home.

I signed up with a government program to help discharged servicemen transition back into civilian life, called The 52-20 Club. We could sign up to receive $20 per week for 52 weeks or until we found employment. (The income ended when I started college in the fall). The first few weeks I relaxed at home, visited relatives in the surrounding area, looked around without success for a temporary job in electronics and started to plan for the future.

To the Roses

Chuck and I believed the best colleges were on the East Coast. We decided I would join him at his home in New York State to finalize our plans, so we made arrangements for him to meet me at the bus terminal in New York City. In early June I packed my bag and took a Greyhound bus from Nevada, Missouri to New York City. When I arrived in New York City many people were milling around at the station and I didn't see Chuck at first. I wandered around and was relieved to see him getting his shoes shined. His father, Clifton Rose, had accompanied him to the city, and we left in their car for their home in Grand Gorge. On the way we stopped in Middletown to visit Chuck's older sister Charlotte and her husband, Ward Mackey, and pick up his younger sister, Doris, who had stopped off at her sister's while her dad and Chuck went on to pick me up. As we neared the Rose family home we entered the Catskill Mountain area of New York State, and many signs warned of curves in the winding road. I had to laugh when we came to a sign that said "unwinding hill." It did seem that there were enough curves to undo the winding curves we had traveled.

When we arrived at the Rose farm I met Chuck's mother Lena, and his younger brothers Jerry, nine years old, and Kenny, five. I stayed with them for a few weeks while Chuck and I

made plans for college. We used most of our time to visit Chuck's aunts and uncles in the area in the car Chuck bought in California when he was discharged.

The Right College

One of his relatives, Uncle Jack, a high school physics teacher in Oneonta, New York, had graduated from St. Lawrence University (SLU), a private college in Canton in northern New York State. He told us about a combined program SLU offered, where students could complete three years there, then transfer to Massachusetts Institute of Technology (MIT), one of the top engineering schools in the United States. After two years at MIT a student would be awarded a BS degree in Physics from SLU and a BS degree in Electrical Engineering from MIT. It would be an ideal solution for us to get basic courses at a smaller school, then intense engineering courses from a top-notch engineering school. It would be well worth the extra year after I patiently waited through the past three years just to have the privilege of attending college at all.

We didn't waste any time writing to the school, but drove there immediately, found the office of the Director of Admissions and talked directly to him. We told him that Chuck's uncle, John T. Lawler, an alumnus, had recommended the college to us, told of our military training and that I had been the Salutatorian of my senior high school class. He assured us that we would be admitted to St. Lawrence for the fall semester and gave us application forms to fill out and return during the summer. What a relief to have that settled! We returned to Chuck's home to prepare for the rest of the summer.

To Church and the Doctor

Two other significant events took place while I was with the Rose family. I reached my twenty first birthday on a Sunday that year of 1949. We never went to church at home, and I remembered the promise I made to myself years before to go to church on my 21st birthday. Chuck's dad kindly agreed to take me, so I kept that promise. Later when we were back at my home, Chuck's 21st birthday came and he asked to go to church as I had done. I had no idea of the location of churches in our area and I talked him out of it. I've always regretted that.

An attack of asthma developed from exposure to hay on Chuck's farm, my first bad reaction in four years. I expected to wait out the three days it normally took to recover, but my wheezing and struggling to breathe troubled the Rose family, and Chuck's dad insisted on taking me to the doctor. I was certain, but wrong when I said that nothing could be done. The doctor gave me a shot of adrenalin, and in amazement, I breathed easier immediately. Meanwhile Chuck and his dad watched me with a puzzled look, because the wheezing sound continued. They thought nothing had changed until I assured them I was much better. New medical discoveries had provided a solution for my asthma, and I thanked Chuck's dad for helping me find it.

Off to Work in Missouri

Before I went to New York, Darwin had the idea that Chuck and I could work with him to make some money for school in the fall. The local farmers needed help to haul their baled hay from the fields to their barns during the hay season. Darwin contacted several farmers who agreed to hire us for the work. Chuck and I looked for an inexpensive farm truck in New York to use for the hauling. The term "farm truck" referred to older trucks used for work around a farm but not reliable enough for long distance hauling. We purchased one with some of the money I saved from my Army pay in Japan. The dealer agreed to put an old discarded wooden bed on the truck chassis. We needed it to haul Chuck's car back to Missouri with us so we could have reasonable transportation while there. Chuck's dad helped get the car on the truck by using ramps, and we put in some blocks and chained it down for the trip. We were ready to go. On our way Chuck and I took turns driving so we could drive straight through without stopping, and it ran fine for the entire trip. We needed to get to my home as soon as possible, because some of the farmers wondered if we would arrive in time to haul their hay.

When we arrived we arranged for rooms and meals in Bronaugh where Darwin stayed. We replaced the old wooden truck bed, which was not suitable to haul hay, with Dad's very good truck bed sitting idle. Because of my allergy to hay, I took over Darwin's job of hauling milk to the cheese factory and he and Chuck hauled the hay.

Soon after we arrived, my sister LaVerna and Jack Drummond, a neighbor boy, were married. LaVerna had graduated from high school that spring and took correspondence courses to prepare to teach school in the fall. A chivaree, sometimes held in our area, descended on the newlywed couple. Mom and Dad, my brothers and sisters, Chuck and I and most of our neighbors went to the big event, meant to be a surprise all-in-fun prank on the newlyweds, although I think LaVerna and Jack knew in advance. We all surrounded the house and shouted, rang bells, whistles, and all kinds of noisemakers to startle and surprise them. It was a first for both Chuck and me.

While I was driving the milk truck one day an unfortunate incident occurred. Back when I was in high school I had removed the car radio from Dad's old Chevrolet when he traded it in for a newer car, and installed it under the dashboard of the truck that I now drove to haul milk. The radio had great sound quality, but the tuning mechanism stopped working and had to be tuned by a screwdriver. While driving I reached down with the screwdriver to tune it to a new station, and suddenly the truck went off the road and tipped over onto a fence post. I got out of the cab and surveyed the slight damage. Farmers in the fields around soon came and helped get the truck upright and back on the road by using three tractors and heavy ropes and chains. One tractor pulled from the side to tip the truck off the fencepost, while the other two pulled the truck up onto the road. Inspection of the truck revealed one bent running board and no other significant damage. No milk spilled from the strong steel cans with their tight-fitting covers. After thanking the farmers for their help I continued on the milk route, and later Darwin used a long crowbar to

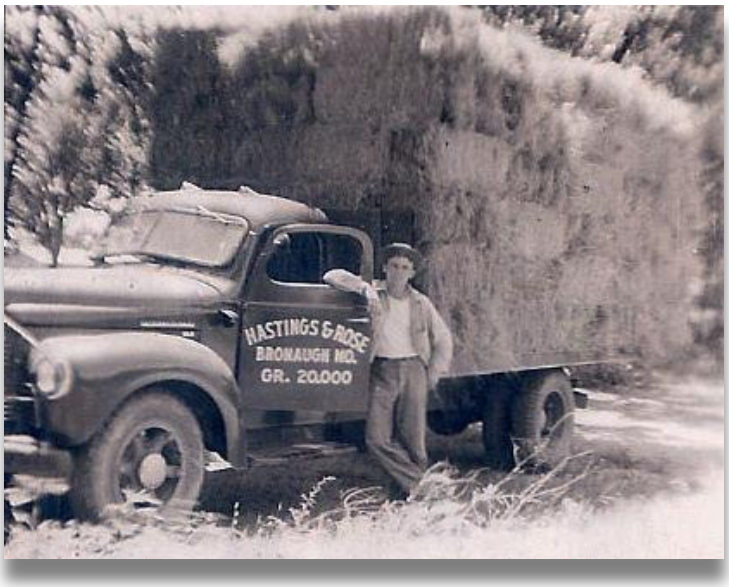
straighten the running board. I made sure it didn't happen again, but for years family members enjoyed teasing me about it.

During the summer Chuck had some free time between hay hauling jobs, and although I had to deliver milk to the cheese factory every day, I had free time in the afternoons. We got to know the postmaster of Bronaugh and when he learned of our plans to attend college he offered to type our application forms and letters to SLU. We expected to write it all by hand, but when he insisted and showed how much neater and professional it looked, we were glad to have him to do it.

Chuck and I drove his car quite a bit on errands to Fort Scott, Kansas, and Nevada, Missouri. We also visited my relatives in the area, including Uncle Oris and Aunt Pearl, who had moved back from California to a farm near Golden City, Missouri. It impressed me that Uncle Oris gave up alcohol when he became a Christian. Chuck and I even went to church with Oris and Pearl, but we didn't know what to think of the Pentecostal service.

We became friends with Bus Jenkins and his business partner. They owned dump trucks and hauled materials for road construction and maintenance. Bus had a big fancy 1940 Cadillac that his wife, a school teacher, used for transportation to school. Bus liked Chuck's small Chrysler coupe and thought it would be more appropriate for his wife than the Cadillac. Chuck liked the Cadillac, traded cars with Bus, and at the end of the hay season he drove the Cadillac home. He had some body work done on it by his Uncle Walt, who operated a repair shop, before driving on to begin classes at SLU.

Darwin took over the milk route after the hay season ended. One of the farmers bought our truck and the old wooden bed to use as his farm truck. We didn't make much money over the summer, but I replenished my bank account, packed my clothes including parts of my Army uniform, said goodbye to the family and took the bus to SLU in Canton.

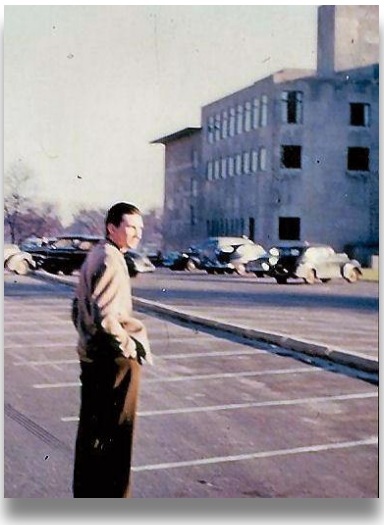


Hay-Hauling Truck

Don & Darwin

Hastings Siblings: Left to right Gary, Betty, Joan, LaVerna, JoEllen, Robert, Billy, Don (holding Lorie), Darwin

Chuck at St Lawrence University



MIT East Campus, Don's dorm is on right

Snow Covered Car

Wheeler Lab Staff in 1960's (Don first row, 4th from left)

Chapter 4

College

1949 - 1954

St. Lawrence University – Year 1

I registered for the fall semester and moved into my assigned room in one of the college dormitories. Chuck arrived shortly, with his Cadillac newly painted and all dents repaired. He had a room near mine in the same dorm. Under the G.I. Bill the government paid for our tuition and meals in the school cafeteria.

To earn a Bachelor of Science degree I concentrated on science and math classes but also took the mandatory literature-type classes. Chuck's courses were similar but we weren't usually in the same classroom. The advanced algebra class turned out to be easy because the text book was the same as the one I used in night school in Tokyo. I especially liked the many physics courses, and learned that my first instructor had been at MIT during the war years and helped design the very radars that I had trained on at Signal Corp School.

Soon after arriving we learned that the athletes of the "L" club hazed the freshman class. They required us to wear small beanies and greet upperclassmen with respect and deference. At certain events we had to wear clothes inside out, and sometimes wear pajamas outside the dorm. The older students who had been in the military considered it ridiculous, but we put up with it to keep the peace.

Only about 15 miles from the St. Lawrence River and the Canadian border, the typical winter weather in Canton was minus 40 degrees, and ice and snow stayed on the ground and sidewalks for months. Since I had not developed the reflexes required to keep my balance on slippery ice, I fell a lot, which provided entertainment for those around who never seemed to slip or fall. One time I went downtown in Canton dressed in my suit when the wet surface of the ice was extra slippery. It was both comical and frustrating that I could not keep from falling. It took all of that first winter for me to learn to keep my balance on ice.

The humidity in the air was very low and that made it easier to adjust to the cold. I felt quite comfortable through the winter wearing my wool army pants and short army "Ike" jacket. Just walking could build up a charge of many thousands of static electricity volts, an unusual effect of the dry air. When reaching out to touch or shake hands with someone, often a strong electric spark snapped between us before we touched. We never had to use pins to hold paper on the walls. We rubbed the sheet of paper to charge it, and then placed it on the wall and the static charge held the paper in place for weeks and even months. Every January the warm Chinook air

would pass through and its humidity caused the papers to fall down. It only lasted a few days and we put the papers back up.

The cold winters at Canton affected cars, and several of the students' cars failed that year, including Chuck's Cadillac. He sold the engine to a stock car racer, but in an early race the engine failed. Chuck bought another used car, and it lasted through his school years. We didn't need or use a car much at SLU that first year. We were too busy with class work to explore the area around Canton. The dorm where we lived was close to all our classes and it was an easy walk to any place in town.

I'd lived in my dorm room for only a short time when one of the students asked if I would be willing to change rooms with another student. A personality clash had developed between two boys and one other who shared a three room apartment in the dormitory. I wasn't especially interested in changing, but someone had recommended me to the two, so to help restore the peace I agreed. My roommates were Carl Tatlock and Kirk Hudson. We got along well and were good friends during the three years I attended SLU. Carl and Kirk were friends from the same high school in Rochester, New York. I accepted their invitation to spend the fall break with them in Rochester, and stayed with Carl's family for the few days.

I became interested in classical music that year, and bought a record player and some music I especially liked. I designed and built an audio amplifier and bought a 12 inch speaker to listen to the music. The law permitted small transmitters to be used inside a house to transfer sound from a record player to a radio. Carl and I, encouraged by how well my record player worked, decided to try an experiment. I designed and built a low power AM transmitter to broadcast music. We needed an antenna that the college would not view as an eyesore. An old, outdated and unused intercom system existed in the dorm rooms, and the one in my room had some very fine wire that would not be easily seen. We ran that wire out the window and across an open courtyard in the dorm complex. I needed to tune the transmitter, so I tuned the radio to a place on the band where there were no other stations and where I wanted the transmitter to operate. I started a record playing and turned on the little transmitter. To our surprise music came out of the radio without any further tuning needed. I played music through the radio from time to time, and Carl and I decided it would be fun to also have station identification. I rigged up a speaker to act as a microphone, and Carl made the announcements. We called it WORF, Oriskany Falls, New York, where Chuck's aunt and uncle, Alice and Li Krohn lived.

Our "station" carried further than we expected. One of the other students who listened to AM and shortwave radio a lot came by all excited about the new station he had just heard, so we let him in on what we had done. Later he came back to report that the transmitter also broadcasted on several shortwave bands. It was poorly designed, and produced multiple harmonic frequencies. We realized our experiment, although fun, had gone too far so we shut it down. The last event of the whole episode happened when the lady acting as dorm mother asked if I felt

alright. She had seen me out in the courtyard with my arms and hands in the air as though I was working with something, but nothing was visible. She concluded that I had lost my mind from the pressure of studies. I assured her that there was a very fine wire she couldn't see, but I'm not sure she believed me. I didn't tell her why I strung the wire since the project had never been approved by the college.

Chuck asked me to help him show movies at the student union building to earn some money. That lasted quite a while, but eventually the janitor of the building took over the job. I also operated a projector to show teaching films to some of the classes, and picked up odd jobs from some professors as I got to know them. Since Chuck and I were experienced at building and testing electronic equipment sometimes people asked us to locate problems and repair things other students and professors built. Life never got boring.

Summer At Home

My freshman year at SLU ended in mid-June and I received good grades in all the courses. I took the bus home and Chuck went to his home for the summer. It was too late to be able to help with any of the farm work because of my asthma, so I rested and relaxed and enjoyed spending time with my younger brothers and sisters.

Needing something to do, I and my youngest brothers, Robert and Billy, built a tree house in a big tree in the yard. We even gave it a name, "The Architect's Nightmare." During the summer two cousins, girls from Greenfield, Missouri, came to visit my sisters for two weeks. The weather was hot, and they wanted to swim, so I took them to West Fork, a fairly large creek, and served as life guard. The girls had raffle tickets to sell. The winner would receive a TV set and the one who sold the winning ticket would get a basket of groceries. The chance of winning was quite remote, but I bought a ticket anyway. I forgot all about the ticket, but after they went home they informed me I had won the TV, and they the basket of groceries. I was amazed that I had won, even more so when I saw the quality of the TV. We put up a simple antenna, and received stations from Kansas City 100 miles away, Springfield, Missouri and Pittsburg, Kansas. Our family used that TV for several years.

Year Two at SLU

When I returned to SLU in September, the college dorm was reserved for freshmen so I could not live there. I rented a nice room from Mrs. Priest, the widow of a former physics professor at SLU. She had a great interest in students studying physics and science courses, so we got along fine, and I even earned a little by mowing her lawn and raking leaves. A professor of English literature, Dr. Delmage, roomed there also, and I got to know him well. I took my meals at a house nearby at a reasonable cost, and with that everything fell in place for my sophomore year. To my surprise and relief, when winter came I no longer fell on the ice. If my foot slipped, my

reflexes instantly positioned my other foot in the correct place to prevent a fall. Ever since then I've not had that problem.

During his sophomore year Chuck decided not to go on to MIT, but join the Reserve Officer's Training Corps, graduate from SLU with his degree after four years, and possibly go into the Army as a career. From time to time we travelled around in his car, but I had less contact with him as he spent more time with ROTC–related activities.

I took more advanced courses that year, including differential and integral calculus, chemistry and thermodynamics. In chemistry class I worked with another student, a girl. She was nice, and we worked well together, but we did not develop a romantic relationship. My uncertain future discouraged me from dating anyone. I enjoyed learning, got good grades, and became a member of the Math and Physics Honor Societies. It was a busy year, but I still had time to do odd jobs around the school.

As the school year drew to a close I decided to take a summer course on atomic and nuclear physics and I stayed at school until it ended. It was well worth the time since I learned much in the course I would not get anywhere else.

Carl Tatlock had stayed for a summer course also, and on the way home I rode as far as Rochester with him and his dad. While there I bought from an elderly lady an inexpensive older Dodge car with a broken hinge on the left rear door. Carl's dad helped me find an insurance agent to use. I invited Carl to go with me and I drove on home. The Korean War had begun and my brother Darwin had enlisted in the Navy rather than be drafted. That left the old milk-hauling truck idle most of the time, so I removed the familiar radio, bought the missing tuning parts, and installed it in my Dodge that had no radio. It worked very well and we had good music for the drive back to Rochester and on to SLU for my third and final year there.

Year Three at SLU

I took the last of the physics and math courses that were available and finished other required courses. One was on Christianity. SLU had started as a Christian college, but had become liberal and called themselves Unitarian. I had no church training, but still firmly believed that God exists, is concerned about us and wants everyone to live a clean and moral life to please and honor Him. I didn't know what to expect from the course. The professor who taught it entered the classroom with a bright smile, strutting with utmost confidence in front of the class. He appeared that way throughout the semester as he undermined and ridiculed the Christian teachings of the students. It had little impact on me as I quickly understood he was presenting pure make-believe and should not be taken seriously. I would play along with it to get a good grade but it wouldn't touch my life or beliefs. It disturbed my friend Carl, and Kirk Hudson even more. He was pastoring a church in the area and planning to be a pastor. The professor gave us

an assignment to make up our own religion, and Kirk struggled with that. To me it was all nonsense, as was what I chose to write up. I offered to let Kirk use mine and I wrote another. I don't know what he used, but my flippant attitude disturbed him. Mrs. Priest was pleased that a class in religion was offered, and asked about it. My description horrified her, and she and other ladies made strong complaints to the college. The professor changed only slightly. What I remember most about the professor is how totally different he looked outside the classroom. I greeted him a few times, and he never smiled or showed the slightest interest in me. His face and eyes had the saddest look I'd ever seen on any face. I could only describe it as a lost soul expression.

That third year at SLU was eventful. Carl borrowed my car, and the radio tuning gave trouble again. While distracted by it he drove into a mailbox beside the road. The mailbox fell over and the front bumper and grille were slightly damaged. Carl put the mailbox back up, and we had the grille straightened, even had the back door hinge repaired. I replaced the front bumper, and although the car was not as good as new, it was better than before. Carl was furious at the radio, that it had "done it again."

I chose to go home during the Christmas break. A student called Mo, who lived in St. Louis, and his girlfriend, planned to go with me as far as St. Louis. Ice and snow covered the roads, but Mo assured me he had lots of experience driving under those conditions. He was driving as we travelled west on route 20 in western New York State, his girlfriend beside him in the passenger seat, and I lying down in the back seat to sleep and rest. He lost control and skidded across the opposite lane into the bank. At that moment a car came toward us in the lane we had skidded into, and slid straight into us. The impact opened the rear door and my feet flew out into the snow. The main impact was on the front passenger side door. The girl's head shattered the window, which cut her face and neck. Neither the driver of the car nor Mo was hurt, and I only had slight bruises where my legs struck the rear door.

A large truck came along and stopped beside the wreck, blocking the entire highway. Then a small panel truck came upon the scene. With no place to go, to avoid hitting anyone he drove off the road into the snow bank. The driver of the big truck helped Mo take the girl to a nearby house then drove on. I stayed with the car, so I saw all the action on the road. A second panel truck with chains on the tires came along and pulled the first panel truck onto the road. Finally the state police arrived and took charge. I was quite cold by that time and went into the house to warm up. Later I took everything out of the car, but left the radio to go to the junkyard with the car. (If someone looking for a radio in a junked car ever got that one, they would be sorry.) By that time the girl had been taken to the hospital, so Mo and I went to check on her. The doctor was still putting in stitches, but assured us she would be alright. The next day I left Mo to care for the girl, and took the bus home.

Questions about the accident and loss of my car dominated that short visit home. The insurance I purchased in Rochester paid for the girl's medical care — I didn't have collision

insurance. Once again I went off to school by bus, and it was a long time before I owned another car. My final semester at SLU went well. I ranked seventh in my class and was inducted into the Phi Beta Kappa Honor Society. Dr. Delmage always took a special interest in my academic standing and was quite happy to learn that I had earned the Phi Beta Kappa key.

Some SLU students went to MIT to see the school and apply for acceptance, and I wanted to go, but couldn't because I had a mild case of the mumps. I applied to MIT before leaving SLU, and when the acceptance came I asked to have my G.I. support transferred to MIT. As my final activity as a SLU student I went with my class to Royal Gorge, New York for a fun time together. Then it was home again by bus.

A Summer Job at Boeing

I noticed some changes at home. My mother had a new water system in the kitchen. My cousin had installed an electric pump with a pressure tank to provide water so Mom didn't have to carry it from the cistern. Water was available for the washing machine too, with the drain water piped to a convenient place outside in the yard and quickly absorbed into the dry ground.

My sister LaVerna was no longer teaching school, and the one-room school had closed. She and her husband Jack had moved to Wichita, Kansas and both worked at the Boeing Aircraft plant. My sister Betty had just graduated from high school and was working at the Beechcraft plant in Wichita. Jack offered to help me get a job at Boeing, and since I would need more money for schooling at MIT I gratefully accepted his offer. I went to Wichita without delay, and LaVerna and Jack helped me find a room for the time I'd be in the city. Jack then took me to Boeing. A foreman of a B 47 flight line crew interviewed and then hired me to work on the afternoon to midnight shift. It was the perfect position for me at that time, for it required the use of mind as well as muscle.

The B 47 jet bomber planes I worked on were designed to carry conventional and nuclear bombs. The later Boeing 707 commercial passenger planes were the same except filled with seats and luggage space. These large planes had small compartments everywhere to house the parts and electronics that the flight line crew tested and repaired. I worked inside almost every compartment. Most of them were high off the ground and I had to use movable stairs to get to them, but I pulled myself up and into those I could reach from the ground. Kansas is very hot in the summer and it was hotter in the enclosed compartments. Heavy sweat often ran off my arms in a stream, so I had to be careful to not let it drip on exposed power cables. I had one minor accident. While lifting myself up through a compartment door one of my hands, slippery with sweat, slipped off the edge of the door. I fell to the concrete below, striking my head on the sharp edge of the doorsill on the way down. I was not quite knocked out, but stunned for a few moments. A cut on the left side above my ear bled a bit, so my boss ordered me to have the

nurse attend to it. She considered sending me for stitches, but I discouraged that. She closed the wound with butterfly tape, and I went back to work. It healed well and left only a small scar.

I got off work at midnight on Friday nights and was free until Monday afternoons, so nearly every weekend I went home. I would get up at 4:00 A.M. on Saturday morning, catch the bus to Fort Scott where Dad met me, and return to Wichita on the bus Monday morning. I really appreciated that break from Wichita, but it must have been a nuisance for Dad, although he never complained and was always there for me. I don't remember doing anything specific at home other than be with family and enjoy Mom's cooking.

In early August notification arrived by mail that the G.I Bill would pay for my two years at MIT. When I told my boss and those I worked with I was leaving to attend MIT, their enthusiasm about the school and the great opportunity I had to go there surprised me. They really wanted what was best for me.

Massachusetts Institute of Technology – Year 1

I took a bus to MIT in Boston, Massachusetts, settled into a nice room on the fourth floor of the East Campus dormitory, and ate in the low-cost school cafeteria. I had already taken at SLU two of the required classes for the semester, one even used the same text book, so they allowed me to substitute other courses required to graduate with a BSEE degree. The alternate courses were in the mechanical engineering field, such as how to operate large lathes and milling machines and how to design structures, training that became very useful after graduation. The electrical engineering classes included drafting, laboratory testing, and various classes that taught how to apply theory in designing things to be manufactured and used. I avoided liberal arts courses when I could because they didn't seem to fit into my plans for the future. In retrospect, such classes would have helped me be better-rounded in the future. One I couldn't avoid was a literature class that focused on the underlying meaning of some books and stories. I learned that the meanings were there, but it was difficult to detect them on my own. That was not my field of interest or expertise.

The students at MIT, a diverse group from countries around the world, came mostly from privileged upper class families more accustomed to fun and parties than the hard work of study. Some in dorm rooms near me asked for help, but usually only wanted answers to give at test time without spending time to actually learn the material. One of the few who studied and did well in classwork was Carlos Soto, from Caracas, Venezuela. He was in many of my classes, and we became friends.

I explored around Boston that first year. I would walk across one of the bridges over the Charles River to Boston Common Park, and go up Beacon Hill or to the business section. The electronics stores were my most frequent destination. A dam downstream of the Charles River formed a lake where rowing teams raced their canoes. MIT had sail boats for students to use on the lake, and I enjoyed sailing with a friend who often invited me.

Unlike at SLU, MIT students often held demonstrations, burned street barricades and rioted, all with lots of noise and loud music. During those times I stayed in my room and waited it out. Nor did I appreciate that some scrambled around outside the dorm rooms at night, shined lights in our windows and even climbed through the window. My room was on the fourth floor, 40 feet above the ground with only a narrow ledge around the building. It was daring and dangerous to walk on the ledges, but no one fell off.

As Christmas approached I walked over to Boston Common to see the Christmas lights. A huge leafless tree covered with blue lights impressed me the most, because I only knew Christmas trees to be the evergreen cedar trees we cut from our pastures. During that Christmas break Carlos invited me to his home where I met his very hospitable father, mother and sister, residing in Boston while Carlos was in school. They are highly cultured, wealthy Latin family, descendants of the historically famous De Sotos. I offered to make my family's special holiday treat, peanut fudge candy. Since that time at Carlos' home I have not always been successful making the candy, but this time it was perfect, and we enjoyed eating it.

During the spring semester I received a letter from Dr. Blankman, a professor of English at SLU. He planned to build a high quality sound system to listen to classical music from an FM repeater station in northern New York State. It rebroadcasted programs from a popular classical station in New York City. A man in Canton had quoted a price for a system Dr. Blankman thought was too high for the questionable quality, and he wanted my advice. I was happy to get involved in his project since it was my hobby to build good audio amplifiers and radios. I found a very good audio amplifier kit I could put together and a newly designed Brooks FM tuner, both at reasonable cost, and an excellent-quality 12 inch speaker unit that gave uniform audio frequency response. When I wrote back to him with that information and the lower cost it would be, he asked me to purchase the units and install them at his home in Canton.

I assembled the audio amplifier kit, bought the other units, and during spring break went to Canton to install them. I stayed with the professor, his wife and three children while doing the work. The professor asked me to go with him to search for antiques, and I saw a radio cabinet for sale at a farmhouse for $3.00. The price included a 1937 GE model 101 radio in their barn, so I bought it, and it remained in my small antique radio collection for many years.

An incident I remember with amusement took place during my stay with the Blankmans. I visited Carl, Kirk, and others finishing their senior year at SLU. Chuck was not around so he must have been away for the break time. As we walked along, Carl asked how I got the scar on the side of my head. Without thinking I simply replied it happened when I fell out of a B 47 aircraft. As we walked, several conversations were going on at the same time, but suddenly there was complete silence. I realized everyone had heard me and were trying to process that statement. I quickly explained the plane was on the runway when I slipped and fell from a compartment.

I spent the summer at home working on projects that included improving reception of the TV I had won, and building a high fidelity audio system to listen to music on records. I had quite a few favorite records at home, my sisters bought some they liked, and we used the system so much some records eventually wore out.

Year Two at MIT

When I returned to MIT that September I took out a small student loan from the college. My tuition was still covered by the G.I. Bill, but I needed money for living expenses. I purchased a hot plate, bought food in the local grocery store and fixed my own meals in the dorm room. It all cost less than meals at the cafeteria.

It was my last year there, so I took the remaining classes required to graduate. They were advanced calculus and classes dealing with radio, radar, television, and the equipment used to test and adjust them for operation. I had learned the basic science and how to apply it to design useful products. Now I concentrated on how to test and tune those products and how to use special graphs and charts to simplify reporting on their performance.

MIT required a technical dissertation to graduate with a BSEE degree. With my professor's approval I chose to design and build a wide band amplifier. The amplifying tube I chose was newly-designed for use in the microwave frequency range. Over the year I designed the circuit components, assembled them and measured the linearity of amplification over the range of frequency the circuit could provide. I gave the results on a graph in a final report near the end of the school year.

My personal project that year was to repair and tune the antique GE radio. In the MIT library I found and copied complete schematic diagrams and instructions for it. This high quality radio received AM stations and shortwave bands and, unusual for its time, there was a magnetic amplifier circuit that changed the dial-light color from white to red if the signal became weak. I replaced the defective parts, tuned it up, and the radio worked great, for a while. It had been stored in a barn for years, and the exposure to moist, cold air caused a component of the magnetic amplifier to burn out. The part was no longer available, but later, when I replaced the part with a transistor circuit of my own design, it worked even better than ever.

The studies were intense that final year at MIT, but I completed all the work and finished the two years with a grade point average of 4.07, the highest possible being 5. I was tired of school. I had been working at it the last 20 years, and was ready to begin a normal life with a good job paying a good salary.

Degrees Conferred, a Job Offer Accepted

About the middle of the last semester I and other seniors received recruitment letters from the C.I.A. I didn't see how my engineering training could qualify me to be a spy, but one of my

professors told of the need to evaluate scientific progress of enemy nations. Since no other company recruiters had come to MIT at that time, I submitted application forms. I heard nothing more from the C.I.A. and gave it no more thought. The next recruiter was from the Raytheon Company. He was looking for someone to work in the design of very high power transmitter tubes like Raytheon manufactured. After an interview he gave a fairly good offer. A short time later I was interviewed by Ned Spencer from Wheeler Laboratories. One of my professors had recommended me to him, and Ned showed strong interest in hiring me. I had never heard of Wheeler Labs. He described it as an engineering company located in Great Neck, Long Island, doing design work for other companies to use in products they produced or sold. It specialized in antennas and radio frequency transmission line systems. That was more to my liking, so I applied for a job there. When the job offer came, it was better than the one from Raytheon, and I accepted it. I agreed to begin work right after I received the second BS degree in Physics from SLU, which would be a few weeks after receiving the BSEE degree from MIT. I attended the MIT graduation as a spectator since there was no one to see me graduate. Then I took the bus home with all my belongings, including the all-important degree.

My brother, Darwin, received his discharge from the Navy in April that year. I visited him in Fort Scott where he lived with his wife, Mary Ann, and was employed doing farm work. My sister, Lorene, had just finished high school and planned to attend Fort Scott Junior College to train to be a secretary. Joan had finished her sophomore year of high school and Gary would begin high school in the fall. Only Jo Ellen, Robert and Billy were still in grade school. Mom told me there had been an extensive investigation about me that spring, and wondered what it was all about. I told her about applying to the C.I.A., and that it had come to nothing. It must have been the security people checking on me.

It was good to relax for two weeks, and then I went on to the SLU graduation. The friends in my class had graduated the year before, but I enjoyed greeting my former professors. As I planned my trip from SLU to my new job in Great Neck I saw that the bus route to New York City went near Chuck Rose's family. They had been kind to me in the past but I hadn't seen them since I had gone to MIT, and I decided to visit them even though I knew Chuck wouldn't be there. He and I were still the best of friends, but were a bit out of touch during the MIT years. I stayed about a day with the Roses. Chuck's father and mother, sister Doris, brothers Jerry and Kenny, as well as his grandmother were there. Their farm was outside Laurens, New York, where they moved after their barn in Grand Gorge burned.

From there I took the bus to New York City, then the Long Island train to Great Neck where Wheeler Laboratories was located. One of the engineers, Bernie Weissfeld, met me and helped me rent a room on Beach Street. He offered to pick me up each morning to ride to work with him and pointed out nearby restaurants. I was all set for a new life as a working engineer.

Chapter 5

Events Unfold

1954 - 1958

Rapid change characterized the mid-1950s. Jets took the place of some propeller-driven airplanes. Farm machinery, cars, trucks, and almost everything else were rapidly improving. In the field of electronics the vacuum tube had nearly reached the limit of its capabilities. In college I used a slide rule to work out engineering problems. It was laborious and time-consuming, and hand held calculators would soon replace it. Programmable computers were being designed, but the vacuum tubes of that time caused the simplest computers to be very large and difficult to use. All that began to change when materials called semi-conductors were discovered. These materials could be used to make transistors, which could do everything the vacuum tube did, but in a much smaller package. These transistors greatly simplified the design and size of computers. I entered the engineering field still using my slide rule. We designed and built things, then tested them and made adjustments until they performed to acceptable standards. To do that we had to know exactly how things worked in order to know where adjustments were to be made. That proved to be an advantage later when we used computers for design work. If the computer predicted that a device being designed would function in a way that by all the laws of physics couldn't work, then I knew the computer program had to be changed, not the device.

Wheeler Laboratories

I was 26 years old when I arrived at Wheeler Laboratories (WL). At a short orientation period I was introduced to Mr. Wheeler and the rest of the staff and shown some of the projects in progress. They gave me a notebook that had to document all the work I did, with the date and job number on each page. All thoughts, plans, calculations and results were written in that book. It all was essential because some of the designs produced patentable products, and the original work with the date was needed as proof to obtain the patent. We were able to make some model parts ourselves on WL machines so the shop course I took at MIT came in handy. The shop made the more complex parts or models from drawings we made. When the design and tests were completed we wrote a final report and delivered it to the client. That report ended the project and a copy went into the Wheeler Lab files.

Harold Wheeler started Wheeler Laboratories in 1947 after working many years in electronics. Everyone called him "Mr. Wheeler" out of respect for his vast knowledge and experience in

scientific engineering, but he was also warm and friendly and had a good sense of humor. His many patents, extraordinary problem-solving talents, and frequent professional papers and lectures were well known, thus many clients came to us to do their design work. The engineering staff was a harmonious group, but each worked on his own project and if he needed help he could go to any of the others for guidance. Mr. Wheeler and the staff regularly shared technical information with everyone to inform and train all of us in the work being done.

Many of the engineers were subject to being drafted for military service, but working on essential military projects deferred them from serving. Most WL projects were for the military and only a few for civilian use. Since I had already fulfilled my military service requirements I was assigned to design antennas for a company called Communication Products (CP), located in Freehold, New Jersey. They asked for new designs constantly as new customer needs came up. Taxi and delivery truck businesses used the antennas to communicate between a base station and their fleets. I also worked on classified military projects. WL requested security clearance for me up through Secret and it was granted without delay. Perhaps the investigation by the CIA in response to my application to work for them sped things up.

My work for CP required frequent trips to its site in Freehold, where the owner had a farm with enough space to test the more complex antennas they needed. Bill Bryson, CP's Chief Engineer, often came to WL and met with Mr. Wheeler, some senior engineers and me to discuss antennas that would perform better than those of CP's competitors. We all learned a lot from Mr. Wheeler at those meetings, especially I, a beginner in engineering. Frequently Mr. Wheeler pointed out flaws in competing antennas, and the group thought of better, sounder designs. For example, a CP customer from the mid-west had encountered so much static noise from rain drops or snowflakes hitting their antennas that they couldn't communicate. We easily recognized the solution was to put the antennas into a sealed plastic pipe. Mr. Wheeler knew that static electricity could build up on the enclosed antenna and burn out the radio equipment. His final solution was to redesign the antenna in a way to ground out the static charge. CP called their new antenna "The Stormmaster."

It was my job to use the basic idea to design the antenna parts, and either build the first model or oversee its construction in either the WL shop or the CP factory. Then I tested the model and adjusted length of components until it operated correctly.

When a design seemed new and unique WL applied for a patent, but often found it had already been tried and patented. For example, one had been patented by a German man in 1934, another by an English man in 1936. Still, sometimes we could get an improvement patent so our design could be produced and not copied by others.

A Trip to Canada

Chuck Rose and Betty Olmstead were married in Ottawa, Canada in 1954. Having just started work at WL I felt I shouldn't take time off to participate there earlier, but I took an early Saturday morning flight to arrive at the wedding on time. I changed planes in Montreal, and after boarding I noticed newspapers filling several seats, which seemed strange. Then an airline official said I would need to get off the plane because it was overloaded. I argued that I was going to a wedding and needed to get there on time. Not only that, but people were to meet me in Ottawa. It didn't matter, I had to get off. They did notify Ottawa that I would be on a later flight, and Chuck's dad and brothers Jerry and Kenny, who had learned of the delay, met me. Since I had been up for several hours, on the way from the airport to the church we stopped at a restaurant for something to eat. I ordered a banana split, and Jerry followed suit. It was breakfast time, and the waiter thought our orders were inappropriate, but served them to us anyway. My popularity with Jerry and Kenny increased, and the incident of having banana splits for breakfast has been remembered with amusement ever since.

That night the Olmstead sisters and their boyfriends, Chuck's sister, Doris, and I went to a movie. The next day I rode with the Rose family back to their home in Laurens, then took the bus and train to my room in Great Neck.

Chuck had finished the ROTC training at SLU in January of 1954. When his Army officer commission was awarded shortly after his marriage he was sent to Fort Benning, Georgia for Ranger training. I visited him and Betty there in November. Betty served a great Thanksgiving dinner, and it was the only time I've had turkey dressing made with grits. I also watched Chuck make his first parachute jump as a Ranger.

Proposal

I enjoyed the work at WL, and the designs of antennas and transmission line components were going well. I had spent eight years of my life to get that good job doing work I enjoyed. I had an income now and could afford more activities. Archery became popular about that time, and Bernie, my engineer friend, showed me the new bow he had bought. I decided to try archery, and bought a high quality bow and some arrows. Another activity I could afford was to travel by plane and go home more often for shorter visits. My mother commentated on that and appreciated it. Nevertheless I was surprised that those things didn't fill the void in my life.

Although Chuck was not around I felt very welcome at his parent's home and often visited on weekends. I realized I was falling in love with his sister, Doris, and on Memorial Day I asked her to marry me. She didn't give an answer, but said she would write to me. In her letter she said she had recently accepted Christ as her personal Savior, and shared Bible verses on that subject and also ones that said, having committed her life to Christ, she should not marry anyone who hasn't made that commitment. Later she told me she expected I would react negatively and decide to drop the idea of marriage. However, it occurred to me that the void in my life might be

filled by becoming such a Christian, and she was surprised when I asked her to help me. She suggested scripture to read and on weekends when I visited and had opportunity, we discussed it. I had never studied the Bible, but now I was eager to find out from it what else I needed to do to please God. I didn't verbalize it that way to Doris, and she didn't realize for quite a while that my focus was on doing good things to earn my salvation. I read the Bible looking for what I had failed to do and what I should do, and found many passages supporting my moral code, but also many I couldn't understand and apply to my life.

Visit Back Home

I had made a commitment to my family to use my two-week vacation to build a better antenna for them. When I asked Mr. Wheeler to recommend one, he showed me a magazine article describing an unusual antenna. It was shaped like a square horn with the top and bottom sides of the horn removed. I worked out the right size to receive channels two through thirteen, and made sketches of all the parts needed to make it. It was big with the mouth 15 feet square and the sides slightly longer.

When I got home I made the antenna sides from light-weight chicken wire mesh, and screen wire mounted on a wooden frame. I cut down a tall straight tree in the woods, dragged it home, placed it vertically in a post hole dug in the yard, and mounted the antenna on it facing north toward Kansas City. I connected TV antenna wire from the TV I'd won in the raffle to the back points of the horn sides. I attached ropes to the antenna to turn it toward stations other than Kansas City. The antenna was a big success. It brought in three Kansas City stations, channel two from St. Joseph, Missouri which is 30 miles north of Kansas City, channel 13 from Topeka, Kansas, and even two stations from Wichita, Kansas, 150 miles away. The Springfield, Missouri station came in strongly, and the Pittsburg, Kansas station almost overloaded the TV set. The unusual antenna drew a lot of interest as neighbors saw it. One facetiously asked if it was to catch ducks in the air.

I had a good visit with my family that summer. My sister Lorene had completed one year at Fort Scott Junior College where she reigned as Homecoming Queen, worked as a secretary in Fort Scott, and dated a fine young man. Still, I was eager to return to my Bible studies and visits to Doris and the Rose family.

When I returned from vacation I started to look for a suitable used car, essential for the frequent five hour trips to the Roses. I bought a green and white hardtop two-door 1953 Oldsmobile 88, and now that I had a car I went to the Rose farm quite often on weekends. I would leave at 5:00 PM directly from work on Friday and return to Great Neck Sunday afternoon and evening. Often when I visited I took a box of chocolates for Doris. That increased my popularity with her younger brothers Jerry and Kenny. I was not only one who liked banana splits for breakfast, but a frequent bearer of delicious chocolates.

On the weekends when I visited I went to church with Doris. The first time communion was served I took the bread and cup as all the others seemed to be doing. Afterward, as we were discussing communion and reading about it in scripture, I saw that I should not take communion, so I didn't again. I read with great interest some Inter Varsity Christian Fellowship magazines and other literature Doris gave me. IVCF was important to her and her friends who were also Christians. Toward the end of that summer Doris and I attended a weekend of meetings at an IVCF camp in the hills outside of Albany. I found it very interesting, but I didn't make any spiritual progress. I did meet some of her friends, including Millie Peck and Nancy Wheeler, whose friendships continued to be a part of my life from then on.

I Accept Christ as My Savior

I had been studying the Bible and other Christian literature for about five months and was feeling discouraged and frustrated. That year Doris was finishing up her college courses, and one Sunday afternoon on my way back to Great Neck as I dropped her off at the house where she was living, I told her I just could not figure out what more I should do to be a Christian. Her answer was very simple. I didn't need to do anything; Jesus had already done everything when He died on the cross to pay for my sins. She shared Ephesians 2: 8 & 9 — "For by grace you have been saved through faith; and that not of yourselves, it is the gift of God, not as a result of works, that no one should boast." I started contemplating those simple statements, but didn't respond to her about it at the time, and she went on into the house. As I continued on toward Great Neck, God opened my mind and I understood that all those years I had tried to earn God's approval by living a good moral life I had ignored and rejected Jesus and His death to pay the penalty for my sins. I felt sorrow and repentance for that and at the same time there was joy as I accepted Jesus as my Savior, and gave myself completely to Him. It all happened in an instant of time, and it was as if I had come out of the deepest dark night and into glorious bright daylight. The emptiness I had been feeling disappeared. That took place in October, just days before my beautiful sister, Lorene, was killed in an automobile accident in Texas.

A Sad Event

Lorene and James Hopkins had been married only a few months. They moved to Texas after the wedding and were employed there. Some friends invited her to go shopping with them in a nearby city. A young, inexperienced boy was driving and while passing some cars he crashed into an oncoming car. My whole family was devastated by her tragic death. I tried to work at WL while waiting for my flight home, but I couldn't control my tears. Someone, I don't remember who, suggested I go back to my rented room and busy myself with packing. When I got home we all wept together. Before the funeral we went to Fort Scott where I met Lorene's husband, Hoppy, as he was called, and his mother. They were feeling sorrow as deeply as we were. She was buried in the Fort Scott cemetery.

Life had to go on, and I soon returned to Great Neck for work at WL. As soon as I could I went to the Rose farm. With all that happened there had been no opportunity to tell Doris about my new-found faith in Christ. That Sunday when we went to church communion was served, and I took the bread and grape juice along with the others. Doris noticed that and asked if I had accepted Jesus as my Savior, and I gladly said yes. We continued to study the Bible together and Doris was a great help to me. I continued to drive up to the farm nearly every weekend, enjoying my time there although we still were not engaged. Later, to my great joy she did say "yes."

Engagement and Marriage

I started thinking of engagement and wedding rings, and my friend Charlie suggested that Raymond Yard in New York City was the place to go. It was a very impressive place with guards everywhere, and a private room for the customer and two people to help find the right rings for me. I purchased a set made of platinum that I liked, kept the wedding ring and took the engagement ring upstate with me the next weekend. I put the ring on her finger, and at last we were officially engaged.

We selected April 22, 1956 for the wedding. Doris had majored in Psychology, minored in Sociology and had received her BA degree from Hartwick College in Oneonta. There was a lot to do for the wedding, but Doris and her mother handled most of it.

I drove in snow and ice a lot as I visited Doris almost every weekend that winter of 1955 and '56. Severe cold and snow storms were infrequent around the more temperate New York City and Long Island areas, but I often encountered them while driving upstate. A few times I couldn't get up the final hill and had to walk the rest of the way, and sometimes I had to dig my car out of the snow.

The WL engineers loved to play pranks on each other, but I gave no thought to that as I drove up on the weekend of the wedding. I stopped at Maxwell Hall in the Bronx to pick up Doris' friend, Nancy Wheeler, (not related to Harold Wheeler) who was in nurses' training at Columbia Presbyterian Hospital. Everything went fine until I turned off the New York State Thruway at Kingston onto Route 28. I had travelled with dimmed lights in the heavy traffic of the Thruway, and when I switched to high beams a loud alarm bell rang in the car. I realized right away that the WL pranksters had been at work. It took only moments to find the bell wire and disconnect it, and we went on. Later I found that someone had filled the windshield wiper tank with blue ink and put Limburger cheese under the hood, which we didn't notice while driving. Nancy and I arrived in time for the wedding rehearsal.

Charlie Wanzowski was an attendant and came with his wife. Doris's brother Jerry was also an attendant. I had kept in contact with Fred Gauss, a friend from SLU, and asked him to be the best man. Chuck Rose, Doris' brother and soon to be my brother-in-law, sent a telegram from Germany where he was serving in the Army with his family.

Doris and I were married in the Presbyterian Church in Laurens, New York that Saturday, April 22, 1956. Doris's matron of honor was her sister, Charlotte, and bridesmaids were her cousin, Sonja Krohn and friend Millie Peck. Her niece, Charlotte's daughter Cheryl, was a flower girl. The church was full of friends, relatives and local people. There were the usual greetings of guests, photos, refreshments and a wedding cake. At some point someone tied knots in our pajamas, poured confetti in our luggage, and put "Just Married" signs on the car. Finally we drove off headed for a honeymoon in Washington D.C., and a new life together as a Christian couple.

Our First Home and Our First Church

I had rented a second room at the house on Beach Street which gave us a small apartment where we stayed briefly. It wasn't a suitable place for us so we moved to a furnished apartment with a bedroom, living room and kitchen in Glen Oaks, near the border of Queens and Nassau County and not far from Great Neck.

We started attending the Manhasset Baptist Church, affiliated with the Conservative Baptist Association. They met in a building called "The White House," a former mansion located on the main street of Manhasset. The church had converted it into an excellent place to meet. In earlier years members of the Saint family attended there, and it is where Marj and Nate Saint were married in 1948 before they became missionaries in Ecuador. In January of 1956 Nate was one of five missionaries killed in the jungles of Ecuador by Auca Indians. Four months later when we started to attend, we often joined in prayer for Marj and her children. We couldn't know that years later Marj would be a colleague and friend.

Doris and I were baptized by Pastor Weymouth at a sister church, since there was no baptistery in the "White House." Doris's mother and father came from upstate to attend. We were baptized by immersion to identify with Jesus in His death, burial and resurrection, a symbolic act to demonstrate that our old sinful life had been put to death and replaced by new eternal life. We joined the church, and soon I was asked to teach a boy's Sunday school class. I was a new Christian and needed teaching myself, but at the same time I wanted to serve the Lord in response to the salvation He had given me. When I saw the Gospel Light lesson book and the teacher's help book, I agreed to take the class. The church had plans for a new building and it was built during the late summer and early fall of that year. Volunteers did some of the work, and Doris and I participated as much as we could.

Billy Graham Crusade

In 1957 Billy Graham conducted an evangelistic crusade at Madison Square Garden in New York City. A huge event throughout the Christian population, it has been described in many mediums, one being the book "God in the Garden," by Curtis Mitchell. There is an exhibit at

Wheaton College depicting the crusade which can be accessed on the internet. It certainly was a big event in our lives. Months before the crusade many churches, including Manhasset Baptist, encouraged members to work as counselors at the crusade. Doris and I took the nine weeks of training classes necessary to qualify.

On May 15th we attended the first meeting of the crusade. To get there we drove about five miles to one of the Queens subway terminals and took the subway into New York City to a stop near Madison Square Garden. Using our counselor badges as identification, we went into a special entrance and since counselors were to sit anywhere in the stadium, we found our way to seats in one of the balconies. By the time the service started the place was packed. After Billy Graham spoke and gave an invitation for people to come forward to accept Christ as their Savior, so many got up and headed to the halls on their way to the front, Doris said she thought at first they were on their way out to go home. Our part was to go forward too, find someone our own age and gender, go with the person to the large counseling room, introduce ourselves, and go through the procedures we had learned. That included either leading the inquirer to accept Christ as Savior, or help the inquirer rededicate his or her life to Christ. We would try to answer any questions, using the Bible to point them to Christ. There were follow-up materials to give and a decision card to fill out. We ended in prayer, and then took them to an advisor who usually was a pastor. He would encourage the inquirer to express the decision he or she made. We then took the subway to our parked car in Queens and drove home. Within 48 hours we followed up by phoning or writing to the inquirer we had counseled.

This was typical of what we did when we participated four or five nights a week of the 110 nights the crusade lasted. The training we received and interacting with inquirers was a formative event in our lives in that it increased our trust and dependence on the Lord and encouraged us to continue to be active for Him. One amusing sidelight of that first crusade meeting was the strong barnyard smell left in Madison Square Garden by the circus animals that had been there the week before. The first hymn we sang that night was "To God Be the Glory," and for years afterward when we sang it in churches, the memory of that smell at the crusade came back to me.

Sometimes we took others with us to the crusade. Among those were Doris' younger brothers Jerry and Kenny, and Charlotte and her son Larry Mackey. One evening we made arrangements to meet at the Garden with Nancy Wheeler and the young Army officer she was dating, Rex Moses. A few months later we participated in their wedding upstate in Oneonta. Through the years since then we've enjoyed a close friendship with Nancy and Rex, to the extent that their children and ours almost consider each other to be cousins.

Wheeler Labs and a Move

I completed my third year at WL that summer of 1957. The demanding, professional, open, friendly and cooperative corporate culture was an ideal place for a young engineer to learn and grow. We worked in small groups of five or six people, and there was never concern that someone else's success would diminish the chance of your own. We had easy access to Mr.

Wheeler and the more experienced engineers. As young engineers we learned to theoretically analyze, supervise our colleagues, make presentations, and much more. The things I learned from Mr. Wheeler have been useful throughout my years as an engineer, and I have often had opportunities to teach them to other engineers in work situations.

The country was in the midst of the "Cold War." The urgency to develop science, technology and engineering increased the requests for WL to design and develop classified military equipment. In addition to the CP antennas, I began to design and test guidance antennas for the Hawk surface to air and Sparrow III air to air missiles. Another challenging military project was to test the performance of a high precision radar antenna that was designed by Pete Hannan. It would be used to guide a missile to intercept and shoot down an incoming enemy missile and was patterned after the large cassegrain telescopes used to study stars. I learned a lot on that project and later designed other parabolic radar dish antennas similar to it.

Later that year WL completed a new building near Smithtown, further out on the North Shore of Long Island. The building would permit WL to design and test much larger antennas than could be done at the Great Neck site. Several other engineers and I were selected to work at the new facility, and at first we traveled out and back by car pool. The daily drive to Smithtown was difficult in the Long Island traffic and Doris and I looked for a house in the Smithtown area. We selected a ranch style house on 70 Howell Drive with three bedrooms and a full basement. The price was a little over $12,000. I took out a 30 year VA mortgage at 4% interest and we moved right in. We started with few pieces of furniture but added to them as soon as we could. Located on the North Shore of Suffolk County, Smithtown was a fast growing but pleasant place to live, and we often enjoyed the two beaches on Long Island Sound owned by the city.

About that time we travelled to Pawling, New York, to participate in the wedding of Doris' friend, Millie, to Philip Baugh. Millie and Philip met while attending the School of Missions of Columbia Bible College in North Carolina. They continued to be our close friends for the next 50 years. Both have passed into heaven, Philip in 2010 and Millie in February, 2013.

Doris and I spent several weekends at the Rose farm during the early years of our marriage, but we were so busy participating in the Billy Graham Crusade and buying a new home that we had yet to visit my family in Missouri. In the early summer of 1958 I took vacation time, and we drove the long distance to my home. There were no interstate highways then and we took old route 40 much of the way, stopping at motels overnight. None of my family was able to attend our wedding, so Doris met them for the first time and was warmly received by everyone. My relatives in Fort Scott were excited to tell me they had seen Doris and me sitting near the front on one of the crusade TV broadcasts. It must have been during one of the later crusade meetings when counselors were asked to sit in the front two rows.

In November we joined an expectant crowd as we watched a military ship arrive in a New York City port, and spotted at the railing Chuck and Betty Rose and their two little girls, Elaine and Carolyn. They were back from Germany for a time before returning in 1962 for another three year term. We enjoyed having them as guests in our new home.

A New Church

We didn't want to leave Manhasset Baptist Church and tried driving back from Smithtown to attend on Sundays, but we soon realized it was too far. We visited churches in the general Smithtown area and Pastor Weymouth mentioned we might look into a newly organized Conservative Baptist church plant in Central Islip, about a 20 minute drive from Smithtown. The first time we attended we were met at the door by a woman, Kathy Rennard, who immediately recognized me as the one who counseled her brother, Roger, at the Billy Graham Crusade. He had pointed me out to her and her husband Ralph when we took the subway home that night. (I kept in touch with Roger and we continued to be friends for many years.) The church met in a community hall located next to railroad tracks on one side, and the city fire house and a bar on the other side. We liked the friendly people and the young pastor and his wife who were our own age, Bob and June Williamson. Sunday school, morning worship and evening services were held there, and Wednesday evening Bible study and prayer meetings were held at a member's home. We eventually joined the church. It needed members, and the Lord knew we needed to grow in our walk with Him through the responsibilities and challenges we would find there, as well as through the depth of Pastor Bob's scripturally sound, practical and gentle teaching.

Doris and I became more and more involved in the activities of the church in Central Islip, and as we grew in our faith and walk with God, I began to think back over my life. There were those early radio programs when I heard that God exists and requires that we live moral lives. In the high school years I recognized the need to get a college education and made plans to get it through enlisting in the Signal Corps. Then came St. Lawrence University and MIT, followed by employment at Wheeler Labs. Then I became a real Christian, and married the special one I loved to become my life partner. God gave me the privilege of leading many to know Christ at the Billy Graham Crusade. In all the living that took place through those years God had guided me and made it all happen. God had His plans for me, and surely part of it was the engineering work that produced important equipment for military use to protect the world from tyranny. Was that all, or was there something more? We were startled when Millie suggested we go to Bible School and possibly from there serve in missions, but I didn't see any way we could leave our source of income, nor how an engineer could be used on the mission field.

Chapter 6

Happenings, All From God

1958 – 1970

Special Events

Our daughter, Lorie, was born on September 15, 1959 in the hospital nearest to Smithtown, Bay Shore General Hospital on the South Shore of Long Island. Before she was born the ladies of the church gave Doris a shower, which started us off with many nice gifts for the baby. We were overjoyed with our baby girl, and had on hand Dr. Spock's "Baby and Child Care" to guide us as we began the long road learning to be parents. It was a happy time and she was the center of our attention and affection. We took her with us to my parent's home to meet my family and relatives, and the new granddaughter was the center of attention there too. We had shown her off to the Rose family more than once by that time.

In 1962 we learned that my mother was seriously ill. She was only 52 years old and had been in good health. She went to a hospital in Kansas City for diagnostic tests, and exploratory surgery revealed the presence of inoperable liver cancer. Doris and I, with Lorie, went to see her, and she and Lorie were able to wave to each other through the hospital window. Doris and I prayed and shared scripture and she said she had accepted Christ as her Savior as a girl, and trusted Christ for eternal life. That was comforting to hear and I trusted her to the care of the Lord. After returning home to Smithtown we learned of her death on January 5, 1963, one day after Dad's birthday.

February 20, 1963 we were thrilled to welcome a baby boy, James, into our family, born in the new hospital in Smithtown. It was Doris' mother's birthday too, an added blessing. Again there was great joy as we now had a girl and a boy in our small family. Lorie was old enough to join in the fun of having a baby brother to whom we all gave loving attention.

November 10, 1964 our second son, David, was born in the Smithtown hospital. We were pleased and thankful for the Lord's provision of another precious boy to our family, and he fit right in with our busy, noisy household. Lorie and Jimmy had just recovered from chickenpox, and Doris and I were concerned when David came down with a full-blown case of it when he was one month old. Our pediatrician was helpful and supportive and he soon recovered.

God had chosen to bless us with a girl and two boys to raise for Him. Lorie was now five years old, Jimmy was just a toddler, not yet two years old, and with a baby too our little ranch house seemed a bit crowded. That's when we began to plan for a new home, our "dream house" that would be larger.

When Lorie was five years old she accepted Jesus as her Savior during a Sunday school class taught by Clara Tucker. Doris and I could not have been more pleased and thankful for God's drawing her to Himself, and through the years her life has confirmed the genuineness of that decision she made at such a young age.

Church Involvement

During the years from 1957, our involvement in the church in Central Islip increased. Doris was asked to start and lead a Pioneer Girls club for girls in grades four, five and six. Pioneer Girls was a church-based program similar to Girl Scouts. We set up the basement in our home for the club's weekly meetings. About ten girls attended at first. They enjoyed it and invited friends, and by the second year about 20 were attending. Doris was thankful to have Kathy Rennard, and later others help lead the meetings. The program required a women's coordinating committee, so when Doris couldn't be a leader when Lorie, Jim and Dave were born, she served on the committee.

It was a small, new church with plenty to do and few to do it. I was asked to teach a Sunday school class of girls and boys in grades four, five and six, and I soon became the Sunday School Superintendent as well. I served on the Missions Committee and at different times I was its chairman and treasurer. A missions outreach was important to this congregation who faithfully gave to support the church. On Sunday mornings we helped clean the community hall, and from a storage van a member towed to the site, many of us unloaded folding chairs and the pulpit, and set them up. After the evening service we folded and loaded the chairs into the van and it was towed to a parking site for the week. On some Sunday nights the city firemen used the hall after us, and we had to hurry to be out of it before they started to roll in their barrels of beer.

Central Islip Church and Parsonage Built

The church looked forward to having our own church building, and began to made plans to build. It was a big undertaking for everyone involved, and a big event in our lives as well. Throughout all that transpired, the church members looked to the Lord for guidance and trusted Him to provide according to His will, and He blessed abundantly. A building committee went to see the buildings of other churches, and looked for lots for sale in the area. In 1959 the church bought a one half acre lot for $2000 on Half Mile Road opposite the Central Islip High School. It was an excellent location and next door to Mrs. Emily Lowton's home, the church member in whose home we met for Wednesday night Bible studies.

The building committee saw a church in Pennsylvania they liked, and the church voted to build one like it. An architect drew up plans and specifications for the building and estimated the cost would be $50,000. Rev. Cotter, pastor of a sister church, helped launch a bond program to raise that amount. He spoke to church friends and members at a formal dinner held at a large hotel conference room to spark enthusiasm for us all to buy bonds and sell them to others. Our bonds paid five percent interest, higher than most industrial bonds at that time, and one local financial advisor sold a fair number of the bonds to his clients. We all did our part to sell and buy bonds and we successfully raised the needed funds. I served as treasurer of the building construction and wrote the checks to pay for the construction costs, Ralph Rennard served as general contractor, and the church treasurer handled the details of the bond income and outgo.

We hired Walter Frailey to be the construction supervisor. He was a trustee of the church and a home builder and contractor. I surveyed the area behind the church for the parking lot. Later I worked with others to put in concrete sidewalks, and installed wiring and speakers for the sound system for the church and nursery. Although a busy time for everyone, the building was complete and dedicated to God's service on September 10, 1961. The dedicatory speaker, Dr. Carl F.H. Henry, editor of Christianity Today and one of Pastor Bob's professors at Fuller Theological Seminary, drew many clergy to the service who wanted to see and hear him in person. He was raised in Central Islip and wanted to give a witness to his former neighbors and friends.

Later, the Central Islip members wanted to provide a parsonage for their pastor. As a small beginning church we had never been able to pay Pastor Bob a proper salary, and renting a home was a hardship for him. The congregation had trusted God to supply needed funds to build the church, and they decided to conduct a small bond drive to raise enough cash to begin to build a parsonage, raising the bulk by taking out a loan from a local bank. The bonds sold quickly, a mortgage secured, a building lot purchased, Walter Frailey agreed to build the parsonage, and Pastor Bob and his wife June chose the house plan they liked. An architect drew up the plans and specifications; the work went forward and was completed without major problems.

Looking Ahead

During the final years of the 1960s Doris and I continued to be active in the Central Islip church, I as a deacon and Sunday school teacher, and Doris as a Pioneer Girls leader. Pioneer Girls expanded to involve older girls and more leaders, all meeting in the new church. Lorie became a Pioneer Girl too.

A banquet was held in September, 1981 to celebrate the 25th anniversary of the First Baptist Church of Central Islip. In a letter of invitation to former members Pastor Bob wrote:

"We have come to a good time in our fellowship, with three of our young people in full-time missions, another studying at Moody for possible missionary nursing, and a fifth young man now serving in the pastoral ministry .... This past year we increased our missions giving by 100%, and we praise God for this."

Another evening of celebration took place May 30, 1986, when the church honored and expressed their love and respect to Pastor Bob and June on the occasion of their retirement from the pastoral ministry. They had given 30 years of faithful, compassionate service to the Lord and the Central Islip church. They greatly influenced our lives and have been supportive friends through the years. In 1992 we all lost a dear friend when June passed into heaven to be with her Lord.

Move to Old Willets Path

Our experience with the church building encouraged us to think more about a new house. We looked at pictures of homes until we saw one we liked and asked the architect who did the church to draw up the plans and specifications. In 1964 we bought a vacant lot on Old Willetts Path, a short distance west of Smithtown. Walter Frailey agreed to build the house, we took out a 30 year mortgage and immediately began to build.

As the house neared completion we put the Howell Drive home on the market. It sold in June, 1965, sooner than we thought it would. The new house was enclosed, and there was a good amount of interior finishing to be completed, but we moved in and roughed it for a while. By that time Lorie was nearly six years old and completing kindergarten, Jim just over two and Dave less than one.

Chuck, Betty and the girls visited when they returned from Germany, and brought with them their dog, a Brittany spaniel named Freckles. Chuck offered to leave her with us, and we happily agreed to keep her. Their next assignment would be in Hawaii and it would be difficult to take her with them. Freckles loved to go with me when I rode my bicycle in a nearby park which I accessed through back lots. If I went by way of the street I left her home. We had her about four years when, one day when I left her home she pushed through the door, ran into the street, and a car hit and killed her. It was a difficult time for all of us.

More Antennas

To help us keep up with progress in our field of engineering, Mr. Wheeler assigned each of us to attend an engineering symposium nearly every year. Those I remember best include ones in Ohio, Alabama and Illinois. I also took frequent trips to WL client companies and companies that produced our models for testing. A lot of our work was contracted through Bell Telephone

Laboratories, and I often went to Murray Hill, New Jersey, or Winston Salem and Greensboro, North Carolina to report on project status. On the SPS-55A Navy antenna project I boarded a Navy destroyer at the Boston Navy Yards to see the antenna that was to be modified for use on Navy ships. Goodyear Aerospace in Akron, Ohio manufactured many of the radar antennas I designed, and I frequently traveled there to clarify any questions about how the antennas should be built. Two notable clients I visited were the Pentagon in Washington, D.C. and the CIA in Langley, Virginia.

A fairly complete list of the antenna designs I worked on is included in an appendix at the end of this publication. Three of these are more memorable to me, and may be of interest to others. A Navy radar antenna designated as SPS-55A, tracked enemy planes or ships and gave direction and range to guns to shoot at them. My assignment was to modify the original antenna to provide the new ability to guide a missile to the target. It was one of the early antenna projects I directed as senior project engineer, with other engineers to assist me. We worked out the changes needed and scheduled Goodyear Aerospace to build the first model. They built it correctly, and we ran performance tests under pressure to ship it to the Navy as soon as possible. We completed the project by writing the final report on the design and performance. A few months later I received a call from the Philadelphia Navy Yard asking what was in the large crate they had. I explained about the antenna, and wondered why we had been rushed to complete the tests. Later the Navy ordered a second antenna, but they chose to have it built by a different manufacturer. Then the Navy sent it to WL for performance testing and verification. Although badly made, we could only do the tests and not criticize it. We heard nothing about that antenna for a while and it became obvious the Navy chose not to use it.

Later an engineer from Raytheon Company came to see me about an antenna the Spanish Navy wanted them to build. It was the SPS-55A antenna, and I appreciated that someone wanted to use it. The Raytheon engineer didn't like the same building specifications that I had objected to, and together we changed everything back to the way I originally designed it. He had it made and soon WL received the first of several of the antennas for performance testing and verification. These came through perfectly made, and I could hardly believe it when I heard they had been made by a manufacturer of fiberglass truck trailers. Designed right, they were easy to make.

Another memorable project took me to the Woomera Missile Range south of the Great Victoria Desert in the outback of South Australia. Project Dazzle was a joint effort between Australia, the U.K. and the U.S. It involved an 87 foot diameter radar antenna built and installed by a company in California to study the entry of missiles into the lower, denser atmosphere on their way to earth. The antenna was to distinguish between real missiles and decoys. When it failed to lock on and track targets, the U.S. Army Missile Command took over to discover and solve the cause of the problems, and chose Collins Radio to rewire the entire radar. One Army officer, who knew

of the WL record of success, insisted that WL be included as a sub-contractor for correcting defects in the antenna. As Mr. Wheeler and a group of us engineers looked at the original design, Mr. Wheeler immediately pointed out design flaws. The group roughed out quite a different design that would require changes in the support structure as well as the faulty feed radiator part.

Fred Van Davelaar did the mechanical and I the electrical design. Several innovative features went into the new designs, and, when drawings were completed, the WL machine shop crafted the new antenna feed radiator part. After my checks on the WL antenna test range verified that it functioned as intended, we went to the Pentagon, explained the problems of the original design and how our new design solved those problems. Still, some did not want to believe it would work. We shipped the new part to Australia, and Fred went there first to supervise the mechanical installation of the support struts. Then Harry Redlien and I went to prepare transmission lines to connect to our new part. These lines had to be cut very precisely to the correct length. As I stood high up on the big antenna structure I saw our new part and the old part near each other on the ground with a group of Australians looking intently at our new one. When I got down, I asked what had so drawn their attention, and it surprised me when they said, "the new one is pretty." During all the design work I'd given no thought at all to that, but often good designs are pleasing to look at.

As project supervisor I kept all the records of our work in the project notebook with descriptions of the daily work, and analyzed tracking errors caused by slightly unequal transmission lines. With the part mounted on the antenna and lines all connected, that completed Fred's work and he returned home. The Collins field engineers worked on the radar and Harry kept watch of their transmission line work inside the radar set to prevent mistakes as they connected those vital lines. While I set up an antenna testing range to verify the antenna performance, Harry went home, but planned to return later to do the final testing.

After Harry left, the Collins crew took a weekend off, and went by plane "to live it up" in Adelaide, the nearest larger city. By that time I had become friends with one of their men, a young Chinese engineer who had attended Stony Brook Boys School on Long Island. He and I didn't join the Collins crew activities, but went along to take a break from the work and see the sights in Adelaide.

I finished setting up the testing range, Harry returned to test everything out, and I went home. Upon completion the Dazzle antenna performed as intended and was used successfully to study missiles entering the atmosphere.

I enjoyed the many contrasts between Australia and the U.S. At night we stayed near the radar site in trailers near a small settlement called Mt. Eba, and discovered that what Australians call tea is the main evening meal, and later in the evening supper consists of a cookie and tea or water. I left New York in the hot humid summer, but arrived here in their mildly cold winter, and I couldn't keep warm. The differences between the southern and northern hemispheres confused me at times. The positions of the stars differed. For example the Southern Cross replaced the

North Star and the Big Dipper constellations. The position of the sun is important in locating south and north, so as I flew in on the airplane from New York I looked at the sun and concluded we were traveling east. But that couldn't be true, we had to be going west, and I realized I was south of the equator.

When I left for Australia it was August 1965, and we had moved into our new home. I was there for a month, a long time to be away from my family. I wrote home about twice a week, and Doris wrote in return. Even so, to the children letters were no substitute for their dad in person. At 10 months David was beginning to walk and did not talk yet. I'm told that one Sunday at church he toddled over to Ray McRorie, who slightly resembled me, and crawled onto his lap. When friends George and Nellie Frailey visited Doris and the children at home, David raised his arms for George to pick him up, and didn't want to be put down. Lorie once said with alarm, "I can't remember what Daddy looks like!" It annoyed her when her friend asked if her dad would really come home. Jim, the stoic one, didn't express his feelings. Doris' mother came for a week, and it surprised her when Doris replaced the water pump on our washing machine when it stopped working. Doris knew how from watching me do it twice before when beach sand clogged it up. A minor traumatic event happened to Lorie. While swinging on the swing in the back yard it frightened her when an air pocket in the soil opened up a good sized hole under the swing.

The third memorable project involved a key part for a microwave phased array antenna for the Navy Aegis program. The Navy needed radar that could detect, track and shoot down missiles fired at their ships. Hazeltine Corporation won the bid to build it, but the antenna they built had a potential problem. The individual radiating elements had to be small and closely spaced to work at microwave frequencies, but that left too little space to fit in the needed waveguides. No one thought waveguides could be made compact enough to fit the space available, but Hazeltine hired WL to find a way to do it, and WL assigned me to supervise the interesting and challenging project. By using reduced-height waveguides and innovative WL-designed waveguide components, it all crowded more closely together than most thought possible, and the waveguide assembly made in the WL machine shop did meet the space requirements. The power distribution to the individual array antennas was surprisingly close to ideal for a first model. I submitted a final report on the project, but heard nothing back from it. The Aegis array with cable transmission lines was tested on the Spy 1 missile ship mockup on the southern plains of New Jersey, but the entire project was abandoned.

Doris' Father, Health Issues

Doris' father had been dealing with congestive heart failure for a long time, and he died in April, 1966. He had an extensive knowledge of scripture and we believed he had accepted Christ

as his Savior. Doris was close to her father and I knew him for many years and respected and cared for him.

An unusual health problem occurred in the late 1950s while we still lived at Howell Drive. I suddenly lost the lower right side of my vision while working at my desk at WL. I mentioned it to Harry Redlein, and he said it had happened to his father-in-law, reassured me that it was fairly common and would soon go away. That relieved me somewhat, but it didn't seem to be going away. After the second day I went to the doctor, who ordered a vision scan that showed the extent of the blank area. He sent me to a specialist who recommended a check for blocked vessels in my head. The test was done in the hospital where x-rays were taken with a red dye injected in my bloodstream to show up any problems. Nothing was found and I went home.

That night I awakened in the early morning hours with my heart beating irregularly and I felt very strange. I decided to call the specialist even though it was late at night, but he had no idea what was wrong. I decided to trust it to the Lord and relax as much as I could the rest of the night. The heartbeat did gradually even out, and I eventually learned it had been caused by a reaction to the red dye in my blood. After a week or so my sight returned to normal.

A chain of events led up to a much more serious incident. I could list many accomplishments: we now lived in our new almost-finished home, we attended church services in the new building, I just finished the final report for my last project at WL, and I was ready to do my stint at jury duty for the next two weeks. During that last work week I pondered about my Christian life and service. I had started that life filled with joy and closeness to the Lord, convinced it would grow stronger with increasing service for the Lord, yet I realized the joy and closeness had largely disappeared from my life. I couldn't understand why, and, right there at my desk prayed asking the Lord to do anything needed to restore me to joy and a close relationship with Him. I left it with the Lord and didn't think much more about it.

We had an old fashioned kind of cellar door outside leading into the basement, and I had installed an inside door to keep out the cold. That weekend I applied a wood preservative to the door and frame to prevent termites and ants from attacking the wood. On Monday I went in for jury duty even though I didn't feel very well. I wasn't selected to serve on any jury that day, and went home feeling worse. Tuesday morning I felt so bad with a pounding heart that I couldn't support any physical activity, so I went to the doctor instead of jury duty. An x-ray showed substantial fluid in my lungs, and the doctor sent me to the hospital. My heart muscle was inflamed, most likely by inhaling fumes of the wood preservative.

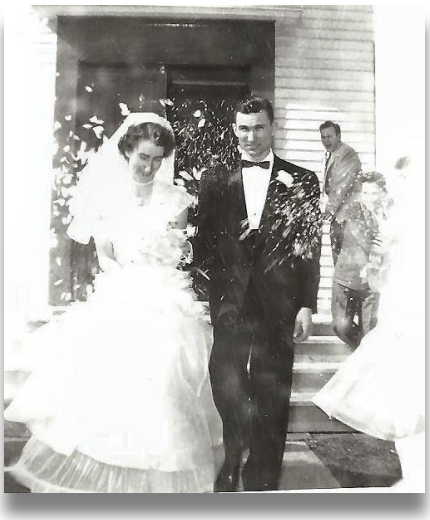
It wasn't so painful, but the heart had to pump very hard just to provide enough blood for my system even lying down and at rest. Any activity caused my heart to pump furiously. I was completely helpless, and didn't see how I could survive. Of course I prayed about it, and was trusting God throughout the struggle. It was a stressful time for Doris. In prayer she committed my life, hers, and our children's to the Lord, and came to accept that whatever His will would be,

it would be in His love and the best for all of us. God then gave her great peace plus the assurance that I would recover. When she visited me in the hospital the morning after the extreme heart events she was smiling and confident that I would recover. That encouraged me, and I began to consider my helpless state. What was the Lord trying to teach me, and how did it relate to my prayer about the lack of joy in my life?

God soon helped me to understand. I had tried to please Him by giving most of my spare time to fulfill responsibilities in the church. I went to every Wednesday night Bible study, and either Doris or I attended every Sunday evening service, one of us staying with the children. We gave more than a tithe to the church. It was the same problem as in those earlier years when I tried to be good enough to earn God's approval. I realized that all this was as powerless to please Him as my helpless physical state was to carry on normal activities. God wanted my devotion to him, not work for Him. He wanted me to trust Him to do His work through me. As I came to understand this I surrendered my life to Him as I never had before.

As I began the long road to recovery, I marveled at the extent of illness He had to take me through to learn that lesson. The recovery was slow, but gradually my heart healed from the damage of the preservative vapor I'd breathed. Doris' mother came to be with us and help out with the children. After about three months I was able to work half days, then after five months I worked full days. I will always be grateful to Mr. Wheeler and the staff that they continued my regular pay throughout that entire time.

I exercised to regain strength and rode a bicycle on the trails of nearby Weld Park as often as I could. My church activities didn't change or diminish, but they were done in a spirit of freedom from trust in my own works and dependence on the Lord to do His will through me.

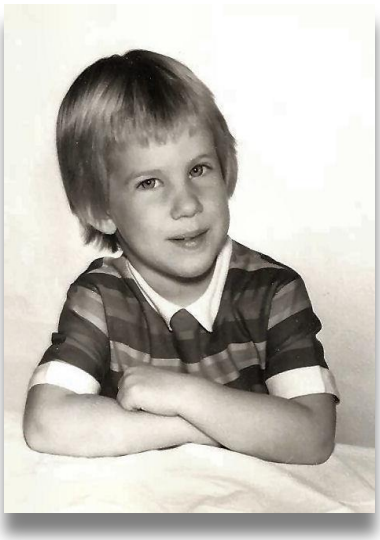


We're Married!

First Baptist Church of Central Islip

Billy Graham Crusade 1957

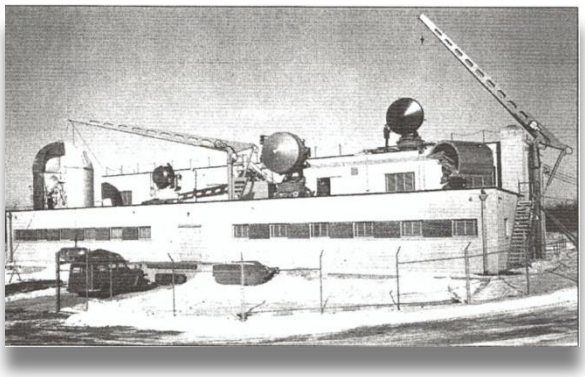
Pastor Bob and June Williamson



Lorie

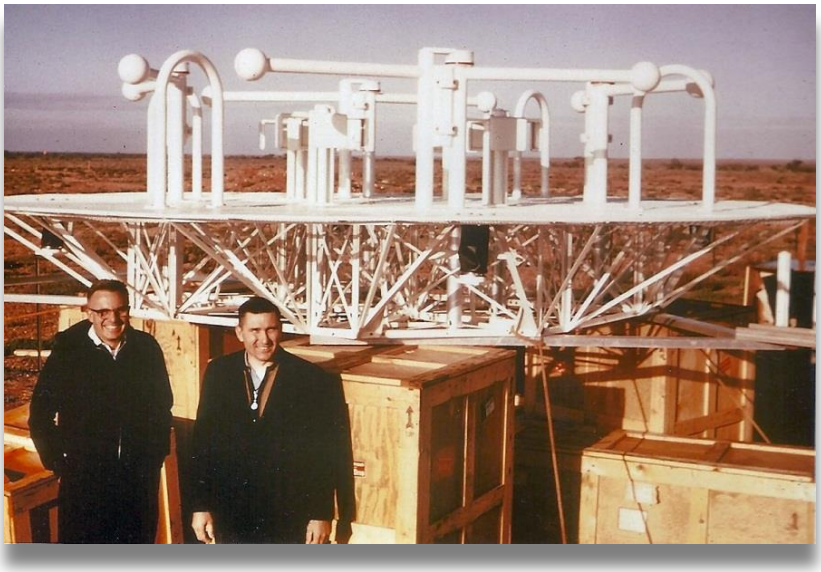
Jim and Dave

Marines loading HAWK missiles aboard a Launcher at Twentynine Palms, CA



Smithtown Test Site

Dazzle radar antenna with feed attached



Don next to Dazzle feed with Harry Redlein

Chapter 7

New Directions

1970 – 1971

A Closing

Mr. Wheeler had worked for Hazeltine Corporation (HC) for more than 20 years when in 1947 he left and formed his own company, with the help of friends who invested in it. In 1959 WL was sold to HC, and Mr. Wheeler became Vice President of HC and a member of the HC Board of Directors. WL became a subsidiary of HC, but continued to function as before. HC was to provide financial stability for WL, and WL was to provide engineering help to HC. For example, I led one interesting HC project to design an antenna used on an electronic device to be dropped from planes by parachutes into the jungles of Vietnam. The device detected enemy troop movements and gave an alarm by radio with location coordinates for use by our artillery forces. Even voices of the enemy troops were transmitted. The antenna had to be built to enter the trees without tangling and breaking, so we simply made the entire outer case an antenna. Since the device was suspended high in the branches of trees, the whole-case antenna worked perfectly, and many thousands were used in the war.

Much of HC's income came from royalties paid by companies that used HC patented devices in their manufactured products. 1965 HC was forced to sue Zenith Radio Corporation for patent infringement, but Zenith countersued, claiming antitrust violations. The charge was false, but the court upheld Zenith's claim for damages of more than twice the value of the entire HC company. The decision was taken to higher courts, the penalty greatly reduced, and the threat to HC's survival had passed, but the court costs for HC were huge.

In addition, in the late 1960s and early 1970s a recession hit the country causing a severe downturn in the electronics industry. WL had to lay off almost half of the WL engineering staff. A few of those not laid off were transferred to HC to help that company survive. Since I had been working on HC projects already, I was one transferred to HC. I was there a short time when I realized the work would not be in the area of my past experience, and I decided not to continue to work there. As a Christian I thought it only fair to tell my HC supervisor that I planned to seek other employment. To my surprise WL asked me to return and I continued at WL until it was officially closed in 1970.

When WL closed I began to search for employment. We hoped that I would find a job near enough that a move wouldn't be necessary. Lorie and Jim were in grade school, and David was headed toward kindergarten. We were comfortable in our new home and in our church, and didn't want to move. It was a great help that a remaining small staff at WL assisted in resume writing, and soon I sent resumes to as many companies as seemed likely to need an engineer with my background and experience.

Missions

After the Lord took me through the health event with my heart, I became more concerned about the need for others to learn about God's love and His provision of eternal life by believing in Christ's death to pay the price for their sins. Through involvement in our church missions program Doris and I knew that God was making Himself known around the world through missionary activity. We observed Dave and Joan Anderson, friends who attended the church, as they prepared and left to serve in Venezuela. The idea of doing that myself grew in the back of my mind. Doris, too, had come to an increased sense of God's love, and she found new meaning in the truth that Christ lives His life in believers, and His life through her should be centered on others, not herself. She realized that missionary service would be an ideal way to share Christ and His love with others. When Doris and I shared our thoughts, we were surprised that we both felt the same way — that it would be a privilege to serve full time to bring the gospel to others. Doris marveled at the change in her attitude — she used to be thankful that the Lord didn't want her to be a missionary.

Doris and I believed that this period of seeking new employment would be the best time to find out if God really wanted us to go to the mission field. We knew that much more interaction with people than was natural for us would be required. Neither of us had public speaking or musical skills to help us communicate our story in churches. We did not have Bible school or seminary training and would not have a pastoral kind of ministry on the mission field. Therefore, if an engineer was not needed in missions, we could be certain that God would not want us to be missionaries. To find out, I sent a special resume to three organizations that had an international radio ministry. Each of them answered and asked us to apply formally, so we knew engineers could be used on the mission field. One of them, HCJB World Radio Missionary Fellowship, the pioneer missionary radio station, had been broadcasting from Quito, Ecuador since 1931. Its shortwave broadcasts went around the world in 12–13 languages, using numerous transmitters and antennas. I could see that HCJB had the potential to need my experience more than the others, and I started to correspond with them.

New Job

I received job offers from six engineering companies. They were located in San Francisco, Los Angeles, Maryland, Cleveland, Boston (at the prestigious Lincoln Laboratories affiliated with

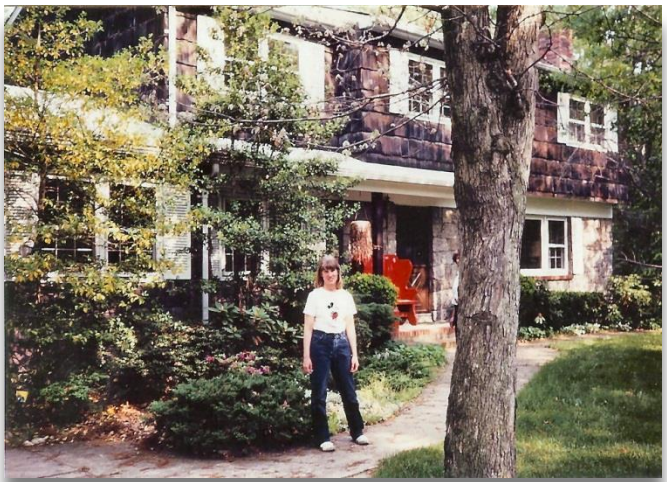
MIT), and Van Nuys, California (with ITT Gilfillan). Work at Lincoln Labs would involve research and development and would be an ideal, stable long term commitment, if that was where we wanted to spend the rest of our lives. Since we were drawn more and more to missionary service, we chose the ITT Gilfillan offer. It dealt mostly with military projects that were short term and I could leave without it being a problem for the company. I would work under Bob Hanratty, who had gone there earlier from Wheeler Laboratories. I was one of four WL engineers to be hired there. As I rejected the other offers, I recommended two other WL engineers, and each was given employment at one of the places I'd rejected.

Once I accepted the offer from Gilfillan we prepared to move to California. We put our house on the market, and when one couple seemed serious about buying it, we chose a lawyer to represent us and complete the sale. We made arrangements for Linda Tucker, a young lady we knew well from the Central Islip church, to care for our three children while we looked for a house in the Los Angeles area. The day we had chosen to fly there turned out to be the day after the 1971 San Fernando Valley earthquake. We arrived after dark that evening, and all night strong aftershocks caused the Sheraton Hotel where we were staying to sway back and forth. The next morning when we opened the curtains of the large hotel window, we were pleasantly surprised to see the beautiful San Fernando Valley laid out before us with the Santa Susanna Mountains beyond it to the north.

Our friends, Nancy and Rex Moses, lived in Calabasas, just to the west of the San Fernando Valley, and had set us up with a realtor to show houses to us. We saw a lot of damage to buildings from the earthquake, and broken objects in homes the owners had not had time to clean up. We settled on a three bedroom ranch with a heart-shaped swimming pool in Woodland Hills, a nice area within reasonable driving distance from ITT Gilfillan.

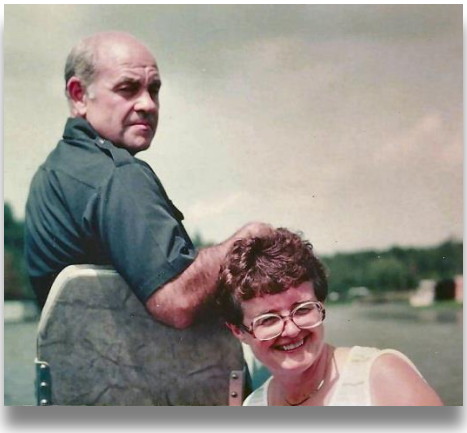
The sale of our house at Smithtown did not go through, but we had to move to California without delay. A church friend agreed to watch for any damage to our empty house and make any necessary repairs, for which I would repay him. There was a goodbye get-together at church and special goodbyes to friends. After the Mayflower van loaded up and left, our friends Ken and Judy Williamson helped us tidy up the house. We drove away with lumps in our throats, but Doris and I had confidence that God was with us and would work out His perfect plan in our lives.

Jim with Tommy, David, Lorie & Freckles



New House in Smithtown, NY

Ken, Charlotte, Jerry



Philip and Millie Baugh

Jim ,Lorie and Dave

California friends on Jim's 9th BD
Jim in center at top, Moses boys above and beside

Lorie graduates from 6th grade, shown with Miriam Moses and Jeannie Shearin

Nancy & Rex Moses

Chapter 8

Two Years in California

1971 – 1973

It was our first time to drive across the entire country, but would not be the last. Passing through Arizona we visited the Grand Canyon, its size and grandeur a marvel to see even in the late winter snow that blanketed everything. Lorie, Jim and Dave had never been on such a long trip before or traveled through such mountains and deserts, and they showed an interest in it all. Upon arrival at Woodland Hills an earthquake-damaged Holiday Inn on Ventura Boulevard was our home for the week or so before the van arrived.

The first Sunday there we set out to find a certain church in the area that was affiliated with the same Conservative Baptist Association as our previous churches on Long Island. We knew the church was located on Sherman Way, but it was set back from the street and we missed it. Since it was about time for a service to start we attended the next church down the street, the First Baptist Church of Reseda. The pastor's sermon proved to be just the kind we needed to hear, we continued to attend, eventually joined, and it was our home church for the next 17 years. It had about 1200 members and was affiliated with the Baptist General Conference, a denomination started by Swedish immigrants in the 1800s. I'm convinced it was the Lord who guided me past the church I was looking for to the one of His choice.

Settling In

The elementary school the children started to attend was conveniently located across from our house. Changing from the Smithtown school system to the new one with new kids was difficult as they finished the grades they were in, Lorie the sixth, Jim the second, and kindergarten for Dave.

As soon as possible I reported to work at ITT Gilfillan. It was easier for me than it was for the children, since I knew Bob Hanratty, my new supervisor with whom I had worked at WL, and there were other engineers from WL too. My first work project was to supervise the fine tuning of the SPS-30 Navy phased array radar antenna. It was the second phase of the design that another company had begun. Gilfillan won the bid for the tuning based on a simple, low cost method that had been devised by WL. The work wasn't very different from what I'd done earlier on the Aegis Navy radar. The results were reported to the Navy, and I was requested to attend a

conference at Norfolk, Virginia, called by the Navy to answer any questions they might have. It was relatively simple to clarify how the tuning had been accomplished, and to reassure them that the tuning would not deteriorate with time.

California was different from Long Island, but we liked it very much. We quickly became accustomed to palm trees instead of oaks and ice plants or ivy in place of grass. Having a peach tree in our back yard was new to us, and the ripe peaches were so good. The children loved the swimming pool. All three quickly learned to swim and friends came to swim too. Doris and I also enjoyed the pool. Summer days in the San Fernando Valley were often very hot, and the pool offered enjoyable relief.

Our neighbors across the street went to the Reseda church. Their daughter, Jeannie, was close to Lorie's age, and their son, Mark, was between Jim and Dave's ages. They've remained friends through the years. We missed our way of life and our church friends on Long Island, but enjoyed being nearer some old friends and relatives living in the Los Angeles area. Rex and Nancy Moses, only a 20 minute drive away, had four children, all in the same age range as our children. The kids got to know each other well from frequent visits, birthday parties and other events. Rex was working as a chemical engineer at Rockwell Corporation.

After Uncle Oris died, Aunt Pearl had moved to La Habra on the south side of Los Angeles. My cousin Dub and his family also lived in La Habra, and we visited them occasionally.

Walt and Dee Wilson, friends from the Central Islip church, had moved south of Los Angeles to Mission Viejo within a week or two of when we moved to Woodland Hills, so we were able to keep in close touch with them. Larry Mackey, Doris' nephew, lived in Riverside, east of Los Angeles.

After some time passed our lawyer found a buyer for our house in Smithtown, and the possibility of mission service continued to be uppermost in our thoughts and prayers. While still living in Smithtown we had filled out HCJB's application forms including references for them to check. Soon after we arrived in Woodland Hills we received word of a favorable evaluation and an invitation to attend a nine day orientation period in June in Miami. We sent information about our move and my new job and asked if a weekend of orientation would suffice. They answered that it would be better to wait for another orientation period. We knew the mission required one year of Bible School, and when we mentioned the possibility of taking the Moody Bible School correspondence course and some classes at Fuller Seminary or BIOLA, they readily approved.

By that time we knew that if we served with HCJB we would need to raise our own financial support, attend language school in Costa Rica for eight months, and of course sell our house. We were in middle age by then, (I was 42 years old and Doris six years younger) and it was daunting to think of all that would be involved in such a change in our and the children's lives. Nevertheless, we had learned that God provides through His strength and wisdom, not ours. We

believed that if He wanted us to serve as missionaries He would provide for our physical and financial needs and the needs of our children, who would be uprooted again. We knew from mission literature that after acceptance by the mission it usually takes a year to raise financial support, and I felt that working at Gilfillan for two years should satisfy my obligation to them. Two years in California was the tentative schedule we had in mind when we settled down to California living.

It was obvious we needed two cars. I looked for an inexpensive used car, which was all we could afford at the time, and found a Chevrolet less than ten years old for only $125. It looked reasonably good inside and wasn't rusted out, so I bought it to be my work car. It ran very well and seemed to meet my needs, at first. On one occasion I accelerated a bit hard and was startled to hear the engine turn on its side under the hood. I quickly stopped and opened the hood to find that the engine had rolled back to its normal position without damage. The motor mounts were broken on both sides, but I continued to drive it, being careful not to accelerate too hard. I didn't dare drive it on the freeways, but could drive to Gilfillan on the local streets without problems. I often dropped Lorie off at school on the way to work, and she remembers the brakes didn't work at one point, a memorable event for her, but I don't remember it. I do remember that the water pump started leaking, so I bought a replacement at a car parts store and installed it. After that the diaphragm in the fuel pump broke and gasoline sprayed over the engine. Fortunately it didn't catch on fire. At that point I not only replaced the fuel pump, but also the motor mounts. The car must not have been used for some time to have all those problems develop, but the average cost of replacing the parts was only about six dollars a month. I kept the car, parts soon stopped failing and it served well even on freeways until we left California.

In the fall when school started Lorie went into seventh grade at Los Angeles Baptist High School, a Christian, coed day school in North Hills. The school was on the way to my work at Gilfillan, so mornings I drove her, and afternoons she returned either by car pool that Doris participated in, or, during another period of time by bus, which left her off at a nearby corner where Doris picked her up. She attended there for eighth grade as well, along with her neighbor friend, Jeanie. Jim and Dave continued at the elementary school across the street.

It was a pleasure to be a part of the First Baptist Church of Reseda. The depth of Pastor Well's sermons and mid-week morning Bible studies Doris attended helped to settle us in our faith. We came to know Pastor Wells as a warm, wise and strong leader. As young as Lorie was then, she, too, remembers him with great respect and fondness. Doris and I participated in church visitation, not easy for us but something we also did in Central Islip. Jim and Dave attended Boys Brigade and its summer camp, and I helped with the weekly meetings and activities. Lorie attended Pioneer Girls meetings. Doris, who had been a Pioneer Girls leader for many years at

Central Islip, at Reseda became co-leader of a Pioneer Girls high school group, and then was asked to serve as committee chairman, coordinating all the grades through high school. Of course we all attended Sunday school and other church activities.

When Jim was in the fourth grade he accepted Jesus as his Savior in a Sunday school class. During devotions I asked David if he wanted to accept Jesus, and he did that as I prayed. We rejoiced that all our children had given their hearts and lives to Jesus to live for and serve Him. All their sins, past, present and future, were forgiven and paid for by Jesus when He shed His blood and died on the cross. They were adopted into God's own family forever, as it says in John 1:12, "But as many as received Him, to them He gave the right to become children of God, even to those who believe in His name." All five of us now had God in heaven as our loving Father forever.

Classes at Fuller Seminary

We worked on the Moody correspondence courses, and I enrolled in an evening Biblical Theology class at Fuller Theological Seminary in Pasadena. It was taught by a Baptist pastor of a church in the area, and the students were a mixed group of older students like me and college age. The school originally had a reputation of being biblically sound, but by the time I enrolled it had become more liberal. I had enrolled to learn the truths of the Bible, but those of us who believed the Bible to be God's Word were looked down upon and ridiculed to some extent. The teacher presented the view of some prominent theologians, that to study the Bible to find God's truths is like trying to see through a wall of bricks. The teacher thought that was extreme, and instead, he thought studying the Bible is like looking through a brick wall with a few colored glass bricks and the restricted view seen is colored and distorted. He looked at me as he said that evangelical Christians view the Bible as a plate glass picture window giving a clear undistorted picture. That was exactly how I saw it. His teaching didn't change the minds of any of the older Christians, but it did confuse the young college students. To offset his teaching I bought a book on biblical theology written by the sound evangelical Professor Ryrie at Dallas Seminary, and read what it said about everything the teacher taught. It kept my thinking straight and I passed the course anyway.

Work At Gilfillan

The second Gilfillan project I was assigned to work on was to design a radar antenna for the Army. This radar was to detect and track incoming enemy mortar shells, calculate the trajectory of the shell back to the point from which it had been fired, then provide that location to our own big guns to shoot back at the enemy mortar. All of that was to be accomplished before the mortar shell arrived, and in that short span of time everything had to be done by electronics with no moving parts. The contract to design the antenna had been won on the basis of using Gilfillan's

proven phased array designs for the Navy, like the SPS-30. My job was to adapt the earlier design to give optimum performance in the new application.

My design work at Gilfillan took place during Cold War struggles against Communist aggression around the world, and our troops were heavily engaged in the war in Viet Nam. My friend, Doris' brother Chuck Rose, was in Viet Nam at the time, and he had described the mortar attacks that frequently took place. All they had to use against the mortar attacks was an old World War II Foster scanner radar that was inadequate at best but wasn't even operational. It was motor driven, and that part worked. When mortar rounds were coming in, they would start the scanner motor going, which made so much noise that sometimes the Viet Cong would stop firing for fear that the noise meant they would soon be fired upon. Our troop's lack of proper equipment highly motivated me to achieve the best design possible for the new radar.

This new design incorporated the latest innovative improvement which was to replace the individual radiating elements of the phased array with pairs of elements linked to radiate together as identical pairs. Previous Gilfillan designs were based on several years' work in designing these types of antennas, and my group's new design improved on those designs of the past.

The procedure was a long, laborious effort. A model of the new design was built and tested, and changes made to correct any defects. A model with the changes was built and tested, and this procedure continued until the new design was perfected. During the work on this antenna we transitioned into writing a computer program that analyzed the measured data and predicted the design changes needed. At WL I had phoned such programs out to a computer located at another company, so I was familiar with the process. Gilfillan had their own computer and using it wasn't very different, but still slow in those days. My group wrote our program on a stack of cards, which was run during the night by a computer operator. The next day the results were ready for use. After some adjustment our program gave very reliable design results. The development of this procedure was the basis for very rapid array antenna designs in the future. I helped write the Gilfillan proposal to manufacture this anti-mortar radar, describing the antenna with computer-generated graphs displaying its performance capabilities.

Gilfillan was awarded the contract. Unfortunately a competing company contested the award, insisting they should have received it. The result was that the whole project was cancelled, and the U.S. armed forces got no anti-mortar radar. However, ITT was an international company with a division in West Germany that had been working to design a similar anti-mortar radar to use against the Russian threat from East Germany. After two years of effort they were unsuccessful, and with U.S. approval they came to ITT Gilfillan for assistance. Even though their antenna was smaller than the one we had designed, our computer program allowed us to provide the Germans with a complete design in only two days. I was glad they would be able to use our design to protect their people from mortar attacks.

Other activities at Gilfillan involved testing some antennas at a test range in the mountains north of the San Fernando Valley, and for a short time I helped at another Gilfillan site east of Los Angeles. These were routine assignments, but more memorable was when I assisted the Gilfillan group at their site near Sylmar just north of L.A. They were working on Air Force projects that used antennas on aircraft. These small, but complex antennas would be used to detect enemy radar signals that might be tracking a plane, and then show where the enemy signals were coming from so the plane could attack or evade. The antennas had been designed and were being produced, but they needed to be properly tuned. The detection and the tracking sections interacted so they could not be tuned separately. I was assigned to help because while designing the new parts for the Dazzle radar in Australia while at WL, I had found a way to tune each of two sections when both were active. Gilfillan had the same test equipment I had used at WL, and I only had to set up the equipment and lead the group through the tuning procedure. When I commented how easy it was, the response was that it was easy, yes, when one knew how. They learned how and my assistance was no longer needed.

Candidate Orientation

We finished the Bible study courses and accepted HCJB's invitation to attend the candidate orientation meetings to be held in Miami June 25th to July fifth, 1972. The mission sent a list of books to read, asked us to write reviews on two of them, write a 1,500 to 2,000 word essay on "The History of the Church in Latin America," and take both assignments to the orientation session. Doris' sister Charlotte agreed to come from her home in Syracuse, New York, to stay with the children, and her husband, Ward, came a few days later.

Walt and Dee Wilson had moved from Mission Viejo to Plano, Texas, a suburb of Dallas. When we saw that our flight to Miami stopped in Dallas for a few hours, we contacted them and arranged to meet at the terminal. We were heading into a trying period of scrutiny and evaluation that would end in either going to the mission field or not, and spending some time with them was fun and relaxing. We noticed a couple also waiting for the flight, not knowing at the time they were Dr. John and Mary Doerfer, also going to the orientation.

HCJB staff met us in Miami and took us to Miami Christian University where the meetings were held. The eleven couples and six single people who attended were housed on campus in the school dormitory. We were given an extensive number of tests to see if we could work well with others, if we were domineering or docile, could we accept authority, etc. We helped with kitchen and dining room tasks and one day cleaned and did light work at mission headquarters. Bible studies, teaching, sharing, testimonies, singing, a boat ride and swimming kept us busy. Dr. Abe Van Der Puy, the president of HCJB, and other leaders of the mission participated in it all. We were described as being a "colorful" group.

With just a few days remaining we all met and were called couple by couple into a room with three of the leaders who discussed personal issues with us, for example, what would it take for us

to give up and go home. The answer was easy – we would if any of our children could not adjust to living in Ecuador and were being harmed by staying. Finally they told us with smiles, and our joyful relief and thanks, that we were accepted to serve with HCJB.

In the remaining sessions we discussed the difficult process of raising support. We ordered a few different HCJB-prepared slide series and audio tapes about the mission to use with groups and churches, and after returning home we bought a good slide projector and tape player. We expected it would take about a year to raise our support. The Lord had led and provided for our needs this far and we would trust Him to provide for our finances as well.

Throughout the years the children were aware of, and participated in our thinking, praying and preparing to serve in missions, more so with Lorie because the boys were quite young. It was part of all our lives, and they never questioned it. During the orientation period we shared with the children at home by phone what was going on, and when we reported with joy that we would serve with HCJB, they accepted it as a matter of course. Lorie was to enter the eighth grade at L.A. Baptist High School and was old enough to understand that great changes would take place in her life. Actually, a relative had warned us not to go to the mission field, because she knew of some missionary children who could not adjust and were harmed by the experience. We had heard it before, and took it seriously. Our children were normal and well adjusted. We had prayed for them and committed them to the Lord's protection just as we trusted our own lives to Him.

Upon arriving home Charlotte and Ward had everything under control, and they returned to Syracuse. I was pleased that Ward had pruned our peach tree – its peaches were large and delicious that year.

Raising Support

Ahead of us loomed the significant task of raising our support and we knew it was beyond our capabilities. It would have to be the Lord's doing. So we prayed and asked the Lord to move in the hearts of Christians and churches as we presented HCJB's worldwide outreach through shortwave radio broadcasts. The Lord took over the task quickly.

Pastor Wells and a few others in the Reseda church knew of our plans to serve in missions, and we were about to bring them up to date on our current situation and ask to present to the church HCJB's outreach and the possibility of our part in it. Before we got to it, during a church service an altar call was given for those who would like to dedicate their lives to the Lord's service. Doris and I had already done that, but I suddenly felt the need to make a public dedication there in the church, and I and a few others went to the front. The man who counseled me was very interested that I was dedicating myself to serve as a missionary with HCJB. It turned out that he was on the missions board, and from that time on he was our representative on the board. Soon after that, one evening Doris was playing on the church women's softball team

at a game, and between innings a missions board member came up to her and cheerfully told her the board had just met, and voted to support us with $300 per month, almost half the $650 we needed at the time. We were surprised, amazed, and so thankful to the church and the Lord for this large amount, and for the church's desire that we be one of their many missionary families for whom they regularly prayed. Eventually we showed our slides to several groups in the church.

It was a new experience for us to look to others for support. We were used to giving, not receiving, and at first it was uncomfortable. It seemed it would be impossible to adequately express our gratefulness. Pastor Wells put us at rest about it when he said the only things we owed others were love and the gospel. Christians give to others as part of their service to the Lord, just as we always did.

Pastor Bob from the Central Islip church sent a list of Conservative Baptist churches in the Los Angeles area, and mailed each a letter of recommendation. We sent letters to them and to the Baptist General Conference churches in the Los Angeles area offering to present the work of HCJB, then followed up with a phone call. Most pastors said their missions budget was already stretched as far as possible, but when I explained that we would still like to present the ministry of HCJB, a number of them invited us to come. Visiting these churches kept us busy throughout that fall of 1972.

Since we had strong ties to churches in the Long Island area we wanted to visit as many of them as possible in the spring of 1973. Pastor Bob helped by sending letters to introduce and recommend us. It would require about three weeks away from my work at Gilfillan, so I requested a leave of absence without pay. Gilfillan did permit it, but if my position was filled before my return I would no longer have a job there. We went through the same process as with the California churches, and I set up dates for meetings. Mrs. Smith, an older woman who had been recommended as one we could trust, stayed with the children, and Doris and I flew back east to the people and places that meant so much to us for many years. The Central Islip church set up a meal schedule so we were able to visit in the homes of many in the church. It became the second church to pledge monthly support for us.

While there we stayed in the home of Evelyn Friedel, one of Doris' best friends. She was dating Joe Yankura, and they became engaged while we were there. Joe served on the Missions Committee of his Presbyterian church in Babylon. He recommended that the church support us, and after we met with the pastor and the Missions Committee it became the third church to pledge monthly support for us.

We spoke and showed slides at several churches in the New York, New Jersey and the Connecticut areas, and each was impressed with the outreach of HCJB, but could not increase their missions budget at that time. Support from churches did not come readily, but we were enthusiastic and glad to share how God was blessing and using radio to bring many to a knowledge of Himself. When we returned home I still had a job at Gilfillan.

Preparation for Language School in Costa Rica

We enrolled by mail in the Spanish Language Institute in San Jose, Costa Rica to begin classes in the fall trimester of 1973. We also enrolled the children in Country Day School, a private English-speaking school attended by children of language school students. This was based on our trust that the Lord would inspire churches, friends and relatives to pledge sufficient financial support and provide a buyer for our Woodland Hills home. Due to inflation the funds we needed had risen to $785 per month. There were still a few months before language school, and much to be done. We continued to visit churches when invited, but preparation to leave took most of our time.

Our realtor found a buyer for our house, a young man who was related to her who wanted to buy it as an investment. He didn't need to move in immediately, so we lived there until we left for Costa Rica. He paid us for the amount of equity we had in our home and took over our mortgage at the low interest rate we had been paying. It saved a lot for both of us, but was a very good deal for the buyer because the cost of real estate in the area shot up rapidly soon after we left.

Dub's wife Ruth put us in contact with Missionary Enterprises, a group that helped missionaries ship their things overseas. We only had to take our clothing to language school, but we had to decide what to take to Ecuador and what to sell. Ecuador did not allow furniture to be imported, but everything else was O.K. Mission staff advised us to take a washing machine, clothes dryer, refrigerator, stove, and box springs and mattresses rather than try to buy them in Ecuador. Kitchen and dining items, household items, tools, clothing, children's articles, and all small items we packed into fiber barrels. Missionary Enterprises put the large items and our five bicycles into crates and took all 18 pieces to their storage area until our eight months of language school were over, at which time they would truck it all to HCJB in Miami, who would have it shipped by air to Ecuador.

The last problem we had before leaving for Miami on our way to Costa Rica was with our Plymouth station wagon. The engine had stopped firing on one of the cylinders and I opened the side of the engine to find the cause. The faulty parts of one of the valve lifters were obvious, but when I tried to get replacements, the parts offered were not correct and the clerk didn't have any others. We were ready to leave, and there was only one thing I could do. I made and inserted in the lifter area a block of wood shaped to hold the loose parts in place, and closed the engine up. When I started the engine, it ran fine on seven of the eight cylinders, so we were good to go.

When we left our home on Long Island, we were uncertain about God's will regarding mission service. Since then God had led step by step and abundantly blessed in practical ways. We had peace knowing that His will is not done in our strength but by His empowerment and His life in and through us. When we left Woodland Hills we committed many things to God for Him to take care of. We knew the children wondered how it would be to attend school in Costa Rica and Ecuador. They were leaving their friends and a way of life they had become accustomed to. Would they be able to make new friends? At the same time they looked forward to the

excitement of new and interesting places and experiences. After all, we were a family, and they would be with Mom and Dad, who were enthusiastic about going and confidently making arrangements for everything.

Doris and I could go forward by faith that with God's help we would pass our language school tests, adjust to a different culture, our financial needs would be met, our children's needs would be met, and we could contribute to the mission's outreach with the gospel. For all this we could "trust in the Lord with all our hearts, lean not to our own understanding, in all our ways acknowledge Him, and He would direct our paths." Proverbs 3: 5 & 6.

Leaving California

We left Woodland Hills on July 18, 1973, to drive to HCJB headquarters in Miami, Florida. Since we would be away for three to four years we allowed sufficient time to sightsee and visit our families and friends. California would remain our official home while we were outside the USA, and our address would be our home church in Reseda. The church would handle any important mail that came for us.

We took the scenic route out of California, and stopped in Kansas and Missouri where we visited my family, installed the needed parts in the car, and spoke in three churches. We went on to New York State to visit Doris' family, then went to Washington D.C. to sightsee with the children, who had never been there before. It surprised us to see Gene Tucker, who grew up in the Central Islip church, singing solos with a military band behind the Capitol building. From there we visited Millie and Philip Baugh in South Carolina, who recalled that we once said there was no way we could serve as missionaries. At the prior invitation of the McDoles, a New Tribes missionary couple from our Reseda church, we visited the New Tribes training camp in Northern Florida. Then we went on to Disney World, where we enjoyed spending the day with the Moses family at Disney World. They were visiting friends who worked there and gave us all special passes for entry and rides.

Finally we arrived at HCJB headquarters in Miami on August 17, 1973. Before going on to Costa Rica we needed to dispose of our station wagon and get final approval to leave. When the staff at headquarters saw the good condition of the car they offered to buy it for their use. HCJB purchased our tickets (paid for from our account) to fly to Costa Rica and provided papers necessary to enter and stay for eight months. That completed our preparations, and we were set for our new life as missionaries, assuming we would successfully learn to speak enough Spanish.

Chapter 9

Costa Rica

1973 – 1974

New Challenges

We flew into San Jose on August 21, 1973 on tourist visas. San Jose is a beautiful city located in a tropical rainforest, with a mild, humid climate because of its elevation of 3800 feet above sea level. Everything was new to us, but we had plenty of help from our "big brother," Elroy Clark, assigned to us by the language school. Missionaries leaving language school often reserved their housing for the next family in their mission to arrive. Thus it was that we "inherited" an upstairs apartment within easy walking distance to the school and grocery stores. The Eric Moore family had lived there before going on to HCJB in Ecuador, and we chose to keep Olga, their maid. Having a maid cost little and was essential, since learning Spanish was a full time job for both Doris and me. Olga did the cooking and cleaning and knew how to prepare whatever we brought home from the store, and that made our lives much easier those first weeks.

The apartment had plenty of space for our family of five and we lived there for the eight months of classes. One interesting feature was that the main railroad tracks between San Jose and Limón on the coast passed about 15 feet from the front of the house. At first it seemed that the trains were coming through the house, but we quickly adjusted to the noise.

We had not been there long when we noticed small spots of blood on our sheets – only ours, not the children's. It was disconcerting to realize bugs were biting us, even though we didn't feel anything. We soon learned they were fleas jumping into the bed from cracks in the wooden floor, and spraying insecticide into the cracks caused them to disappear, for a while. Before long when little red spots appeared again we weren't alarmed. We just sprayed the cracks and the fleas disappeared until they hatched out again. There was a different problem in the boy's bedroom. At night with the lights out, cockroaches appeared on the floor. If one of the boys had to get up he would wake Doris or me to turn on the light, and the cockroaches would scurry away. Lorie was spared such things, but we all had to adjust to the shower. Water and its electric heater were turned on by a metal handle on the shower head, and we just had to trust that we would not be electrocuted.

The children's school began August 20, so they were only a few days late. They went by bus to Country Day School, the boys in fifth and third grade to the elementary school and Lorie to ninth

grade in a high school at a different location. Our trimester began August 29th, but we needed to arrive a week before to be interviewed, take a language aptitude test and sit in on lectures and films on language learning, as well as lectures on practical aspects of life at the institute and in San Jose.

We no longer had a car. Walking nearly everyplace we went helped us lose weight and firm up some muscles during those eight months. For longer distances there were plenty of buses to take. We knew no Spanish at all, and the first trips to the grocery store were a challenge. I usually went and, since shoppers had to ask for each item, I could only point to the things we needed. Once I tried English asking for beef steak, and to my surprise they understood. They were accustomed to language school students and were patient with us.

Learning Spanish

I never found out the results of my language aptitude test, but I began classes with the naïve idea that I only had to learn Spanish words and say them. What a lot I had to learn! Doris and I were in different classes, perhaps to avoid embarrassing each other. In the beginning my teacher spoke, and when he asked me to repeat the words in Spanish I discovered I could not make the words sound like the teacher's. They sounded like English, and I began to see that they had to be learned like a two year old child first learning to talk. My garbled words weren't understandable to the Latin Americans around me, and talking louder didn't help. I did gradually improve with time, and soon English was no longer permitted in the class room. At first, when the teacher asked me a question requiring an answer in Spanish, I would in desperation reply with Japanese words I had picked up during my time in Tokyo, not realizing I even knew those words. The teacher would scold and say I was using English. I had taken a class in German at St. Lawrence, and when Japanese failed, German came out of my mouth. The teacher still thought it was English. It was a bit comical. Soon my mental processes settled down, and began supplying somewhat garbled Spanish words.

My training in the analysis and solution of technical problems helped me understand the sentence structure and verb tenses of Spanish fairly quickly, but at age 45, I was very slow to develop the speech skills and memorize the vocabulary needed to carry on a polite conversation. Doris did better than I with speaking, and what was easier for me was harder for her. Even for other younger students, the pace of study was grueling, and out of that shared experience lasting friendships developed, even with those going to missions other than HCJB. Besides learning to speak Spanish, we were taught to fit in and adapt to the Latin American culture.

Lorie, Jim and Dave did well at Country Day School where they continued in the standard English language curriculum, but with Spanish included. Even though Spanish was only a small part of their studies, they progressed as fast as or faster than Doris and I studying full time.

Other Activities

Not all our time was spent studying Spanish. We visited two volcanos while in Costa Rica, joining other students going by bus. One was an active volcano near San Jose. We climbed by foot up the cone-shaped hill to the top, and looked down into the crater to a lake of rusty colored water. Gas bubbles came up through the water from below as we watched. We hadn't seen anything like that before, and Lorie, Jim and Dave enjoyed the experience. I thought of that volcano later when we felt a jolting earthquake one day while eating in our apartment with a guest. We didn't think much of it, after experiencing so many aftershocks in Woodland Hills after the big quake in 1971, until there was a loud scream from the Costa Rican family below our apartment. That got our attention.

I had opportunities to help other students with electronic equipment problems. One man, who was an excellent singer, used a tape player to accompany him. The player malfunctioned and I was able to fix it. I helped another with his wire recorder.

We frequently went with the kids to one of the few American-style fast food places in San Jose to enjoy pizza, burgers and ice cream. This helped ease all of us through the minor culture shock we were going through. It also helped that local Costa Rican boys were friendly and always ready to join with Jim and Dave in playing ball, and sometimes I joined them using what Spanish I could. Some from our orientation class in Miami were there with their children, and once a week we joined with them at a gym where the kids shot baskets and in general ran around and played with each other, discharging a lot of excess energy. Each Sunday our family went by bus to a small Costa Rican church.

The second trimester we served as "big brother" to Charlie and Gloria Carlson, HCJBers going to serve at the HCJB hospital site at the edge of the jungle in Shell, Ecuador. This required us to use what seemed like all the Spanish we knew and more besides. The school sponsored a helpful lecture/workshop series on anthropology and missions. The President of HCJB and his wife, Dr. and Mrs. Abe Van Der Puy stayed with us while they served as speakers for Spiritual Emphasis Week at the language school. When I wrote earlier of our church in Manhasset, I mentioned Marj as the widow of Nate Saint. She later married Dr. Abe and we were friends through the years at HCJB. A week after hosting Abe and Marj, the Ecuador Field Director, Dick Broach, stayed with us when he came for a few days to discuss field assignments with the HCJBers in language school.

Cahuita

We and two other HCJB families decided to spend a few days at a beach on the Caribbean coast. We planned to take a picturesque train ride from San Jose down the mountain to the coastal city of Limón . From there we would board another train going south, board a large canoe to cross a river, then go by bus to a small town called Cahuita.

The families were Marty and Sharon Erickson and their two children, (going to Quito to teach at the Alliance Academy,) and John and Mary Doerfer and their two children, (John to serve as a surgeon at Vozandes Hospital in Shell.)

What happened: Fog and rain blocked visibility more than 20 feet from the train as it slowly wended its way down the mountain, stopping at every little town. When we finally arrived in Limón toward the end of the day another couple who had gone to Cahuita ahead of us and come back, said that the accommodations at Cahuita were very inhospitable, and suggested we stay in Limón. We decided to follow our original plans, and boarded the train going south. We visited with some English-speaking people on the train, and we all exited the train at the same time as we stepped into the dark, foggy, rainy night.

When we gathered in the small, rickety station lighted by only one weak light bulb hanging from the ceiling, and counted our children, the Doerfers discovered their four year old daughter, Beth, was missing. Authorities held the train and the men searched for Beth, but they didn't find her. Alarmed, we searched and called into the thick darkness, to no avail. Then it occurred to us that Beth may have followed the others who got off the train, and crossed the river with them. Marty climbed the bank over the river and yelled across the river in Spanish, "is there a little gringo girl there by herself?" An answer came back that yes, there was.

With great relief we proceeded, with our luggage, to traipse through the rain and mud up the bank and back down to the river, slipping and sliding and blindly following the one ahead of us since we couldn't see a thing. The river was at flood stage and the current very strong from the heavy rain. Although told that it really wasn't safe to cross in the small boat which we could barely all fit into, of course we went ahead anyway and reached the other side safely, then followed single file through the rain and mud to a bus. It was so dark no one could see anyone on the bus, but when John called out "Beth, are you here?" a little voice answered "yes," and we breathed a sigh of relief and thanksgiving to the Lord.

The bus had no glass in the windows, no windshield, and no lights. But we were thankful for small things – someone stood next to the driver to point a flashlight onto the narrow, little-used road ahead. We finally reached our destination, the hotel which was an old, rickety two story building with a bar on the ground floor and a jukebox playing loudly. Upstairs were a long hall with our rooms off it, a large room with one wooden table and some benches and one dim light bulb hanging from the ceiling. The upstairs walls reached to about 6 inches from the roof of the building, so with the lights on all sorts of flying insects came in.

We unpacked the bread and cheese we brought to eat upon arrival, expecting to eat meals at the "restaurant" bar downstairs the rest of the time. While cutting the hunk of cheese Marty cut his hand deep enough that Dr. John had to attend to it, using his first aid kit.

Our rooms had only bunk beds — nothing else. Lorie, Jim and Dave were in a room across the hall from ours. When everyone was settled down and quiet, suddenly the three of them cried out for help. We rushed to their door, but couldn't get in because they had locked it. We asked them to unlock the door but they wouldn't get out of bed to do it. Lorie said Jim should, Jim said

Dave should, Dave said they should. Finally Jim did. Bats were flying around in the room with the kids hiding their heads under the sheets. They wanted to sleep in our room, or us in theirs, but we had only two small bunk beds, each barely large enough for one person. Finally, we let Dave, who was most upset by it all, sleep with me and the other two just had to keep their heads covered.

The next day we found the beach to be nearby and beautiful — white sand, palm trees and warm Caribbean water, with a thick stand of trees and jungle-like growth to the side. Mary Doerfer and Doris put our valuables — cameras, money, watches, etc. in one bag to carry to the beach. During the activity the bag was set down off by itself, and at some point it disappeared, never to be seen again! Someone must have darted out from the trees and taken it. Thus Marty was the only one left with money and a camera. We were thankful that John had insurance that covered everything we lost.

We stayed a couple of days and left sooner than we had originally planned. The stressful trip down and losing Beth, the rough minimal accommodations, the juke box keeping us awake, losing our things – all together had taken a toll. We took an uneventful trip further south (didn't have to cross the river) to a town which had an airport. The flight back to San Jose was through turbulent air and the small plane tossed around frightfully, causing everyone to feel unwell, an apt end to a vacation we will never forget.

As the eight months of language school came to a close in mid-April of 1974 we took a lot of time to review for the written and oral final exams, and thanks to the Lord's help we both passed. We got certificates of departure from Costa Rica and visas for entry into Ecuador from the Ecuadorian Consul in San Jose. All five of us had separate passports, so each had to get a certificate and visa. We flew out of San Jose on April 22nd (Doris and my 18th wedding anniversary) to Panama City, where we stayed overnight in the airport. We napped some, but Dave made an effort to stay up all night. He regretted that later when the effects of the oxygen-deprived air in the high altitude of Quito hit him harder than the rest of us. The early morning flight to Ecuador stopped in Guayaquil where we changed planes, and then went on to Quito. Finally we were missionaries on the field, looking forward to a part in heralding Christ Jesus' blessings. Doris was 40 years old; I would be 46 in June.

Chapter 10

First Term at HCJB

April 1974 – May 1977

As our flight neared Quito we could see the mountainous terrain and a couple of magnificent snow-capped mountains before the plane lowered down between some rugged hills to come to a landing. Amidst the confusion and hustle of the crowd entering the country all five of us had our passports and official papers checked, we found our luggage and took it through customs, then waited to be allowed to leave. Finally we emerged and met the official HCJB greeter, Joe Christopher, who drove us to the HCJB compound, where we saw for the first time the area we had seen so often in photos and slides.

Our "big brother," Chuck Hutchinson, met us there and took us to his home, where we met his wife, Sylvia, and two children, Rusty and Scott. We stayed with them about two weeks while they helped us search for an apartment to rent and wait for our shipment of household goods to arrive. Missionary Enterprises had taken our barrels and crates to Miami and HCJB staff had shipped them to Quito by air. We soon found a nice apartment in the Jipi Japa section of Quito within walking distance to the HCJB compound and the Alliance Academy where the children would go to school. The apartment was the first floor of a two-story house. We met the owner who lived upstairs, Marko Vargas, a Captain in the Quito police force. The shipment of household goods soon arrived at the airport. When customs officials gave permission, I, the boys, and some HCJBers who borrowed a truck picked it up from customs and moved us in.

During our time with the Hutchinsons, Chuck Rose, my old friend and Doris' brother, pleasantly surprised us with a phone call from a Quito hotel where he was staying. He was a Lt. Colonel stationed at the Rock Island Military Base in Illinois, visiting Quito with other military officials to discuss a military assistance program for Ecuador. It was good to spend some time with him, and at one point Marty Erickson drove us all to see the transmitter and antenna site in Pifo.

We had arrived in Quito a few weeks before the end of the Alliance Academy school year, and Lorie, Jim and Dave attended classes for that short time, enough for them to become familiar with the school and its routine.

Quito, Ecuador, and HCJB

The Andean city of Quito is located in the northern highlands of Ecuador and flanked by volcanos, some of them snow-capped and visible from the city on a clear day. Mt. Pichincha, an

active volcano over 15,000 feet high looms over the western side of the city. One of HCJB's broadcasters called it "our friendly neighborhood volcano." Quito is about 9,300 feet in altitude, and day temperatures run in the 70s during the two seasons, rainy and dry. It was a very pleasant place to live, but it took some time to adjust to the thin air at that height.

The population is made up of different people groups. About 14%, the lowest class, are Indians descended from the Incas and more primitive tribes isolated in the jungle. Mestizos, impoverished descendants of the Spanish conquerors, and mixed blood people make up about 72% of the population, and 6% are the wealthier, educated Spanish descendants. Ninety five percent of the population is Roman Catholic.

In 1930 the founders of HCJB, Clarence Jones and Reuben Larson, assigned its name. It had to start with the international call letters assigned to Ecuador,"HC." The men wanted the last two letters to form a slogan in Spanish and English, and decided to use "J" and "B," to form the Spanish slogan "Hoy Cristo Jesus Bendice," meaning "Today Christ Jesus Blesses," and the English slogan "Heralding Christ Jesus' Blessings." In order to raise funds in the United States for the new station the men had to form a legal corporation, and they called it "World Radio Missionary Fellowship."

The mission's extensive and varied outreaches in and from Ecuador always surprised and impressed first time visitors to HCJB. I will give just a limited overview of what HCJB was like when we arrived because I can't do justice to all that was in place. I need to point out that the numbers I give increased as the years went by. Located on the 2 ½ acre compound in Quito were 10 –12 language services with a total staff of about 40 missionaries. They used 10 broadcast and recording studios to produce programs in their native languages that were aired to countries around the world. A state of the art print shop manned by three or more missionaries printed literature, pamphlets, missionary prayer letters, even books. TV programs for release on Spanish TV stations were prepared by four missionaries. Nine missionaries staffed The Bible Institute of the Air and produced Bible correspondence courses in conjunction with radio and TV programs. Engineers numbered 24, six of whom lived and worked at the transmitter and antenna site in Pifo. Support services, staffed by missionaries and some Ecuadorian employees, included a small commissary, a post office, a business office, secretaries, administrators, and a mechanic to repair mission vehicles.

Across the cobblestone street from the compound the well-equipped 53-bed Rimmer Memorial Hospital, also known as Hospital Vozandes—Quito, operated with a staff of about 36 health care providers including missionary doctors with a wide range of specialties, missionary nurses, technologists and various assistants.

Fourteen HCJB missionary teachers, along with teachers from other missions, taught at the Christian and Missionary Alliance School for missionaries' children, located next to the hospital and across the street next to the HCJB compound.

The antennas and transmitters that directed and powered the radio programs around the world sat in a beautiful valley near the small town of Pifo, eighteen miles east of Quito, a 45 minute drive on mountainous and winding roads.

To get from Pifo to HCJB's hydroelectric power plant 25 miles away at the small town of Papallacta, it took at least two hours, driving over a narrow treacherous dirt road which crossed the Continental Divide at 13,500 feet above sea level, then back down to the plant at 11,000 feet. The plant supplied electricity to the transmitters in Pifo and had enough surplus to sell power to the Texaco Oil Company nearby and the city of Quito.

Further afield at the edge of Ecuador's eastern jungle HCJB's second hospital, Hospital Vozandes—Shell, provided surgical, out and inpatient care, intensive and emergency care, maternity, ophthalmology, laboratory and pharmacy services to local patients, as well as to many from jungle villages in cooperation with Mission Aviation Fellowship.

In the coastal city of Guayaquil, HCJB operated an FM station called HCJB-2, and in Panama assisted an AM/FM station called HOXO. In the years to come I would help briefly at both stations.

When we arrived, the HCJB missionaries in Ecuador numbered about 200 plus 30 short term workers, and at Miami headquarters about 17. Fifteen years later the total of them all had grown to 450.

Since the beginning of HCJB in 1931 many changes and much growth took place, but the staff always depended on the Lord for direction and provision and focused on working together to spread the gospel of Jesus Christ to the ends of the earth. Funds and staff needed to carry out the various ministries were scarce. HCJB missionaries came from many different cultures, languages, and religious denominations, and worked in a country foreign to them. Such circumstances could easily cause tensions between missionaries, and while that did happen sometimes, all had the same goal of sharing the gospel with the lost, were serving the Lord they loved, and without fail that love extended to each other. That made us a special family of believers.

Our Work

We had no car at first, but we could walk or take a bus to many stores. Doris sometimes went with other missionary wives to buy fresh food at the outdoor market toward the center of town near the Central University. Inexpensive fresh fruits, vegetables and meat abounded. Fruits new to us, such as maracuyas and naranjillas, when pared, deseeded, blended and sugar added, made delicious juice. In the early years of our stay few foods came frozen, packaged or in cans. We

often sliced beef roasts for steak, especially the very tender lomo fino, known by us as filet mignon.

There were no hard and fast rules regarding the number of hours a missionary wife should work in mission assignments. We hired a maid. The mission recommended that families do this so that wives could work in a mission ministry to the extent it would not compromise the welfare of the home. Most wives with children worked half time, either with work that could be done in their home, or outside the home in various places around the compound – language services, the school, the hospital, etc.

Doris was assigned to the English Correspondence Department to help process an average of 1200 letters per month. Letters from listeners helped the engineers learn signal strengths and interference on the bands so they could adjust the frequencies. Statistics compiled from the letters influenced program content, as they showed over 50 percent to be under 25, over 90 percent men, and 85 percent unchurched. Replies to the listeners included information about HCJB and Ecuador, gospel tracts, and counseling.

Doris agreed to work half days, but it was not unusual for her to take letters home to process in the afternoon or evening. She received a lot of satisfaction being busy with work she knew was important in spreading the gospel.

I was assigned to work in the Engineering Department at the transmitter and antenna site in Pifo. Pifo-assigned engineers with children in school lived in Quito, and along with some Ecuadorian workers rode each day to the broadcast site. Driving east from Quito, at the beginning of a winding hilly road, on a clear day we could look 15 miles across a beautiful valley and see HCJB's antenna towers standing tall at the HCJB transmitter and antenna site. (As shown on the cover photo.) I took this trip every day, to work at my desk and in the field to design and oversee construction of antennas. There were six houses on the site where engineer families lived, and a building housing seven transmitters and offices. Another building served as a schoolhouse when there were young children living there and a teacher was available.

Up through 1948 HCJB's broadcasts originated from antennas and transmitters located on the compound in Quito. The mission leaders wanted more antennas and stronger power to be able to broadcast further, but to do that they needed a location outside the city with more space, and they purchased a 45 acre site in Pifo. Antennas installed there were used to broadcast to North and South America, Europe and Asia. Some of the antennas were lost in a rain storm when lightning struck the main support tower, and all the other towers collapsed too. When I arrived, new, far better antennas had been built to replace the old ones, and plans had been made for more antennas, some of which were partly assembled.

I arrived just in time to watch the erection of two support towers for a new 49 meter shortwave antenna to broadcast to North and South America. Herb Jacobson, who had designed

the antenna, directed the tower-raising. It was impressive to see the towers go up, pulled by a D-7 Caterpillar tractor by a block and tackle arrangement, while Ecuadorian workers pulled on ropes to help guide the towers until they were vertical. Then they attached guy cables to ground anchors that held the towers in place. A good-sized group of spectators had assembled to see the action. Raising towers would be part of my job from then on.

Herb Jacobson was needed for other projects, so I was assigned to finish the new antenna. I worked on it more to complete the design, then mounted the antenna structure on the standing towers and took measurements, which showed the antenna band width was too narrow. Based on things I'd learned at Wheeler Laboratories, I added four more wire cables to the radiating part. This more than doubled the bandwidth, and when the tuning parts were added the performance exceeded requirements. The added wire cables gave the active antenna a three-pronged appearance, and someone quickly dubbed it the Pitchfork Antenna. This new antenna and its transmission line from the transmitter building were the first ones rated up to 250,000 watts (250 kW) of power.

Of course I didn't do all that work alone, but with the assistance of a crew of Ecuadorians employed by HCJB. They had several years of experience working on antennas and towers, so we made good progress. I worked with the Ecuadorian crew to make sure everything was done correctly, and climbed the 250 feet tall towers too.

Many antenna projects had been planned before I arrived, so there was a full-time work load ahead of me. John Stanley, Jim Heck, Dave Pasechnik and others handled the day to day operations of airing the programs sent from Quito to Pifo via FM.

John Stanley pointed out that no antenna or funds to build one existed to broadcast Spanish to Columbia, Venezuela, and the islands of the Caribbean such as Cuba. I designed a relatively small, short-range antenna to broadcast 50 kW of power, used left over materials from an old collapsed antenna and remnants from new antennas, and I and the Ecuadorian workers built one. Then I prepared a report of the antenna gain and shape of the radiated beam, including predicted signal strengths in areas covered by the beam, and John put it on the air with afternoon Spanish programs.

To our surprise many letters from listeners came from Spain, far beyond the range I had predicted. The response drew the attention of our program supervisors, who informed John and me that this programing was directed into an area of South America reserved for another Christian broadcaster. We had to discontinue broadcasting in Spanish, but continued to broadcast with the antenna in English to that area and the Southeastern United States.

John also pointed out that one of the antennas for sending English programs to the Eastern and Midwest areas of North America also sent Japanese broadcasts to Japan. The great circle route to Japan (shortwave beams always travel great circle paths, the shortest to the target areas) is along the West Coast of the North American continent, so most of the broadcast power was being

wasted. It was fairly simple for me to install a switch and some extra transmission lines in the antenna to shift the beam direction west to broadcast Japanese, and also Spanish to Central America and Mexico when desired. The beam could then be switched back to the east for English broadcasting.

The next antenna, to broadcast English to New Zealand, Australia and the South Pacific region, had been partly assembled and I finished the design. Since the supporting towers were already in place, it was only necessary to assemble and attach the antenna to the towers. Next I tested the antenna, designed and installed the tuning components, and as always, prepared a final report on its performance.

Not all my time was spent designing and building antennas. Soon others noticed the usefulness of reporting on the performance of the antennas, and asked me to provide performance reports for the existing antennas. I already had the mathematical equations programed into the HP calculator I was using, so was able to calculate the beam shapes and gain for each antenna.

Near the end of our first year in Ecuador, the need arose for additional antennas to broadcast shortwave to North and South America. Two antennas in Pifo, one facing north and the other south, were not in use because the bands they operated in did not propagate. We decided to replace those antennas with ones designed to work in effectively propagating bands. I designed the new parts, they were assembled, tested and tuned and we had the antennas needed to broadcast to North and South America. The old parts were available to reinstall when those bands were needed again.

HCJB's long range plans were to install a large reflector antenna with the capability to steer the radiated beam over a wide range of angles. This steerable antenna would be driven from a 500 kW transmitter, which HCJB would design and build. "Catch the Vision," a World Radio Missionary Fellowship book edited by Marilee Dufendach, relates the story of the transmitter:

"Building the big "500," a genius of modern-day broadcasting, was a formidable, pioneering task which took five-and-a-half years. HCJB assigned twelve engineers to the team with Herb Jacobson as senior design engineer, Don Spragg as project manager, and Steve Hunter as general project director.

In 1975 the first two engineers moved to Elkhart, Indiana, where Clarence Moore had provided space in his electronics plant, and the use of his tools and machine shop, with his engineers available as consultants. (This was the same Clarence Moore who, as one of HCJB's first engineers, had won international acclaim by inventing the cubical quad antenna.)

Many major changes were required to make space for the steerable antenna in Pifo: move the standard AM broadcast antenna and 50 kW transmitter from Pifo to a site on Mt. Pichincha to broadcast in AM from there; construct a building on Mt. Pichincha to house the transmitter; modify the transmitter before moving it; build a standby antenna at Pifo to continue broadcasting in AM while the new site on Pichincha is being prepared; work on the steerable design and oversee its assembly. All these things were my responsibility to complete.

First, I modified the transmitter. The work had been started, but needed a lot of improvement. I completed the design and mounted the new parts in the transmitter, making it ready to be used on Mt. Pichincha.

Next to deal with was the standby AM antenna, for which I chose a rather unique approach. Four towers on the edge of the Pifo property supported a shortwave antenna. Two of the towers on one end of the shortwave antenna would make a good AM antenna while still supporting the shortwave antenna. It was relatively simple to jack up one tower and put an insulator under it, ground the other tower, then connect a wide top-loading cap from the top of one tower to the top of the other, to form an AM folded antenna. I installed a 72-wire radial ground plane and connected it to the grounded tower, and the AM antenna was complete. The AM transmission line was then extended out to the antenna and with some relatively simple tuning it was ready for service.

The next task was to lower the original AM antenna tower, and prepare it to be reinstalled on Mt. Pichincha. I lowered the tower by the same method the towers for the first antenna had been raised, only gently lowering instead of raising it, with a long pole and block and tackle. Everything went well until the tower was about 2/3 of the way down, and one of the guy cables broke. That allowed the tower to buckle near the middle, and the rest crumpled to the ground. The crumpled section was saved as a kind of art exhibit, and I straightened the bent sections. Even so, I chose to use new, heavier and stronger tower sections for much of the new AM tower, because of the wind force and potential icing conditions at the 13,000 foot altitude of the Pichincha site.

Toward the end of 1975, we installed the refurbished AM antenna tower on Mt. Pichincha. Seventeen 20-foot tower sections, tools, materials to pour concrete including water – everything we needed to do it had to be carried up the steep mountainside in a small pickup truck over a poorly maintained switchback dirt road that caused the Ecuadorian workers to yell in fright the first few times up and down. I didn't think we could get around all the corners and under some of the trees with the 20-foot tower sections, but we did, sometimes collecting a few tree branches.

There were challenges with the work itself. I selected a location for the antenna tower we prepared and toted up the mountain, and for a second tower which would be put in later. The

Ecuadorian workers put in a steel-reinforced concrete base for the tower, then bolted the tower sections together. There wasn't a level space long enough to lay them out in a straight line, so we dug a trench through a small hill. Four sections were used as the lifting pole to erect the first 220 feet.

With no space for the caterpillar tractor to pull up the tower, we had to use a winch truck. To prevent the tower from going past vertical and falling on over, we hooked a cable to an old Ford pickup truck to restrain it. For this tower raising I had carefully calculated where each stabilizing guy cable and anchor should be, and as a result the tower went up with no problems. However, the one who drove the pickup left too much slack in the restraining cable, and the tower began to fall on over. When the slack went out of the cable it lifted the front of the pickup to the full extent of its springs and the wheels almost left the ground. The driver feared that he would be catapulted right over into the deep canyon just ahead of him, and he was shaken up a bit.

After the 220 foot section was securely guyed in place, the lifting pole was lowered and dismantled into separate sections. Using a pulley arrangement each section was raised up and bolted to the top of the standing part until the full height of 315 feet was reached. Even 315 feet weren't quite tall enough for the AM frequency, so I added top-loading to the tower in the form of a triangular halo supported by the guy cables, and that completed the antenna structure. Here is some of what I wrote in a letter to our supporters about what happened:

"Working in an office was never like this! How can I describe what it's like to work on a mountain in the high Andes? The grandeur and beauty of Quito all laid out 3000 feet below, and the valleys, mountains, and snow-capped peaks defy description. 'The heavens are telling of the glory of God; and the firmament is declaring the works of His hands. Psalms 19:1'

"Although we're on the equator, it is cold on Pichincha and heavy coats are necessary. Of course, the air is thin, making the climb up the 315 foot tower difficult. The rainy season was in full swing when we raised the last section of the tower. I'll never forget that cold water on the colder steel tower and how it felt on my hands. The water running down my sleeves as I climbed to the top was uncomfortable, but nothing compared to the snow and sleet as it hit. We had lightening too! My head was out of the top of the tower one day when I heard the loud buzzing and crackling of static electricity. I knew a lightning bolt was about to pass between the ground and the cloud overhead. You wouldn't believe how fast I can climb down a tower! The bolt actually hit the mountain peak above us, and when it did, the whole tower lit up for an instant like a florescent bulb.

"The steep dirt road up the mountain became a muddy mess in the rain. Sliding and skidding down it was a nightmarish experience, since it was always through dense fog. What a road! Twice we had wheels over the edge, and many times they were in the ditch or stuck on steep spots. The truck broke down many times, including the steering twice. One time, driving slowly, I had a head-on collision with a car. Through all this the Lord has wonderfully kept us from injury or tragedy."

Next we constructed the building to house the 50 kW transmitter. Metal wires inserted in the walls shielded the interior from the strong RF (radio frequency) currents outside. Trenches in the floor for power cables and a special opening in a wall for the 50 kW transmission line to exit to the antenna completed the building. The transmitter and AC power installed in the building gave the AM broadcasts from Pichincha better coverage from the high altitude than from Pifo.

We recognized that once the AM radio station on Mt. Pichincha was on the air, a 50 kW transmitter dedicated to standby AM service would be unused most of the time. Therefore we decided to modify the transmitter so it could also broadcast in shortwave to Ecuador, Columbia and Peru, and free up a five band transmitter to broadcast in shortwave around the world. The modification required about $5,000 for new parts, since they were not available from the scrap pile we used for the antennas. Unfortunately the engineering department had no money for the parts, and the transmitter work had to be delayed. During the summer of 1977 Jim Heck and his family returned to the U.S. on furlough, and by the time he returned in late summer he had raised the full $5,000 from his supporting churches. Still, we weren't permitted to begin the transmitter assembly until early December, although all of the design work had been completed for several months. We had a deadline of early March to complete everything for the new broadcast schedule.

We worked long hours, John Stanley to install the AC power and control wires, and I to make and install the RF circuit parts and the transmission line parts and ducts needed to connect to the antenna. The Ecuadorian workers helped a lot with my work, and other engineers helped John. At one point even a school teacher living in Pifo helped John with the extensive wiring. The work was completed, and the new 50 kW transmitter went on the air just in time for the new schedule. With the new improved antenna, the new transmitter provided as strong a shortwave signal as the old 100 kW transmitter and antenna, and much stronger in many parts of Columbia.

My Dad

Back while working on the South Pacific antenna I received the news that my father had passed away on January 1, 1975, only three days before his 71st birthday. HCJB arranged for a flight home to be with my family, while Doris and the children stayed in Ecuador. My sister Joan and her husband Bill met me at the Kansas City airport, and we traveled to Fort Scott for Dad's funeral. It was a sad time for all of us. Dad had a massive stroke as he and Mabel returned from the southeastern part of the country visiting Mabel's relatives. He was buried in the Fort Scott cemetery next to my mother who had died earlier. I remained with my brothers and sisters while we took care of Dad's affairs.

Non-Technical Activities

We appreciated the fine Christian and Missionary Alliance school where all the teachers were missionaries and Spanish and Bible classes had high priority in the curriculum. Aside from studying, Lorie kept busy with sewing, cooking and photography; Jim and Dave with go-carting, bicycling and sports.

Jim and Dave liked to go to Pifo where there were many interesting activities. They got to know the Ecuadorian employees, who were very friendly with them, and as a bonus the boys were learning to speak Spanish. Jim discovered a gasoline powered washing machine engine, wheels, tires and other parts stored at the site. When he learned they were parts for a motorized cart planned by a missionary about to leave Ecuador, he wanted to use them to make a go-cart of his own. I bought the parts, and Jim and I, with Dave looking on, sketched the plans for one. Ramon Diaz, the HCJB Ecuadorian machinist and welder, helped a lot by welding odds and ends of scrap and it was soon completed. It had an angle iron frame with motor, clutch, brake, steering bar and seat. Jim, Dave, and Lorie enjoyed driving it around the site.

A few years later we moved to an HCJB-owned apartment on a side street where it could be ridden, so we took it there. It attracted a lot of attention, and not only his school friends, but a number of missionaries enjoyed riding it. Eventually we sold it to another M.K., Danny Osterhause, who enjoyed riding it around the area.

A Vehicle

An agent HCJB hired to help missionaries deal with legal papers helped us through the red tape to get a driver's license. We bought a small Mazda pickup that was modified by cutting off part of the truck bed and adding a back seat to the cab. All five of us easily fit inside, with plenty of space for baggage in the covered bed. The car worked fine until the engine stalled when we tried to drive up steep mountain roads. Going up Mt. Pichincha, or to the snow line of Mt. Cotopaxi, sometimes all but the driver had to get out and push. The thin air of the high altitude was part of the problem, but I figured out that on steep hills the fuel formed a vapor lock when the gas tank was far lower than the fuel pump. I installed an electric fuel pump back at the gas tank to put pressure on the gas line, and that solved the problem. Even so, in the thin air the small engine struggled on steep hills. When we drove to the beach at Atacamas or Manta it was amazing how much more power the engine had there. We owned that car as long as we were in Ecuador, but as the children grew space for the five of us seemed to decrease.

Our First Trip to Shell

We took a trip to Shell Mera, 94 miles from Quito at the edge of Ecuador's eastern jungle, to visit our friends, the Doerfer family. John was serving as a surgeon at Hospital Vozandes–Shell. This hospital, in cooperation with Mission Aviation Fellowship (MAF) which flies in patients from many jungle villages, is the main base for missionary outreach to Indian groups in the

jungle east of Shell. We thought we left in plenty of time to arrive in mid-afternoon. The main highway from the south end of Quito made its way down the central valley of the Andes, passing snowcapped mountains on the right and left. Beyond the cities of Latacunga and Ambato we turned east and Chimborazo, Ecuador's highest snow-capped mountain, loomed up before us. Soon we passed through Banos, a small city at the base of a very tall, cone-shaped active volcano named Tungurahua. Quickly the road turned left, took us past a heavy waterfall, then into a one-lane tunnel that needed our lights on to warn oncoming traffic not to enter while we were in it. From there the narrow, winding dirt road cut into the side of a steep mountain on the left, with just enough width to keep us from falling into a deep canyon on the right where, hundreds of feet below, water from the large waterfall formed a river which ran all the way to Shell. Soon we came to the "car wash" where water came down the mountain on top of our car. Travelling on, when we met an oncoming car, truck or bus, one of us had to find a place wide enough to stop and let the other pass. On some curves we waited while a bus or large truck backed up and went forward a few times to get around a sharp curve. Once we forded a stream crossing the road. Just as the road started to improve we came to a long line of cars waiting for a bulldozer to clear a landslide that had blocked the road. After a long wait cars started moving, and I didn't think our small car could get through the deep churned up mud, but we made it across. As we approached Shell it was getting dark. We knew in a general way the location of the Doerfer's house, but were relieved to see John walking home so he could direct us. It was an enjoyable visit with the Doerfers, and the boys renewed their friendship with Johnny, whom they knew well in Costa Rica. Then, we retraced the challenging route back home.

Sightseeing

The Indian culture is centered around family groups. They live in and near their own cities scattered throughout Ecuador, and some develop their own industries for income. The Otavalon Indians are one such group, well known for the colorful clothing and articles they sell to tourists. Attending Saturday sales events in Otavalo involved a 45 minute drive north through the scenic countryside where butchered hogs for sale were hung up in places along the road. Other towns of interest along the way included one where wood carvings were sold, and another that specialized in leather goods. A favorite tourist spot was the Middle of the World monument, where the Equator is marked out by east–west and north–south lines, and we could stand with one foot in the Northern Hemisphere and the other in the Southern.

Lorie and Janet work in Hospital

Lorie decided in the summer of 1975 to volunteer as a candy striper in the HCJB hospital. Her friend, Janet Williamson, daughter of Pastor Bob and June, came to also work in the hospital and the French and English language services. They were a common sight around the compound

wearing their red and white striped jumpers. It pleased them that they were allowed to help in the operating room and observe all kinds of surgeries.

A Sad Event

I had been driving the mission van to Pifo and back for several months and knew to be cautious on the narrow winding roads where accidents were not uncommon. One day as I drove back to Quito and passed through the small town of Kumbaya, a young boy about seven years old, looking back at another boy chasing him, ran across the street into the side of the van. It happened so fast I couldn't avoid him. I walked back to the boy lying in the street, and many people quickly appeared, along with a policeman. His parents were there and I asked them to come with me and the boy to the HCJB hospital in Quito. A friend saw me drive up to the emergency entrance and summoned the head of the Ecuadorean staff, a lawyer, for help. The policeman had followed me to the hospital, and, since in Ecuador the driver is guilty until proven innocent, he planned to take me to prison. The lawyer said I needed to be admitted to the hospital for observation because of the shock of the accident, so that's where I went, accompanied by the policeman to guard me.

The dent on the van clearly showed the boy hit the car, rather than the car hitting the boy, and there were many witnesses to the accident, so the judge, who came to the hospital, ruled that I was innocent. He ruled that I should pay all costs related to the accident, which was covered by the HCJB insurance plan. I was in the hospital for over a week, and everything looked hopeful that the boy would recover, but he died suddenly from undetected internal injuries. It was a sad time for everyone. We prayed for the humble Indian family and had to just commit it to the Lord and move on. We don't know why God allowed it, and we're looking forward to finding out when we get to heaven.

Miscellaneous

In September, 1975, twenty two lives were lost in a political revolt as two factions of the Army fought for about 12 hours near the presidential palace in downtown Quito. All was quiet in our area in the north end of town.

The next summer, just before Lorie's senior year in high school, she worked at the hospital in Shell and at the hospital in Quito again. Another activity to note is that Lorie and Doris learned to be control operators and enjoyed controlling some HCJB-produced live broadcasts. There was a Pioneer Girls program for English-speaking children, and Doris served on its committee. I started teaching the junior boys Sunday school class at English Fellowship Church, where we attended.

It was good to have Ken and Judy Williamson visit. Before coming they asked what we needed, and they brought many things, even some clothing. In those early years we couldn't get

many of the usual things easily found in the U.S. For example, peanut butter was always appreciated, since that made in Ecuador was a disappointment.

Ecuador and HCJB were special to us, and we were proud to show them off to our guests. We enjoyed taking them to the usual places, including Shell. On one visit to Shell we and a few others went with Dr. Nelson on a medical checkup trip to the jungle village of Chi-tas, walking through a muddy sugar cane field and crossing a small river on a narrow log to get there. The people were pleased to see us and invited us to sit on benches in a circle, then passed around a bowl of chicha for us to drink from. We knew that to make it they chew on a special root, then spit it out and wait for it to ferment. Most of us only pretended to take a sip. We did enjoy breaking off a piece of sugar cane to chew on as we walked back to Shell.

School resumed in August of 1976 with Dave in 6th grade, Jim in 8th and Lorie a high school senior.

The Lord Provides

We didn't have our full missionary support pledged when we arrived in Ecuador, but trusted the Lord to provide for us. He did just that in ways we couldn't have imagined. Michael Toman, who worked with me for a short time, decided to leave HCJB, and wrote to the First Federated Church in Des Moines, Iowa, to recommend that the support they were giving him be transferred to us. After we sent information they requested, they took on that support, and continued as long as we were active missionaries with HCJB.

Shortly after my accident our friends Phil and Millie Baugh and their two boys visited. Phil and a partner had purchased a hardware store in Florence, South Carolina, which was flourishing under their management. Phil and Millie wanted to give us more support, and they asked how much we needed to come up to the full amount the mission required. It had been raised a few times, and we didn't know, for we just lived on what the Lord brought in. Millie looked over our account file, figured the amount to be $300 a month, and they contributed that amount from then on.

We appreciated just as much the other friends and family who faithfully supported us month after month and kept us in their prayers. We knew we could trust the Lord to meet our support needs, and it was a blessing to see how He did it.

Each fall annual business meetings held at the Quito compound drew the staff together from headquarters in Miami, Radio HCJB-2 in Guayaquil, the hospital in Quito and at the edge of the jungle in Shell, and nearby Pifo. The mission's trustees conducted their own meetings then too. Each year a well-known pastor from the U.S., such as Kent Hughes, Gordon McDonald, David Hocking, and Stuart Briscoe challenged us each day. Each department submitted its annual report, for example the Department of Evangelism gave the following statistics for the year: there were 35 campaigns, most initiated by national churches … 200 people came to the Lord

directly as a result of the film ministry … about 10 as a result of the telephone ministry … several come each day for spiritual help ….

A Steerable Antenna

Carl Smith, president of Smith Electronics in Cleveland, Ohio, had built a model of a steerable antenna, but the actual antenna had not been constructed. After HCJB decided to build it, we took the necessary steps to prepare a site in Pifo for its construction, as I described previously about moving an antenna and transmitter to Mt. Pichincha. During my first term at HCJB, as I worked on other antennas in Pifo I also worked on designing the steerable. Its design and construction was my most challenging project during my years at HCJB.

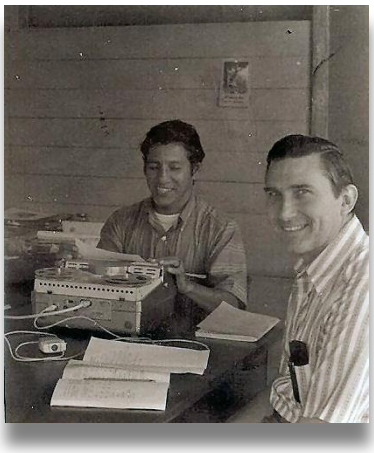
The beam would cover from Japan on the west, to North America on the north, and around to Europe and North Africa to the east. The size of the large band-shell shaped reflector, (similar to the reflector in the headlight on a car) would be 558 feet in diameter and 246 feet high, consist of 18 miles of horizontal and vertical wires woven together somewhat like a giant basket, be supported by a 417-foot tall steel tower, and held in shape by attaching six miles of cable from it to seven 156-foot tall towers evenly spaced around the back.

I carefully surveyed the location of the antenna and supporting towers, completed the design of the towers, and, while they were being constructed in the HCJB shop, other Ecuadorian workers put in the concrete tower bases and guy anchors.

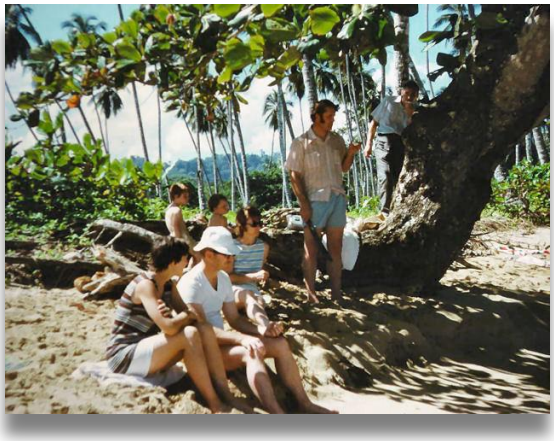
The 417-foot center tower was much taller and heavier than any that had been lifted at HCJB by the boom method. I calculated the force to lift it would be 20 tons, so I used a five strand block and tackle to reduce the bulldozer pull to four tons. Even so, the compression on the boom would be 14 tons, and on the tower itself 12 tons. I used out-rigger cables on the boom to prevent buckling.

When everything was ready to raise the tower we prayed for success. Many of the engineers were assigned to monitor potential problem spots. All of us had hand-held radios to communicate if trouble developed anywhere. The calculations and preparations proved sufficient as the tower began to rise smoothly without problems. We adjusted the guy cables as the tower rose higher, and all went well until it was nearly vertical. At that point the tower began to bow and seemed about to buckle. The command went out to stop. Stop! The truck following the progress of the tower to prevent the tower from going past vertical was stuck and couldn't move forward with the tower. When we pushed it, it suddenly went too far forward. The tower sprang back straight, then over the other way, and for a moment wagged like a dog's tail before stabilizing. What a relief when the tower was vertical and guyed in place. An HCJB broadcaster had taped a running commentary as the event took place, and aired it on one of his programs later. Many photos were taken as the tower went up, so we used the audio and slides together and had an interesting slide show to use in presentations on furlough. I and the Ecuadorian crew put

up the seven back towers without incident, and we were ready for the next step — designing and building the reflector.



Don at language school



Cahuita beach,Costa Rica,the Doefers in foreground

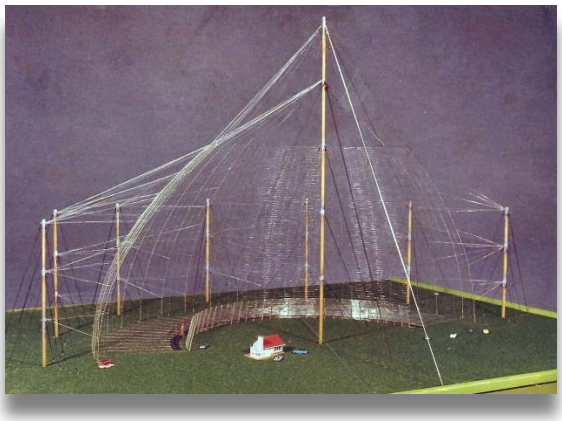
Boys with friends in San Jose- Jim & Dave far left, John Doerfer, Kevin Carlson far right

San Jose, Costa Rica, upstairs apartment next to railroad tracks

Pifo Staff – Bill & Jackie Wright w/Brent, Janell & Kari, Don & Doris, Mark & Carol Kerk with David, Marian & Stan Houghton, Trish & Tim Roberts with Tiffany

Lorie, Jim, Dave, Rusty Hutchison, and Cookie with the go-cart

Don using HP calculator to design steerable antenna reflector



Steerable antenna model *

***HCJB Global Photo**

Chapter 11

Our First Home Ministry Assignment

(Also known as furlough)

May – December 1977

As our first Home Ministry Assignment (HMA) drew near there was much to do. Doris needed to arrange meetings with supporters, produce a slide series of the tower-raising, finish the technical brochure she had been assigned to write, prepare the apartment for another family to rent, oversee packing for the five of us, and complete numerous other details. I had many technical tasks to complete, including work on some details of the steerable antenna design.

Leaving involved many mixed feelings. Lorie would graduate from the Alliance Academy and "leave the nest" to go to Houghton College in upstate New York. Working in the Vozandes hospitals had influenced her and Janet Williamson to pursue nursing as a profession. They planned to take pre-nursing courses at Houghton for two years, and then transfer to Columbia University in New York City for two years to earn a B.S. degree in nursing.

Doris and I looked forward to seeing family and friends, yet knew we would have to become the "missionary speaker," much harder than doing the work on the field. Yet, we were excited about the Lord using radio to send out the gospel of Jesus to far-reaching places, and wanted to share about it.

Right after Lorie's graduation on May 22, 1977, we flew from Quito to Miami on a chartered flight, jokingly called the "rapture flight," because after graduation so many missionaries left at the same time. Lorie would not be able to go to California with us, so as a special treat we allowed her to fly from Quito to California to visit the Moseses and her friend, Miriam Moses, and join us a week later.

New York State

At HCJB headquarters in Miami we picked up the car Millie and Phil Baugh had sent for us to use. The boys wanted to go immediately to MacDonald's for hamburgers to satisfy a four-year yen. We felt uneasy using dollars instead of the Ecuadorean sucres we were used to, and were unprepared for the complicated menu that confronted us. Driving north, we visited Disney World with colleagues Norm and Kay Emery and their three boys, and then went to the Baughs in Florence, South Carolina for a few days. Lorie flew in from California and joined us. From there we stopped in New Jersey to see old friends from Central Islip, Kathy and Ralph Rennard, then went on to Oneonta, New York to visit Doris' mother. The next two months we shuttled between

church meetings in upstate New York and Long Island. In July we took Lorie to Houghton College to register before going again with her later when classes began.

The Mid West

The end of July we said good bye to Doris' mom and headed west to Michigan to attend meetings during HCJB week at Gull Lake. Millie and Philip had rented a house there and our two families stayed in it for the week.

The next stop was at the First Federated Church in Des Moines, Iowa, where we met the people who had decided to support us because of Michael Toman's recommendation. They were enthusiastic about the outreach of HCJB, and contributed $1000 toward the cost of an antenna I planned to build to broadcast to the Amazon Valley section of Brazil. Their pastor, Tom Allen, arranged to visit us in Ecuador a month after our return.

Traveling on to the Missouri and Kansas area we visited my family and attended the family reunion in Greenfield, Missouri. After a quick trip to Texas to visit Walt and Dee Wilson, and some church meetings back in Missouri, we went on to California.

California

Arriving in California the end of August, we settled in for the next four months at the missionary house of our home church in Reseda. Lorie had begun college at Houghton, New York, and Dave and Jim started seventh and ninth grade at L.A. Baptist where Lorie had attended before. It was good to be back home with the people and places that held so many memories from the past. Doris' sister Charlotte and her husband Ward had moved to the Valley from Syracuse, and we saw much of them. The next four months were crammed full of meetings with Reseda church groups, other churches in the area, and friends. I repaired an air conditioner and did other maintenance at the mission house and purchased parts for our refrigerator, washer and dryer back in Ecuador. We also enjoyed fun activities with the boys such as visits to Magic Mountain and Disneyland.

To New York, Long Island, Miami and Ecuador

December 17th we and the boys left Reseda and headed for New York to pick up Lorie at Houghton College and spend Christmas with Doris' mother and the family. Since Janet Williamson also attended Houghton, after Christmas we took Lorie to the Williamsons' to ride back to college with her. We said good bye to Lorie, not knowing when we would be together again, stayed a couple nights with Millie and Philip, and then went on to Miami.

Home Ministry assignments were not vacations. We had been busy and on the road a lot, but we enjoyed sharing with our supporters the vital part they had in sending the message of salvation through HCJB broadcasts to a world of lost people. Jim, Dave, and Lorie part of the

time, didn't complain about the long car trips, although when we had to speak at a meeting they were always relieved if they didn't have to attend. During this seven month period we made about 48 church and 28 home presentations, traveled about 20,000 miles going up the east coast from Miami to upstate New York, back and forth to Long Island, to Michigan, Texas, Los Angeles, and back to New York and Miami. January 3, 1978, the four of us left for Ecuador and our second term at HCJB.

Chapter 12

Second Term at HCJB

January 1978 – May 1981

Back to Work

Upon returning from home ministry assignment Doris and I went back to the same areas of work as before, although Doris' responsibilities increased to having charge of the correspondence office. The boys resumed classes at the Alliance Academy with Jim finishing ninth and Dave seventh grade, and Lorie would finish her first year at Houghton College.

HCJB planned to expand and improve the broadcast ministry, and needed new antennas and transmitters to be designed in addition to the partially completed steerable. The first antenna I worked on was to broadcast Spanish and Quechan Indian dialects to Ecuador, Peru and Bolivia. Since these were relatively close, the new antenna was modest in size, completed and ready to broadcast in April 1978. The second, to broadcast to the Amazon Valley of Brazil in Portuguese, and in Japanese to the colonies of Japanese people who settled there, required a large antenna to broadcast over the high Continental Divide located near Pifo. The beam of the antenna would strike the steep slopes of the mountain and reflect in unwanted directions unless I took special care with the design and location. I wrote a special computer program that included several slope angles on the mountain, and then found a place in the antenna field where the radiated power would provide uniform signal strength all the way to the Atlantic Coast of Brazil. In March 1979 when the antenna began broadcasting, the signal was strong, and later was used to broadcast to Central Africa.

Representatives of the Association of Christian Quechua Indians of Ecuador came to John Stanley, director of Pifo, to request a radio station dedicated to their use. HCJB had already helped them with two small AM stations, but they wanted something that covered all of Ecuador. Both John and I were eager to help them. It would require a tropical band shortwave transmitter and antenna of 5 or 10 kW to give a strong signal. The three million Quechua Indians in Ecuador liked to listen to their radios from 4:00 AM, and we chose an all-night, tropical band frequency. HCJB approved the project, the Quechua church provided the funds, and John and I designed and built the transmitter and antenna. Designing the transmitter was an unusual task for both of us since the usual HCJB transmitter designers were still in the U.S. designing the 500 kW transmitter. The antenna design was unique in that the signal was directed almost vertical to the ionosphere and reflected back down to fit the boundaries of Ecuador.

The new Quechua transmitter and antenna went on the air in May, 1979 with a good signal. So many Indians bought radios that many stores ran out of them. Soon the Quechuas requested a second transmitter and antenna to broadcast during the daylight hours, and we designed and built those also.

Family Activities

Lorie and Janet completed two years of pre nursing schooling at Houghton College and were accepted at the Columbia University School of Nursing in New York City. The Lord provided a job for Lorie in western New York before she started at Columbia in the fall. At Columbia, Lorie, Janet, and Carolyn Huber, a friend from the Central Islip church, lived in Maxwell Hall and took some of their training across the street at Columbia Presbyterian Hospital. The boys had part time summer jobs at HCJB. David helped in the English correspondence office and worked with locks and keys, and Jim copied tapes for the International Programs Department and operated the central control room which sent out all the HCJB programs.

In many ways it was a blessing for the children to grow up in Ecuador. Lorie lived there only four years, but it was home to her, and we were pleased to have her home for a month at Christmastime. The children had friends from a cosmopolitan group of people working in the embassies, at Texaco Oil, and other businesses. The missionary children were from Australia, Japan, Canada, Europe and the USA. Many of them lived in dorms in Quito while their parents served in outlying areas of the country. The school was the center of this group which formed a kind of "third culture," not the culture of their home country or of Ecuador, but one uniquely their own.

Jim was friends with a classmate, Bob Stuck, and Bob's older brother Don and younger sister, Ruth. Bob's mother, Joyce, a widow, served with the Gospel Missionary Union at the jungle mission station of Macuma. A small hydro plant there provided electricity, but Joyce did not have a washing machine that worked. Joyce made arrangements for us to visit one weekend during the summer when the Stuck children were at home. Doris, Jim, Dave and I drove to Shell and from there took a Mission Aviation (MAF) flight to Macuma, landing on a short dirt runway. I was able to fix the machine and hook it up to electricity.

Macuma, an area inhabited by the Jivaro Indians, or as they preferred to be called, the Shuars, in the distant past had been headhunters, known for shrinking heads. Joyce needed to attend a Shuar graduation ceremony at a small school miles into the jungle. We all went with her, at one point slogging through a huge swamp wearing rubber boots that we sometimes walked out of when they stuck in the mud. Doris and I visited Macuma again with Millie and Phillip Baugh to show them the ministry and to discuss the possibility of installing a radio station there.

Word came in 1979 that Charlotte's husband, Ward Mackey, passed away after a long battle with cancer. A close member of the family, we would all miss him greatly.

We moved from the apartment to an HCJB-owned duplex not far from the compound, and a "third son" was added to our family. Mike Del Aguila's parents had been transferred from Quito to serve with Wycliffe in Guatemala City. Mike, David's friend, wanted to continue to attend the Alliance Academy, and his parents allowed him to live with us during the school months. Mike was fun-loving, out-going and enjoyable to have as part of our family. He now is a doctor working as a specialist in epidemiology.

As a Christmas present for the boys we accepted another addition to our family, a butterscotch-colored Cocker Spaniel puppy we named Chica, meaning "girl" in Spanish. Her antics and liveliness constantly entertained us. Jim, Dave and Mike were good players on the high school basketball team. We spent many evenings at the games, and afterwards listened to them wind down as they reviewed the plays of the games.

One of our favorite places for outings was HCJB's hydroelectric site at Papallacta. It had a refreshing country atmosphere with cows on the grounds and the Papallacta River flowing through the hydro plant. The boys caught trout in the pools of the river – the fish actually leapt out of the water to snap at the dry flies.

Holidays in Ecuador were usually celebrated quite differently than we were used to. Every year on the fourth of July the American Embassy in Quito invited Americans to the ambassador's residence for hot dogs, hamburgers, games for the children and candy from the U.S. that we couldn't get in Ecuador.

At Christmastime the poorer Ecuadorian mothers and their children, often wearing masks, went door to door saying "navidadies," for us to give them clothes, toys, or food, reminding us of Halloween back home.

On New Year's Eve many dressed up a dummy to look like an old man. This represented the Old Year and all the bad and evil it contained. At midnight this effigy is burned as a symbol of destroying and putting away the past and the New Year can be started fresh and clean. Also, New Years was the time we encountered young men wearing masks who stopped traffic on the streets, brandished a toy gun (we hoped they were toys) and let us proceed after we gave them some money.

The kids enjoyed one particular custom of the carnival period in February when young people filled balloons with water to throw at each other and anyone nearby. One never knew when a pick-up truck passing by might have a large store of water in the back and throw a pail full of water on pedestrians and other vehicles.

During our second term an unusual event surprised us. A short term missionary brought his Honda-250 motorcycle to Ecuador and when his term was up he decided to give it to Jim and John Tocknell, another missionary. Jim was happy as could be when we allowed him to accept it, and we became half owners of a motorcycle. Because of his age he couldn't get a license to ride it. I could barely ride a bicycle and didn't feel competent to handle a motorcycle, but Doris had enjoyed riding her brother's motorcycles and she agreed to get an Ecuadorian license. The way it worked out, she rode it to an off-road location, usually at the base of Mt. Pichincha, where Jim could ride it, and the rest of us followed along in the car.

Technical Activities

HCJB had become a powerful voice carrying the gospel to every continent. Ecuadorian officials and the people in general also appreciated its outreach inside Ecuador through local broadcasts, healthcare and other ministries. I noticed it when I was with a group in an out–of–the–way rural area. We stopped to ask directions from some people, and they hesitated and asked who we were. When we told them we were with HCJB, they immediately treated us as friends, warmly gave directions and offered to assist in any way they could.

That regard extended into technical areas as well. When we moved from the apartment to the duplex we had problems with electrical power. The voltage was low and frequently tripped off. The house wiring seemed to be adequate so I checked the power lines outside. The houses in the immediate area were fed from a three phase Y-connected overhead line, and nearly all were connected to the same phase. That one phase was way overloaded, so I got in touch with the power company to suggest they connect us to the phase with the fewest houses connected to it. When they learned I was an HCJB engineer, they simply gave me permission to shut the power line down and connect to any phase I chose. I was amazed that they seemed to think HCJB people could do everything. I borrowed the HCJB power line pole to switch off the power line, climbed up the electric line pole and changed our connection to the least-used phase. (As Doris walked home from the compound, from a distance she saw someone working high up on the pole, and getting nearer she could hardly believe that it was me.) After connecting the switch again, we had full voltage and more reliable power.

HCJB engineers often helped Ecuadorian radio stations with problems. The first time for me was to investigate why a station on the southern outskirts of Quito was not being heard in the city. The station had been providing a fair signal, but after installing an antenna tower and radial ground wire system, they couldn't be heard at all. I saw that the placement of the tower and ground wires created a V-shaped antenna pointing 45 degrees into the air and the radiated beam was passing above the city. I advised them to move the tower and reinstall the ground wires in a symmetrical pattern around the tower to send the beam into Quito. I never heard if they followed my recommendation.

Other requests came to repair and improve the Quechuas' 5 kW and 1 kW AM transmitters and antennas in Colta and near Latacunga, and later improve their tuning circuits. Another Quechua station had similar problems, and when I opened the antenna tuning box I found that an opossum and her babies had crawled inside and been killed by the RF power. It was a sad sight, but when removed the station worked fine.

Along with the more urgent Ecuador, Peru, Bolivia and Quechua antennas, I continued to work on the design of the focusing reflector for the steerable antenna. For good focusing the surface shape had to be very precise. The wire grid that formed the reflecting surface was under tension, and to limit the tension the wires needed to sag, and I chose 3% as an acceptable amount between support points. The horizontal and vertical wires were made in long continuous lengths crossing each other like a woven basket. Preformed wire grips held the wires together at intersection points. Each wire was laid out on the ground, and each intersection point was marked in preparation for assembly. There were about 10,000 intersection points, so there was a lot of measuring to do, and that with the wires under tension to include the stretch.

To calculate the lengths of wire, I had to derive mathematical equations, and write a computer program to speed the process. When the intersecting points had been calculated for each wire, missionary Norm Emery and some others from Quito came to help mark the wires and assemble the reflector, for I didn't trust that to the Ecuadorian crew. I was pleasantly surprised at how fast the work went, for the reflector was all assembled, supported by the main tower, and held in shape by the back towers, all in under two months.

The next step was to design and build a small antenna inside the giant reflector to send a wide beam of radiated power up into the reflector that focused the wide beam into a narrow strong beam. At first this small antenna was not movable, but located to point the focused beam directly into Russia. This part was completed by December of 1979, and when connected to a 100 kW transmitter, it gave a good signal into Russia. The gospel messages going out from it made all the work and calculations worthwhile.

The completed 500 kW transmitter designed and built in Elkhart, Indiana, arrived in Pifo in the late fall of 1980. The engineers who had worked on it returned to Pifo and installed it in a specially built room in the transmitter building. During its reassembly I modified three of our existing antennas to operate at 500 kW of power, one to broadcast into Europe, another to South America and the other to North America. I designed 500 kW transmission lines and with the Ecuadorian workers connected them to each of the modified antennas, and also to the 500 kW steerable antenna.

Chapter 13

Second Home Ministry Assignment

May – October 1981

Graduations, an Engagement, Jim off to College

By the beginning of 1981 Ecuador was in turmoil. Peru and Ecuador went to war in January, and President Roldos declared a State of Emergency. We made plans and arrangements for our second HMA to begin in May, 1981. Lorie would graduate from Columbia University School of Nursing in New York City on May 19th. Jim would graduate from high school at the Alliance Academy May 23, and begin fall classes at Azusa Pacific University (APU) located in the San Gabriel Valley East of Los Angeles. Since both Doris and I could not attend both graduations, Doris would attend Lorie's, and I Jim's. The time passed quickly and Doris and Dave left May 9th to settle in at the missionary house in West Islip, Long Island that our supporting church in Babylon provided for us. They would attend Lorie's graduation and help her vacate Maxwell Hall. Then she would stay with us in West Islip.

Jim and I remained in Ecuador until May 29th. I took our Cocker Spaniel, Chica, to the family who would take care of her while we were gone. By then the other half owner of the motorcycle had left Ecuador, and Jim and I gave it to an engineer who was happy to have it. Jim went with his senior class to the beach. Graduation took place as scheduled, with a tea at school afterward and a party in the evening next door at the Balzars. Everything went well until May 24, when the president of Ecuador and his wife were killed in a plane accident. All the schools closed including the Alliance Academy, which cancelled three days of exams. It didn't affect Jim or his class since they had graduated, and Mike rejoiced that he didn't have to take finals. In a few days the airlines flew on schedule, we got Mike off to Guatemala, and Jim and I left for New York City as planned.

In late 1980 Lorie had become interested in a young Christian man she met at Calvary Baptist Church in New York City, Bill Wendt, and they became engaged in February with plans to marry that October. On meeting Bill, we found him to be as exceptional as Lorie had portrayed him to be. Bill lived in New Jersey with his family, worked in Manhattan for Lever Brothers as a Distribution Analyst and was studying to earn a M.B.A. degree.

Both Lorie and Janet Williamson graduated on a beautiful, joyful spring day. Doris and Dave enjoyed the day with Bill, his parents Leonora and Bill Wendt, Janet's fiancé Jim Keane, and Janet's mom and dad, Pastor Bob and June Williamson. The graduation ceremony on the main

campus of Columbia University was crowded and impressive, but with 7,200 graduates they couldn't pick out Lorie or Janet. A smaller ceremony for just nursing students was held outside the Columbia Presbyterian Hospital. A few days later Jim and I arrived from Ecuador, and the five of us settled down in the mission house in West Islip for about two months.

Chuck and Betty Rose were living in Canada, and offered to sell their Ford to us. It was a large car in excellent condition, just what we needed to drive across the country two times. HCJB friends also on furlough, Marty and Sharon Erickson, and Doris' mother visited. We spent time with her and relatives in upstate New York and spoke at her church. The Central Islip church had us to speak twice, and we spoke at the Babylon Baptist Church that owned the house where we were staying.

It was good to be with Lorie while we lived together at the mission house and we got to know Bill when he came on weekends. Doris enjoyed helping Lorie pick out her wedding dress and helped make wedding plans. Lorie passed her nursing boards in July, thus becoming an R.N. She was hired to work as a nurse at Mt. Sinai Hospital in New York City. A realtor helped Bill find an apartment in Fort Lee, New Jersey, where Lorie would live after we left for the West Coast and where the two of them would live after their honeymoon in Bermuda. It was near the George Washington Bridge, convenient to the employment of both.

Soon it was time for us to head west. We and the boys helped Lorie move into the apartment, and then left for California. We stopped to visit my family and relatives, and then went on to occupy the missions house at Reseda Baptist Church in the San Fernando Valley. We helped Jim enroll at APU and get started with classes. His major was Business Administration. There was a short time to bring the church up to date on our work at HCJB and visit friends. It wouldn't work out for Dave to start school there since we needed to return to help Lorie with wedding preparations, so we had made arrangements for him to fly back to Quito, stay with friends Norm and Kay Emery and their boys and begin his junior year at the Alliance Academy. We regretted that he would not be able to attend Lorie's wedding.

Lorie and Bill Married

With David off to Quito, and Jim set up at APU, we drove back and stayed with Lorie in her apartment in Ft. Lee. Bill's friends and relatives had given her a shower earlier in the summer, and we went to Smithtown with her the week before the wedding where the ladies from the Central Islip church had a shower for her. She had completed most of the wedding preparations before we got there, but there was still much to do. After the rehearsal the evening before the wedding Bill's parents served a special dinner at their home for the wedding participants. She and Bill were married at Calvary Baptist Church in New York City October 17th by the pastor, Dr. Donald Hubbard, in a beautiful, meaningful ceremony using the vows Lorie and Bill had written. Jim flew back from APU to attend, and relatives and friends of both Bill and Lorie were

there, including Doris' sister Charlotte from California and Chuck and Betty Rose from Canada. Doris' mother and two brothers had planned to attend, but couldn't because Jerry's son had been killed in a hunting accident. The reception, including dinner, was next door to the church in the Regency Room of the church-owned Salisbury Hotel.

Lorie and Bill left for a honeymoon in Bermuda, Jim went back to APU in the Ford, and we left for Quito, arriving October 23 at about 7:00 AM. The Lord had blessed abundantly and allowed us to have a memorable, joyful five months with loved ones and sharing the gospel message.

Chapter 14

Third Term at HCJB

October 1981 – August 1983

Back Home in Ecuador

It was good to be back home again and see Dave, who with a few engineers met us at the airport. He got along very well with the Emerys but was happy to have us back. We were saddened to learn that someone had stolen Chica, probably when the gate in front of our duplex was left open by mistake. Mike moved in again, and he and Dave settled down to school work and basketball. A relative of Chica's mother, owned by a teacher of the boys, had a litter of puppies, and the teacher offered to give a puppy to the boys. We said O.K. and thanks, and David named him T.J.

Helping Hands

HCJB launched a program called "Helping Hands," and I became more involved in helping other radio stations in Ecuador. The largest project was to design and install a new AM antenna tower and tuner for Radio Ingapirca in the Cañar province near Cuenca. I also assisted with transmitter repairs and tuning for Radio Ondas in Cuenca, and designed and helped build and install a new FM antenna for the owner of Radio America in Riobamba, then tuned his transmitter to work efficiently into the new antenna.

A group of missionaries from Sweden, in Ecuador to develop agricultural products to improve the diets of the Ecuadorian people, wanted to install an AM radio station in Santa Rosa. I helped them design and build a 1 kW transmitter, and then build an antenna that best covered the area they wanted to reach.

During our time in Ecuador I designed a number of small antennas for higher frequency communication purposes: an FM antenna for HCJB programs to Quito, one for HCJB communication between Quito and Esmeraldas on the coast, two for repeater stations for the HCJB fleet of cars and trucks, and designs for Texaco to communicate between Quito and the oil fields in the jungle east of the Andes.

When the HCJB studio-to-transmitter link frequency changed from the FM band to microwave, many listeners in Quito requested that the FM be continued. I designed and built an FM antenna, installed it on the tower on the HCJB compound and connected it to a low power transmitter. The new FM signal covered all of Quito and a short distance beyond.

Transmitters

As I gained experience in designing transmitters, I noticed that the HCJB 50 kW transmitters were not running at their best efficiency, and some listeners reported that the audio was weak. As time permitted I studied the problem, and made some minor repairs and modifications. Then I wrote some computer programs that computed the best voltages for maximum efficiency. After tuning to the new settings the three 50 kW transmitters delivered the full power with 100 % modulation, where before they had provided only 40 kW. Not only that, but they required essentially the same AC power to produce 40 kW as was needed when set up for the full 50 kW. The lost 10 kW was being wasted in heating the transmitter tubes, shortening their lives.

The three 100 kW RCA transmitters operated in a completely different way than our 50 kW transmitters, and Jim Heck asked me to analyze them. They were difficult to tune and Jim often had to assist the Ecuadorean operators. Jim followed all the instructions for tuning up, but wondered why those directions called for rotating two tuning knobs in opposite directions after completing the tuning. I hadn't worked with the RCAs, and studied the manual to learn how they worked. I often felt God gave me insight and understanding of the antennas and smaller transmitters I'd designed, but more so as I analyzed and wrote a computer program for the RCA transmitters. When I ran the program and made a graph of the results, it showed that there was a tuning problem that could not be corrected that was causing the output tubes to heat up, thus causing their relatively short lives. The problem was just a fact of life with those transmitters which had given years of faithful service with clear audio for our listeners. They had a lot of moving parts that were about worn out. The decision was made to replace them with new 100 kW transmitters of the latest design using a solid state high efficiency modulator and automatic tuning and would have minimum maintenance and long life. Eventually they were replaced, one by one.

Hydro Power Grows

When the 500 kW transmitter went on the air it doubled the power of our shortwave broadcasts, but it also nearly doubled the amount of AC power needed to run the transmitters. Plans had been made to increase the power generated at the HCJB hydroelectric plant at Papallacta to meet that need and also to have more power to sell to the Ecuadorian power grid for income to meet operating costs. I had very little part in that massive project, but I marveled at how the Lord provided to meet that need.

The existing generator had an output of nearly two megawatts, and the new one was to be six megawatts. A lot of design work was needed and an engineer at Duke Power Company in North Carolina donated much help designing the new generator and turbine. He also helped locate a company in Europe that would manufacture it for us at a reasonable price.

A greater amount of water was needed for the larger generator, requiring a new dam at Lake Loreto and a larger settling basin and dam at Papallacta. A new bulldozer was needed for that

work, and no money was available. That was no problem for our God! A church in California not only shipped over the bulldozer, but also sent a man to operate it, and his wife helped with meals for the working crew. My small part was to survey the basin of the brook from Lake Loretto, and estimate the amount of soil to be removed to form the settling basin upstream of the new dam. Two new tall and heavy control gates for the dams would pass just the amount of water needed for the turbine driving the generator, but HCJB didn't have the equipment to lift them into place.

It was amazing to see how the Lord took care of the smallest detail. A young man felt God directing him to go to HCJB in Ecuador. He was an explosive expert and didn't see how that could be useful at HCJB, but thought maybe God wanted him to use his gift of singing and playing the guitar. Meanwhile a group had come from the U.S. to install a gas pipeline from the oilfields to Quito for the Ecuadorian government. They needed an explosives expert and didn't have one. They did have the heavy equipment we needed, so they agreed to install the gates in exchange for help from our explosives expert. Some didn't think a Christian should work with the rough pipeline installers and besides, thought they would not fulfill their part of the agreement. The young man knew God had sent him so he did the work to the best of his abilities while maintaining a quiet Christian witness. The pipeline people were so impressed with the young man that they not only installed the gates, but also provided a helicopter to place power line poles on the mountain slope for bringing power to Lake Loreto to control the gates there.

After the new generator was in service, the old generator needed to be rebuilt. A fine Christian man, Charlie Snyder, came from Canada with his son and daughter and put it in like-new condition. We still needed more standby power for emergency situations, and the Lord provided funds for a 600 kW diesel generator that fulfilled that need.

Summer and School Year of 1982, 83

About the time we first arrived in Ecuador Clayton and Helen Howard launched a club for those who listened to shortwave radio as a hobby, and called it ANDEX. Doris' work in the tape library and the English correspondence office decreased as she worked more and more with ANDEX helping to get the bi-monthly paper published and mailed to a growing membership. Ruth Stanley, who had become the director of ANDEX, lived and worked in Pifo, and Doris drove there three times a week to help. She also began a program of study with Azusa Pacific University to attain a Master of Arts in Social Science degree. The program helped people living abroad, such as missionaries and teachers, to continue their education in the area of human resource leadership. Each year professors from the United States, usually from Azusa Pacific University, BIOLA, and Fuller Seminary, led a week of concentrated classroom instruction followed by year-long study projects. As a result of these studies Doris received an assignment to help the Publicity Department write and edit articles.

God blessed us abundantly the summer of 1982 when the whole family came together. Dave worked in the Locks and Keys Department; Jim came home for the summer and worked in the

HCJB business office. We were surprised when he came down with a mild case of the mumps. He returned to APU for his second year there. His time at home overlapped Lorie and Bill's special treat of a three week visit. It was fun for Lorie and us to introduce Bill to what had meant so much to Lorie — our colleagues, the mission sites, and the beautiful country of Ecuador. We drove to Shell, and from there MAF flew them to the jungle mission station at Macuma. Bill and I climbed to the 16,000 foot-high refuge on Mt. Cotopaxi, and we went to the beach on the Pacific Coast.

Dave graduates from High School

We were pleased that Dave wanted to be baptized. When Ron Cline, the pastor of English Fellowship Church, baptized him, he gave a good testimony about accepting Jesus as his Savior.

Visiting the Galapagos Islands was always on the back of our minds, but it never fit in with our work and other activities. However, we gladly allowed Dave the special experience when the opportunity came for him to go there with a group. Some of his comments: he did not get seasick, the many sharks in the water never bothered people so the group went swimming anyway, coral cut up his feet, he snorkeled a lot, seeing the tropical fish was thrilling, he had a great time in spite of the heat and mosquitos.

Back in California when we anticipated serving in Ecuador, we didn't know how our children would fit in to the new way of life, but we trusted that God would work it out to His glory and their well-being, and He did. We didn't plan the timing of our first term of service so that each child's graduation and our need to be with them in the U.S. would come at furlough time, but He did. Not only that, but Jim graduated from high school the same time Lorie graduated from college, and her marriage fit in then too. How convenient for us all, and our work on the field was not unduly affected.

1983 was Dave's year to graduate, and Mike's too. Mike's mother came to be with Mike two months before graduation and they stayed at the Wycliffe guest house. The class decided to go to the beach for their senior trip, and sent four boys to Atacamas on the coast to find and reserve a place for them. Soon after, two of the boys came down with malaria, so the seniors were not allowed to leave the mountains. They went to a recreational area near Otavalo and enjoyed swimming, water skiing, horseback riding and miniature golf. The graduation went well, and I had a small part in it by leading in prayer.

Chapter 15

A Short Home Ministry Assignment & Fourth Term at HCJB

1984 - 1988

Dave left soon after graduation and went to California to stay with Jim and find a summer job. Then he would start school at LeTourneau College in Longview, Texas, to major in Computer Science Engineering. Doris and I needed to qualify for a short HMA, so we didn't leave Ecuador immediately. No longer needing to live in Quito because of children in school, we and the boys' dog, TJ, moved to Pifo. The Kerks, our neighbors, graciously kept TJ, and we left August second. We took a bus from Miami to the Baughs in Florence, South Carolina, picked up a car they gave to us, and drove to Don's sister Joan's home in Missouri. There we met up with Jim and Dave, who had driven from California. From there we drove Dave to LeTourneau to begin his first year of classes.

Lorie and Bill's came next, then a missions conference at our supporting church in Babylon, Long Island, and a visit with Doris' mother in Oneonta, NY. In October we went on across the country to California, house-sat a Reseda church member's home and shared in meetings about HCJB's outreach. Then we drove to Texas and left the car with Dave, and by the beginning of January we were back in Pifo starting our fourth term at HCJB. As I write this it seems we were caught up in a whirlwind, but at the time it was just a typical Home Ministry Assignment.

Actually, it was not just another furlough. Upon arriving in Pifo, it hit us, especially Doris, that we had left all our children back in the U.S., and we now faced the proverbial "empty nest." Busyness had only delayed thinking about it. To add to that, TJ was gone. He had often scouted the area with Tara, a German shepherd living at the site, and one day Tara came back but TJ didn't. The Kerks put up lost dog and reward signs in Pifo, and someone brought around a Cocker Spaniel, but it wasn't TJ. Sightings of him were reported, and Doris searched for him in Pifo, but he had disappeared. We suspected someone stole him, but we'll never know.

We had not been back long when Don and Lois Spragg offered to give us their Cocker Spaniel, Butterscotch, who was TJ's sister. One of their girls had developed an allergy to dogs, and Doris was happy to take her with the understanding they would keep her when we would take a scheduled trip to Panama. She was quiet, obedient and lovable, and had lived in Pifo before when the Spraggs lived there.

We attended the only Protestant church in Pifo, a small Baptist church whose pastor enthusiastically preached the gospel. As we sat on the hard benches in the informal services and listened hard, our comprehension of Spanish increased.

Work on the steerable antenna was progressing as I hooked up the new 500 kW transmission line between the antenna and the 500 kW transmitter, and no problems developed. The steerable capability had not yet been built into it, but we could broadcast to the Western U.S., Japan, and Eastern Russia.

The Lord Provides Again

Time after time the Lord provided funds for HCJB's engineering team in the midst of serious financial needs. There were no funds available when we planned to begin replacing our worn out 100 kW transmitters. They were priced at $350,000 each. However, Harris, one of the top transmitter companies in the U.S., was moved to donate a surplus 100 kW to us, just for the cost of shipping!

In the months ahead when the steerable antenna would be functioning fully, it would still not be able to broadcast to Australia and New Zealand. We needed a 49 meter 500 kW antenna for that, but with all the other big projects underway, no funds were available for it. Slavic Gospel Association (SGA) needed a reliable broadcaster to send the gospel to Russia by shortwave. HCJB offered broadcast time on the 500 kW transmitter for Russian programs in exchange for financial help to build the antenna, and SGA found a donor to provide the $100,000 needed. I ordered the materials, and when they arrived in Miami in July 1984 I went to help pack them, as it turned out, in the 8 x 8 x 40 foot container with the new Harris 100 kW transmitter. Back in Pifo, I finished the antenna design and we raised the four towers in September, but the Ecuadorian customs officials did not release the shipment of the Harris transmitter and antenna materials until just before Christmas.

It was a race against time to complete the antenna for the new 1985 spring schedule broadcasts, but it was in use by the second week of April. It was one structure that, from one side, beamed a strong signal that swept through Western Russia and curved down through India, and from the other side beamed to the South Pacific. Eastern Russia was covered by the beam from the steerable antenna that curved through and down to India from the opposite direction. All our broadcasts traveled great circle routes that passed through India.

Jim and Dave came home for their Christmas break. Many of their Alliance school classmates also returned, and we hosted a picnic for them and their parents in Pifo. 48 attended. Other activities included a trip to Otavalo and the leather town where the boys bought leather jackets, an Alliance cookout, an afternoon at Coach Howard's home with the Doerfers and another family, Christmas dinner with the Ross family, dinner with the Baxters, and a fishing trip to Lake Loretto that turned out to be a cold, wet, rugged time.

Panama

A trip to Panama had long been scheduled for Doris and me to work for three weeks at HCJB-related radio station HOXO in Panama. We left on Easter Sunday, April seventh, 1985, before the final connection of the Europe side of the 49 meter antenna, and what a relief to hear while we were in Panama that it worked perfectly. Our arrival at HOXO coincided with a complete breakdown of their 5 kW AM transmitter. It was sad that the station lost the whole Easter weekend of broadcasts. By Tuesday night the transmitter was functioning, although imperfectly. Two more weeks of work fixed it, leaving one more week to work on other repairs

Panama was a nice change of pace from Ecuador, and we were able to sightsee. It was hot, but what fun to watch ships go through the locks of the Panama Canal, and ride a train across the Isthmus and back. We stayed at the home of the Jim Higley family. Jim took us fishing on a lake of the canal where we caught over 30 peacock bass in about two hours. He was a teacher and semi-pro tennis player and Doris enjoyed getting some tennis lessons from him. Later in the year he visited us in Pifo when he came to Quito to play in a tennis tournament.

Jim Graduates from APU

Jim was to graduate from APU in May, and it was too soon for us to take another furlough. Since we had not taken our allotted vacation time for years, we were able to schedule three weeks of vacation, and went from Panama to Los Angeles to attend the event. Doris' sister Charlotte, Nancy and Rex Moses and friends from Ecuador also attended to see Jim receive a B.A. degree in Business Administration. Norwest Financial soon hired him as an assistant manager.

We then flew to Lorie and Bill's in New Jersey, seeing for the first time the house they purchased last summer in Sussex, New Jersey. From there we visited friends on Long Island and went to Oneonta to see Doris' mother. Doris' brother Chuck and wife Betty came from Canada, Jerry and Kenny lived in the area, and when we went to a special restaurant to eat, Doris' sister Charlotte surprised her mother by showing up. It was a rare occasion for Doris' mother to be with her five children at the same time.

Back in Pifo

We arrived back in Pifo in time for Doris to take more APU classes and get out a mailing of the ANDEX bulletin. Ruth Stanley, who was the ANDEX director, and her husband John left Ecuador permanently, and Doris became the ANDEX director. She had been working with ANDEX in various capacities since our arrival in 1974, so knew the ins and outs of the work.

Other radio stations dominated much of my time that summer and fall of 1985. Two small Christian Quechua Indian stations in Colta and Illuchi and a Christian station in Santa Rosa needed antenna and transmitter repairs. I flew to Cuenca for a few days to install a FM antenna

for a businessman who wanted his own low power FM station there. The antenna I designed and built covered the entire city with FM signal.

HOXO in Panama needed help to repair lightning damage and to plan the installation of lightning protection parts. It was a short stay, and Doris didn't go with me. Back in Pifo, I began to design a new 500 kW antenna to beam gospel programs to North and South America. It would be HCJB's third largest antenna.

World by 2000 Commitment

At the annual meetings in October, 1985, Phil Baugh was elected to serve on the HCJB Board of Trustees. Millie and Phil came to Quito for the meetings.

Ron Cline, then president of HCJB, and the presidents of Far East Broadcasting and Trans World Radio, made a commitment that stated:

"We are committed to provide every man, woman and child on earth the opportunity to turn on their radio and hear the gospel of Jesus Christ in a language they can understand so they can become followers of Christ and responsible members of His church. We plan to complete this task by the year 2000."

I was in the process of completing most of the antennas mission leaders had hoped and planned for before I started with HCJB, and realized that by the time of our next furlough in a few years, the last one would be finished. When I asked the broadcast director, Roger Stubbe, about future plans, he said there would be few new antennas to build, if any. I think World by 2000 plans were under discussion then. Don Spragg, the Engineering Director, suggested I get involved in administrative meetings, I assume because he realized the need for the kind of major work I had been doing in Pifo would greatly decrease. I told him I didn't think I could function well in administration or management, and that my strength and interest was in design engineering. I didn't say this to Don Spragg at the time, but the upcoming situation was no problem for Doris and me. We knew the Lord would continue to lead and direct us as He had in the past.

Danny Osterhause, purchaser of the boy's go cart a few years before, attended LeTourneau College, training to be a pilot. He and his flying instructor decided to fly to the Ontario Airport northeast of Los Angeles over the Thanksgiving weekend, and Danny invited Dave, also attending LeTourneau, to go along and stay with Jim over the holiday. Dave assured us of how safe it would be, and we gave our permission. It was a small plane so they would stop at a few airports along the way to refuel. All went well, but just before taking off to come home the instructor decided to take only a pilot friend up for a brief ride. He allowed the friend, who was not familiar with the controls, to land the plane, and as he landed he pushed the control that

brings the wheels up, instead of down. The plane slid along the runway damaging its nose and undercarriage, but neither man was hurt. The instructor, Danny and Dave took a commercial flight home.

Danny, following in his father's footsteps, became a missionary pilot with Mission Aviation Fellowship (MAF) based in Shell, Ecuador. In 1997 an Ecuadorean plane crashed in the rugged mountains not far from Shell, and Danny and a pilot colleague, while helping to search for the plane, crashed in the mountains and both were killed. It was a sad time for many.

Alaska

The Plasma Physics Laboratory of UCLA had installed a large array of shortwave antennas and transmitters on a site near the Chainy River outside of Fairbanks, Alaska. Under contract with the U.S. Navy, the UCLA group planned to direct over a million watts of radio signal power into the aurora to heat the ionosphere and facilitate reflection back down for radio communications.

When problems arose, the Christian professor in charge of the project requested that John Stanley and I go to the site to help with the transmitter and antenna problems. At first I was skeptical about using my time in secular work, but the mission assigned me to go, and I think the Lord was honored by John's and my participation.

John and I went at different times. When I went it was the Christmas holiday season and I needed to be away through Christmas and New Year's. UCLA paid for my expenses, and we used money from our mission undistributed account for Doris to go as far as Los Angeles, where she stayed with her sister Charlotte and could see Jim, who was employed at Norwest in the Los Angeles area. As it turned out, David came during his Christmas break from LeTourneau College, and Lorie and Bill, surprising Doris, came from New Jersey, so she was able to spend a good amount of time with all the children as well as Charlotte and her children.

Coming from the warmth of the equator, it was a shock to my system when I arrived in the minus 20 degree temperature of Fairbanks. During the three weeks I was there it actually warmed up to near 32 degrees, called a heat wave by the Alaskans, and only went down to minus 20 again the day I left in January. The errors in the antennas were obvious, and required substantial modifications and retuning. The tuning test equipment was sensitive to the cold, even in the "heat wave," so we set it up inside a tent with heaters, and I did that part of the work in more comfort. By the end of three weeks the antennas operated correctly, and when John Stanley later repaired the transmitters the UCLA group continued with their project.

1986

A once–in–a–lifetime event took place in March, 1986. Halley's Comet returned, and for a few nights we could see it from our back yard in Pifo, shining even brighter when we used our binoculars.

Two summer missionaries, Steve and Dennis, lived with us during the summer months of 1986. They were engineering students attending John Brown University and Messiah College. Steve's parents and sister visited Steve in July, and we drove them to Papallacta to see the power plant. When we returned to Pifo we were amazed to see that high winds had blown antennas to tatters all over the antenna field. Ecuadorians said it had not blown so hard for many years. We found eight antennas broken and out of service, and a tree had fallen on the power lines. I and the workers made the simple repairs in a few days, but two antennas had to be lowered to the ground for extensive repairs.

The winds remained high, and more minor breakages occurred, some by a horse. Doris printed this story in the next ANDEX bulletin:

"Bill, one of the Pifo missionaries, saw a horse galloping wildly across the antenna field. As he gazed in amazement — he felt he was living out an old-time western movie — the horse tangled in a guy wire and broke another antenna before his plunging and kicking finally freed him. As Bill watched the horse gallop out of sight, another horse and rider galloped up. Bill simply pointed the direction and in true western fashion said 'he went that-a-way,' and off galloped the rider."

The episode was over, but we had more repairs to make.

Dave's graduation from LeTourneau College was scheduled for April, 1987, and we planned our next HMA to coincide with it. There was much for me to do in Ecuador before then. Upon returning from Alaska I resumed work on the 500 kW shortwave antenna to broadcast to North and South America and Japan. I needed to finish its design and construction, erect the towers and have the antenna installed on the towers. This was our third largest — 110 feet wide and supported by four towers 315 feet tall. The South America side of the antenna was more complex because the radiated power beam had to pass over the 14,000-foot Andes Mountain range. It was good that the antenna had not been in place when the high winds went through the area. The more complex side of it was completed by the end of 1986 and the simpler North American side by March, 1987.

High Adventure Ministries in Los Angeles purchased the old RCA transmitter that the donated Harris transmitter replaced, and I helped prepare it for operation at their frequencies before it was packed and shipped to their site in Chatsworth just north of the San Fernando Valley.

The HCJB AM radio station on Mt. Pichincha had been operating with a single antenna tower. With a second tower the signal could be heard farther up and down the central valley of the Andes Mountains. Back to the Bible donated funds for the second tower, and I was assigned to build and install it on Mt. Pichincha. This was completed in the spring of 1987, and I gave

instructions for others to complete the inter-connecting transmission lines and tuning networks I designed.

Future plans of HCJB

As a direct result of the World by 2000 commitment mission leaders decided to stabilize the Ecuador field, find a new location to set up a site similar to Pifo, and have HCJB engineers build new transmitters for HCJB and others. In early 1986 some of the engineers set up offices at the Crown International facility in Elkhart, Indiana and began to build transmitters. In November Eric Moore, the new engineering director, said after our 1987 furlough he wanted me to make a break with Pifo and work out of Quito. He wanted other engineers to do many of the things I did from Pifo, and that wouldn't happen as long as I lived there. He expected we would live in Quito only a few years at the most before I would be needed to design and plan a layout for a new site in a different part of the world, and then it would be better to function from a base in the U.S. With that clarification we began to make plans to move from Pifo to Quito. We accepted an HCJB apartment near the Quito compound that would be available in January, and sublet it until our return from HMA in 1988.

Christmas with musical concerts and other holiday activities was always a special season at HCJB. Without any of our children, though, it was lonely, so it was a joyous Christmas in 1986 when Dave returned home during his spring break.

Jim and Christine Engaged

Christine Cunningham was Jim's APU classmate from Upland, California, not far from APU. She graduated with a B.A. in Administration and worked for Bank of America in Pasadena as section manager of branch operations. On Valentine's Day she accepted an engagement ring from Jim and they planned a November 7th, 1987 wedding. They had been going together for a few years so we knew and loved Christine.

Earthquake Hits

A special service was held in March, 1987, to dedicate the North and South America antenna. Many of the HCJB administrators attended, making the event all the more meaningful. Later that week a large earthquake struck. It was centered near the small village of Santa Rosa and the continental divide in the rugged Andes Mountains about 40 miles directly east of Pifo. The timing was significant to both Doris and me for different reasons. The emergency interrupted most normal activities, and had it occurred earlier it might have seriously delayed the completion of that large antenna. We felt it strongly in Pifo, but it didn't damage the antennas, transmitters or buildings. Even at Santa Rosa the antenna I had designed and helped install was not damaged,

but the building that housed the transmitter and control equipment was badly damaged and parts of it fell on some of the equipment, which I helped to repair later.

Doris had completed the master's degree classes, and she had scheduled the last requirement, an oral presentation to colleagues, to take place in Quito during what turned out to be the evening after the earthquake. The quake was felt strongly in Quito and strong aftershocks continued that next day and evening. Everyone decided to go ahead with the presentation anyway, with the understanding that if the building started to shake very much they would all run downstairs and out of the building. Everyone felt jittery, but we felt no strong aftershock, and in those unpredictable circumstances Doris successfully finished all the requirements for the degree.

The Sunday after the earthquake Doris went with an HCJB medical caravan about 70 miles over dirt roads, to Santa Rosa, the nearest they could get to the center of the quake. She helped a medical team of two doctors and four nurses take temperatures, dispense medicine, help with dressings, hold children for injections, and cook some for the team. A helicopter took injured people to a hospital in another location, so there were few injuries to treat from the quake, but respiratory infections from exposure ran rampant. Thousands of people made their way out of the mountains and jungle, and Santa Rosa was the first place in one direction they came to. Most were shoeless, carried a bag holding all their possessions, were traumatized, dirty, and tired. Many left family members buried in a landslide that destroyed their home; others couldn't find family members who might not even be alive. They needed food, clothing, shelter, and someone to calm and comfort them. Truckloads of food and clothing from various groups were delivered and large tents erected.

Hundreds of people who had no interest in God before were eager to hear about the saving power of Christ. The medical team showed films in the tents, and in two nights over 30 people accepted Christ as Savior. In a village near Santa Rosa, two weeks before the quake evangelicals had been stoned. Now the people asked HCJB to show films about the gospel.

It was time for home ministry assignment, and we would not live in Pifo upon return. Doris realized that because of our future plans she could not keep Butterscotch. We gave her to Sheila Leech, a nurse serving in the Santo Domingo area located in the foothills of the Andes on the route to the coast. We found out later that Butterscotch adapted well and enjoyed going with Sheila as she visited the Colorado Indians and others in the area.

Doris finished the last Andex bulletin for the March mailing, and then moved the related files to Quito for someone else to take her place while she was away. A few days before leaving we moved our large household items, such as furniture, refrigerator, etc. to our new apartment to be used by those who would sub-let it, and stored the smaller things in Pifo to move after we returned.

Chapter 16

Fourth Home Ministry Assignment

April 1987 – December 1987

Dave's Graduation from LeTourneau College

We timed our HMA to enable us to attend Dave's graduation April 25th at LeTourneau College in Longview, Texas. We, from Quito, and Jim and Christine, from Los Angeles, flew to Dallas where we met and drove to Longview together. Jim stayed with Dave in the dorm and Christine with Dave's girlfriend. Dr. Paul Leiffer, an engineering professor, and his wife Jani had invited us to stay with them. Jani had been in a Sunday school class I taught and in one of Doris' Pioneer Girls groups in the Central Islip church.

During the few days there we attended the senior reception, graduation banquet, and graduation ceremony. The next day, after attending Dave's church together, we and Jim and Christine went to the Dallas airport for the two to fly back to Los Angeles, and we to fly to McAllen on the southern tip of Texas for my first work assignment during this HMA.

HCJB was affiliated with a chain of FM radio stations along the border of Mexico to broadcast the gospel to people on both sides of the border, especially into Mexico. The station in McAllen had a high-gain antenna mounted on a 1200-foot tall tower, and the tower had developed a bow-shaped curve that I was asked to investigate. The bow had increased with time, and eventually the tower would collapse from the tensions in the guy cables. I found the center of the bow to be at 120 feet and installed a guy cable to prevent further bowing and danger of collapse. That was all I was equipped to do at that time, but later others re-adjusted all of the guy cables. We flew back to Dallas, where Dave met us with our car he had been using since our last furlough, and the three of us headed east.

We stopped in Alabama to see friends of Dave, and then went on to visit Bob and June Williamson in Georgia, where they lived since their retirement. From there we stayed with Millie and Phil Baugh in Florence, South Carolina for a few days. They had a car for Dave. He needed one since we had to use the car he had been using in college. We and Dave went on to Lorie and Bill's where Dave stayed for two weeks before going back to Longview, Texas, to concentrate on finding a job.

Trip to Liberia

Soon after arriving at Lorie and Bill's in New Jersey, Sudan Interior Mission leaders asked me to go to Liberia, Africa, for two weeks, to help missionary radio station ELWA with antenna problems. The station was located near the capital city of Monrovia in a grove of palm trees right

up against the beach on the Atlantic Ocean where the air was cool and pleasant. I stayed with Cork Loken and his family, gave some general advice about the antennas and transmitters, and provided computer programs to aid in antenna design. While I was there Doris visited her mother in Oneonta and helped her brother Jerry at his fast food stand in Sidney, where she learned how to make some delicious ice cream concoctions to serve to customers.

Work in Elkhart and on to California

Upon returning to Lorie and Bill's we visited our supporting churches on Long Island. Soon the engineering center in Elkhart asked us to come for six weeks to fill in for an engineer while he recovered from a health problem. The team there needed to get HCJB's newest, most modern and efficient 100 kW transmitter off the drawing boards, and the engineer's job was to procure the unique parts from Christian-owned machine shops in Michigan and Indiana. While there I visited and worked with those shops, but for some larger inductor coils I contacted Kintronic Laboratories in Bristol, Tennessee. The company was owned by a Christian family named King, and I worked directly with the company president, Tom King. During that time he developed a strong interest in HCJB's missionary outreach.

Doris and I left the HCJB Engineering Center in September and drove to California, visiting relatives and churches on the way. We stayed in the familiar Reseda church's missionary house, and every week shared about HCJB with different church groups.

Dave had found a job with Airborne Instruments Labs (AIL) headquartered in Commack, Long Island. AIL had a military contract to maintain and repair computer control systems in the B1 bomber aircraft, and Dave was assigned to that work at Edwards Air force Base in Lancaster, California, an hour north of Los Angeles. It was a special blessing to be able to see both Jim and Dave quite often, and be involved in some of the activities preceding Jim and Christine's upcoming wedding in November.

HCJB's old 100 kW RCA transmitter that High Adventure purchased, and I had helped pack for shipment, was set up at a site on the side of Chatsworth Mountain on the northwest edge of the San Fernando Valley. High Adventure leaders asked me to work with Roy Shantz to help refurbish it. After quite a few trips up the mountain, the transmitter and antenna worked properly, and the shortwave broadcasts could be heard in Europe and North Africa.

Jim and Christine Married

Interesting, significant events had characterized our furlough so far, and Jim and Christine's wedding November 7th was memorable. The evening of the rehearsal we hosted a dinner for the wedding participants. The thorough planning and efforts of Christine and her parents, Jim and Donna Cunningham, resulted in a beautiful wedding. Christine wore her mother's wedding dress, and her uncle, Reverend Cunningham, assisted in the wedding. Jim's attendants were Don and Bob Stuck and Russ Cline, all old friends from the Quito Alliance Academy, and Christine's

brother Jim. Dave was the best man. Christine's attendants were her sisters Sarah and Jennifer and two friends. Many friends and relatives attended the wedding and reception, including Lorie and Bill from New Jersey, my sister Joan and her granddaughter from Missouri, and my brother Robert, who was working in the Los Angeles area. Jim and Christine went to the Rocky Mountains in Colorado for their honeymoon.

More excitement occurred when we learned that, Lord willing, we would become grandparents. Lorie and Bill proudly announced that they expected a baby in July.

We were with Dave, Jim and Christine for Christmas. As his Christmas gift to us Dave treated us to a day of skiing at Mountain High in the mountains north of Los Angeles. Doris and I had not skied since some fun on the slopes at the Rose farm in New York, but after some instructions we were able to glide along pretty well. Our furlough ended on December 31, 1987, and the engineering director gave us a new assignment.

Chapter 17

Last Term at HCJB

January – August 1988

Back to Elkhart, Critical Decision Made

Eric Moore, the engineering director, assigned us to return to the Elkhart Engineering Center for a few months before going back to Ecuador. We left California the first week in January and took the more southerly route hoping to avoid winter snow storms. All went well until we encountered freezing rain in Texas, then snow on top of that. By the time we entered Oklahoma it was several inches deep. Our goal was to spend the night with my sister, Jo Ellen and her husband Francis, in Claremore, Oklahoma, so we continued to drive even when big semi-trucks scattered so much snow we couldn't see the road. We arrived safely in snow so deep the car barely cleared it.

Jo Ellen had recently become a Christian and was recovering from bone marrow transplant treatments in the course of which the lower part of one leg had been amputated. During our overnight stay we prayed with her and shared some passages of scripture. The next day we continued on eastward although the snow conditions had not improved. To our surprise as we passed Joplin the snow stopped, from there on the roads were clear and dry, and we arrived safely in Elkhart.

When we were in Elkhart the summer before we stayed with the Lindall family two weeks, then moved to a downstairs apartment on the south bank of the St. Joseph River. This time we stayed in the home of a lady who had gone south for the winter. I was assigned to install and test the 100 kW output tube and its components. The placement of these parts and the shape and location of all connecting metal straps was critical to the operation of the transmitter. I ran diagnostic tests to find all possible unwanted signal frequencies that might be generated and transmitted, and to prevent them I installed large damping resistors and short circuits in locations that didn't interfere with the assigned shortwave frequency.

Doris kept busy with routine office work and also wrote and worked with a printer to produce a brochure describing the work and purpose of the engineering center. In those days only few groups and commercial print shops used computers to produce literature. In January 1988 Dave was transferred from Edwards Air Force Base to a base in North Dakota, where he spent two very cold months before a transfer to McConnell Air Force base in Wichita, Kansas.

During this time in Elkhart Doris and I prayerfully thought through the future plans of HCJB and how we might fit into them. We knew there was a search on for a new location to set up a site similar to Pifo, and my future work would be to design antennas and plan layouts for them, but a promising site had not been found. I approved of proceeding this way, but at the same time at age 60 I realized the work would not keep me busy during my active years before retirement. I was also concerned about how we would manage to have the potential antennas built.

I had come to know Tom King, president of Kintronic Labs, having worked with him while filling in at Elkhart, and we met again at a NAB conference. Kintronics specialized in designing AM antennas and their networks, and Tom had plans to expand the company by building shortwave antennas. He knew of HCJB's plans and my situation, and suggested that I join his company, design antennas, help to produce them, and help HCJB as the mission needed me. As a Christian he would be pleased to have a part in HCJB's outreach by supplying antennas at cost.

This had many advantages for everyone involved. As HCJB and other groups participated in the World by 2000 effort, they could purchase custom-designed antennas as inexpensively as possible. I could both design antennas and oversee construction, as would not be the case located at an HCJB base. After much prayer and wrestling with the idea, Doris and I decided that was what the Lord would have us do. I shared this with Eric when he visited Elkhart, and although he preferred my status continue to be a full time HCJB missionary under HCJB direction, Doris and I believed God had guided us to Kintronics.

Our work in Elkhart completed, we left on April 13 and drove to Lorie and Bill's in New Jersey. Lorie was expecting her baby in the first weeks of July, and we planned that Doris would return near that time to help. Doris visited her mother while I flew to Bristol, Tennessee to discuss plans to join Kintronics.

Back in Quito

We left our car with Lorie and Bill, arrived back in Ecuador in early May, and settled into our apartment in Quito. I don't remember any specific assignments, but I assume I helped with miscellaneous tasks in Pifo and went to meetings in Quito. The man filling in for Doris became the director of ANDEX. The mission administration did not favor us leaving their staff, but agreed that our membership category in the mission would change to constituent members, and I would be called upon whenever they needed me. We would be self-supported rather than receive missionary support. Looking ahead to when I am writing this, we have been active members of HCJB ever since.

Doris' Mother

Doris' 86 year old mother had surgery in late June, developed a blood clot in her lungs, and,

sadly, passed away June 30. An enthusiastic fan of HCJB, she loved the Lord and we are comforted knowing she is now living with Him.

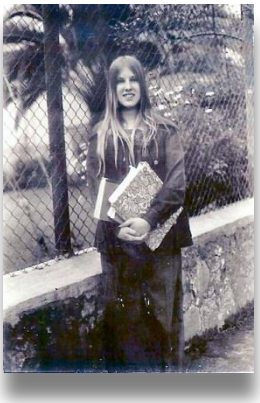
Michael, Our First Grandchild

Doris had a plane reservation to return when Lorie's baby was due in early July, so she only needed to fly back about a week earlier. She had just time enough after her mother's funeral to get back to Lorie's the day before Michael, our first grandchild, was born on July 9th. It was a joy for her to be with him and help Lorie and Bill for two weeks before returning to Quito.

We Leave Quito

Tom King visited for six days in mid-August. We showed him some of Ecuador and most of HCJB, and he was there to attend our farewell dinner. We sold most of our belongings to fellow missionaries and Ecuadorean workers and had a moving company pack things we wanted to take with us.

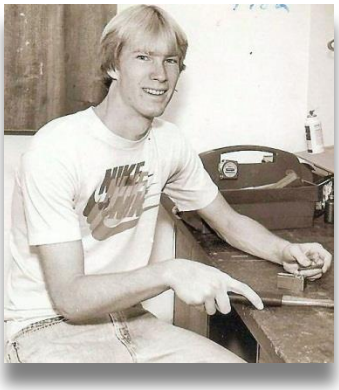
We left Quito the end of August and went to Lorie, Bill, and Michael's, picked up our car, and drove to Bristol, Tennessee to an apartment Tom had reserved for us.



Lorie on way to school at Alliance Academy

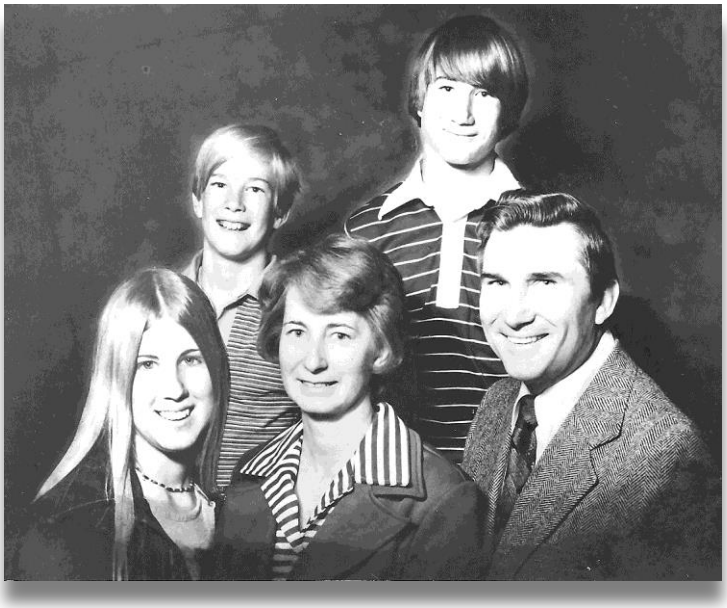
Jim enjoying his motorcycle - Quito is in the background

Janet & Lorie served as candy stripers in Hospital Vozandes, Quito



Dave worked in locks and keys department

Jim worked in broadcasting control room

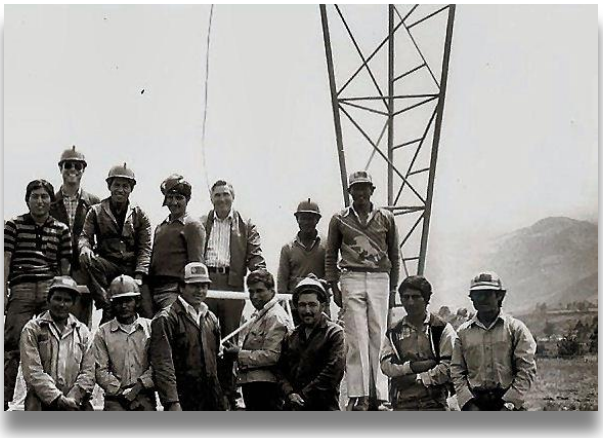


Proud to be a missionary family

Helping Hands in Cuenca
© John K. Tommerbakk

Tom King & Don view 500 kW transmitter in Pifo

Repairing an antenna high up In bosun chair



Pifo work crew after raising tower

49 meter antenna to broadcast to Russia & Australia *

***HCJB Global Photo**

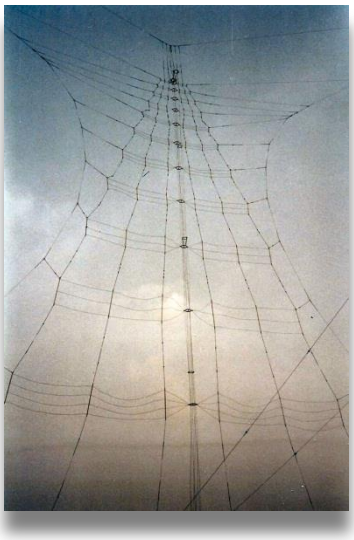
Map of Ecuador

HCJB staff 1986 – 1st row left to right: Dr. Hocking, Sharon & Clyde Moore, Phil Baugh, Dr. Abe & Marj Van Der Puy, Ron & Barbara Cline, Ben & Marilee Cummings. *

***HCJB Global Photo**

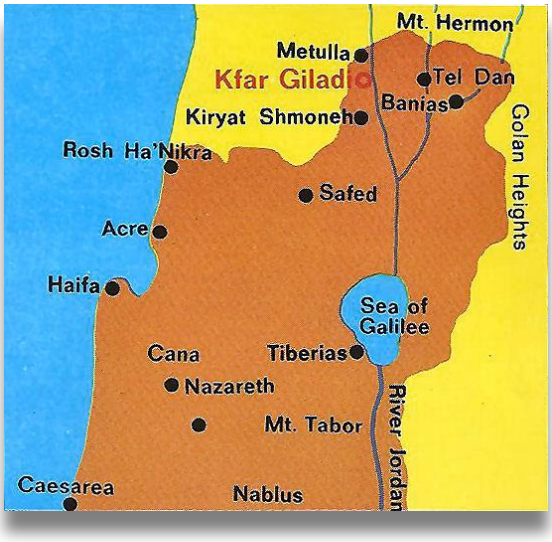
Antenna in Lebanon on Mt of the Doves

Installing switch in Equatorial Guinea



Log periodic antenna in Sudan

Kintronic Labs



Kiryat Shmoneh, Kibbutz Kfar Giladi, Metulla in Northern Israel

Chapter 18

Tennessee

1988 - 1993

Transition

A big change began in our lives when we accepted employment at Kintronic Laboratories (KTL) in Bristol, Tennessee. Doris and I lived in an apartment for about two months before we purchased a new ranch-style house at 258 Whispering Woods Drive, Bluff City, TN, only three miles from KTL. The house was on a wooded hillside on a lot slightly over an acre, with some level land at the top and bottom of the hill.

It was a pleasure to settle down in our own home, but the transition from missionary to non-missionary status involved feeling some losses. We missed many things from the past—the involvement we'd had with the people and country of Ecuador, the friends and colleagues with whom we had participated in work crucial to sharing the gospel, the "on the spot" involvement in the work, and that special relationship between a missionary and supportive churches and friends. However, we looked forward to continuing to be part of the HCJB team when needed.

Family

Our children soon visited. Lorie, Bill and Michael came from New Jersey, Jim and Christine from California, and Dave came from Wichita with his lovely friend, Kelly Vogel. Bill was working for Nabisco in Parsippany, New Jersey, and Lorie worked part time in the ICU of a hospital in Ridgewood, New Jersey. Lorie had also become active with Concerned Women for America.

Jim, with his fluency in Spanish, diligence and good business sense, had worked up to being in charge of a Norwest branch office. He and Christine had purchased a condo in San Dimas in the San Gabriel Valley.

Dave worked in Wichita at McConnell Air Force Base as a field engineer.

David and Kelly are married

Kelly grew up in Wichita and she and Dave met at the church they both attended. They soon became engaged, and married in Wichita on June 17, 1989. We enjoyed getting to know Kelly's parents, Carol and Ron Vogel, meeting all her family, and being with many relatives on the Hastings side of the family who attended. This included Lorie, Bill and Michael from New

Jersey and Jim and Christine from California. Jim was Dave's best man. Attendants were our "third son" Mike Del Aguila, Kelly's two brothers and a local friend. Kelly's attendants were local friends. After a reception at the church we all saw them off to Hawaii for their honeymoon.

A New Church Home

While searching for a church in the Bristol, Tennessee area, Tom King suggested we visit the 250 member Edgemont Presbyterian Church in Bristol, affiliated with the Presbyterian Church of America (PCA). We were impressed with the depth of the new pastor's preaching, the music, the worshipful service and the friendliness of the congregation. We attended membership classes and found that Reformed and Baptist doctrines had much in common, where they differed did not affect us, and we joined the church.

The loss we felt when ending full time service with HCJB soon was replaced by becoming active in the church. Doris enjoyed working as the church historian and librarian, and eventually became president of the Women in the Church (WIC). She organized a women's retreat and had as guest speaker her old friend, Dee Wilson, by then a popular speaker to women in California. I became an elder and kept busy with the many responsibilities that went with it. As Chairman of the Missions Committee I scheduled PCA members Dr. Abe and Marj Van der Puy to speak at our missions conference. Dr. Abe was President of HCJB for many years, and the church appreciated hearing Marj share about the martyrdom of her late husband, Nate Saint.

Doris worked one year as assistant to the director of an adult day care program in nearby Johnson City and served on the advisory committee of the Area Agency on Aging.

Work at KTL

My full time job at Kintronic Laboratories kept me busy. KTL designed and manufactured high quality equipment for complex AM broadcast antenna systems. These antennas consisted of several tall towers spaced to broadcast radio programs to the exact areas assigned by the FCC, and at the same time prevent signals from reaching places the FCC did not want the signal to go. My new job was to design the circuit network components required to make that happen. The design was then sent to the KTL shop, where the parts were manufactured and mounted in aluminum cabinets and shipped to the customer. Some of the complex AM antennas required as many as 10 or 12 towers, a tuning unit for each tower, and a complex network to distribute the RF power to each tower in exactly the correct amount and phase relationship. Sometimes as many as four different radio stations used the same antennas at the same time on their different frequencies, and designs for special circuits were needed to prevent interference with each other.

I was familiar with these circuits and began immediately to help Tom and his dad, Lewis King, with the very heavy work load. The personal computer supplied to me along with design programs written by earlier KTL employees made it easier. (HCJB had few personal computers and I didn't use one while I served in Ecuador.) They also wanted me to help expand the

business by designing shortwave broadcast antennas that KTL would build. We did those things routinely over the five years I worked at KTL.

The KTL business depended upon advertising, and the annual conventions of the National Association of Religious Broadcasters (NARB), and the larger National Association of Broadcasters (NAB) usually held in Las Vegas, best filled that need. In 1990 and 1993 Tom and I also attended the Mexico Broadcaster's Convention in Mexico City. KTL had a booth at the NAB conventions and displayed one of their custom-built AM antenna systems. These were not demonstration units, but actual systems designed and built for a broadcaster and on its way to him. During my first year at KTL, to introduce the new shortwave antenna product line at the NAB, we built and displayed a small scale model of a shortwave antenna complete with supporting towers.

The bright lights and casinos make Las Vegas a fascinating place. Everywhere we went, to rooms or restaurants, it required passing through a casino, but I had no desire to gamble. Apart from the convention I enjoyed sightseeing in the many scenic places near the city such as Hoover Dam on the Colorado River and Zion National Park. Though it is a worldly city, we did find some churches there, and I attended one in the Calvary Chapel denomination. I don't remember that I had anything to do with it, but later the Calvary Chapel group asked KTL to provide a low cost FM antenna to help the Christian king of one of the South Pacific islands build a station to cover his island with Christian programming. KTL was not set up to build FM antennas, but I had designed such antennas at Wheeler Labs and HCJB, and with Tom's approval I offered to build one.

I purchased a long section of coaxial cable, and with the help of a church friend cut it into 35 lengths of about one meter to form individual radiating sections, and attached sections together to make one continuous line. To seal it from rain we coated the junctions between sections with silicone grease and sealed them with heat shrink tubing. I tuned the antenna using KTL equipment, coiled it into a small package and with instructions to suspend it from a tower shipped it to Calvary Chapel. Later I heard that the antenna was suspended from a tree on the island, connected to the FM transmitter and put on the air. The king was pleased that the broadcasts could be heard everywhere on his and surrounding islands. Still later when I visited the Calvary Chapel church in Las Vegas, I learned that the island had been hit by a strong typhoon, and all the stations were off the air except the little Christian station which stayed on the air throughout the storm.

KTL Shortwave Antenna in Equatorial Guinea, Africa

Some Lutheran Hour programs were aired from a government radio station in Equatorial Guinea on the west coast of Africa. Gene Bronauld, in charge of distributing the programs, wanted the station's antenna system to send the signal in a new direction and hired Kintronics for the job. In

January, 1990 I flew with some test equipment to Malabo, the capital city on an island off the coast, by way of Madrid, Spain. On arrival a large crowd of people including government and embassy officials met the plane, not to meet me but because flights from Spain were important events in that remote, former Spanish colony. Gene met me and took me to a hotel room to stay overnight. The broadcast site was on the mainland to the east, and the next day Gene and I traveled to Bata, near the site, and went to inspect the antenna. The shortwave station had been put in by China and was operated by two Chinese men who were skeptical about changes we might make. The antenna used for the broadcasts was like one of the antennas at Pifo I worked with to broadcast to either South or North America depending on the position of a switch. We would only need to add a switch to the Chinese antenna to broadcast in the opposite direction.

There was no hotel in Bata, but Gene arranged for us to stay in a building soon to open as a hotel. It was better than the hotel in Malabo, but I was surprised to see that the bugs and mosquitos were controlled by bats that flew up and down the halls of the building. When I returned home I designed and had the KTL shop build the switch and transmission line parts that were needed, and I would install them on another trip to Africa.

Ecuador

Tom had agreed that that I could take time off if HCJB needed me, and HCJB asked me to help with an antenna need in Pifo. Steve Sutherland had been doing the antenna work after I left and he had tentative plans for a new antenna, but wanted me to go over his plans and approve them or make suggestions for changes. The type of antenna and the selected location in the antenna field looked good so I gave my approval. Steve had no problems putting up the antenna.

The Sudan, Africa

In 1992 Harris, the transmitter manufacturer hired Kintronics to design and build a shortwave antenna in Sudan that would operate with 100 kW of power on all shortwave bands. I designed a log periodic antenna and the parts were built in the KTL shop and delivered to Harris for shipment to Sudan. I then went to Sudan to supervise and assist the assembly and suspension of the antenna between the two 90 meter tall towers already up.

This was my third trip to Africa, and this time I stopped in Frankfort, Germany, and Cairo, Egypt on the way to Khartoum, the capital of Sudan. The city is on the Nile River at the junction of the Blue and White Nile Rivers, and at the eastern edge of the Sahara Desert. A Harris engineer, there to install the 100 kW transmitter, and I had rooms in the Hilton Hotel, prominently located on a strip of land near the junction of both rivers. A family park was located on the tip of land between the rivers. From my room I could watch people bathing in the White Nile River, and see camels and many goats wandering freely eating green plants.

Each day a car and driver took me to the antenna site with a crew of workers to help assemble the antenna. The sandy desert, only 15 degrees above the equator was hot, but so dry

sweat evaporated quickly. The wire cables became so hot our hands sometimes blistered as we assembled the antenna. The blisters didn't fill up with water in the hot, dry air. Instead, eventually the dead dry skin of the blister formed a callus that protected our hands from the hot wires.

The hotel was a place where people met for special occasions. Every day we returned to the hotel filthy dirty and bedraggled, where I had to pass through crowds of people in their best clothing to get to the elevator and my room. What a pleasure to shower, put on clean clothes and go down to the hotel restaurant. Since there were people from many different nations in Khartoum, each night the food changed to French, German, English, etc. My favorite was Tex Mex night.

One of the hot days at the antenna site I was quite thirsty, and asked if it was safe, filtered water in one of the barrels. They assured me that, yes, it was, and stressed that it was Blue Nile water. It was sandy, but tasted good. I checked later and found that Blue Nile water was not only safe to drink, but according to the area folklore, those who drank it would return, which I didn't plan to do.

The work went well, but we had some windy, dusty days, with light rain on one of them which came down as muddy drops that didn't settle the dust. I informed the foreman of the crew that we only had three weeks to complete the work, and then I had to leave for work scheduled in Equatorial Guinea, but that didn't seem to concern him or the workers. I couldn't get the crew to hurry, although I tried. Even so, we got the antenna up and the transmission lines in place and connected on my last day there. The only thing left to be done was to tie off the guy cables to anchor points on the ground, and I gave instructions to the foreman to do that the next day.

Back at the hotel I cleaned up and put on my suit for a special meeting given in appreciation for my work. I left Sudan and headed to Equatorial Guinea by the only way to get there, which was to go to Cairo, Frankfort, Paris, Douala in Cameroon, then Bata. Gene met me and again we stayed in the hotel with the bats. What a change from the Hilton in Sudan. I installed the switch and interconnecting transmission lines in about a week, and it pleased the Chinese operators that the antenna worked as before but now in both directions. I had been away for about a month and it was good to get back to Doris and our home in Tennessee.

I had only been home a week when KTL was informed that the antenna in Sudan had collapsed and must be repaired or replaced. I went back to Khartoum, and the foreman of the work crew explained the problem. As soon as I had left the crew took a week of vacation instead of attaching the guy cables to the anchors as I had instructed. During that week a big sand storm came through from the Sahara desert, and the antenna tangled and broke in places. We found the antenna disconnected from the towers and partly buried in the sand. The crew and I spread it out, made the needed repairs, and suspended it from the towers again. I very carefully connected the guy wires to the anchors and adjusted the tensions. No more Blue Nile water for me!

Israel

High Adventure Ministries had a radio station that aired Christian programs to Israel in the AM band from studios in Metula, a town in Northern Israel on the border of Lebanon. The antenna they used was located just across the border in Lebanon at an Israeli Army outpost. The Army gave them permission to erect a shortwave antenna at the outpost. It would broadcast in shortwave to the Soviet Union and Africa, and High Adventure asked KTL to design and build it. On a home ministry assignment in California I had helped refurbish High Adventure's 25 kW transmitter that was replaced by the 100 kW transmitter they purchased from HCJB. They planned to use this 25 kW with the new antenna.

I designed the new antenna and Stormy Weathers, a Christian tower manufacturer in Texas, came to KTL and worked with me to assemble the antenna, raise the support towers on the KTL property and mount the antenna on the towers. We then disassembled the antenna and towers and shipped them and the 25 kW transmitter to Israel. Going through this process gave Stormy the experience he needed to install everything at the outpost over the border in Lebanon. In 1992 he completed the installation, and High Adventure asked KTL to send me to the site to make final tests and adjustments to the antenna tuning equipment.

Doris was invited to go with me, the only time, except going to Panama for HCJB that she went with me on one of my trips. A High Adventure administrator, John Tayloe, and Dr. Don Meyer, their engineer, planned to meet us on Monday at the Newark Airport and go on the same El Al flight to Tel Aviv. We had never met them in person, didn't know what they looked like, and couldn't find them. We checked in for the flight anyway. The El Al security staff took us aside and asked many questions, such as why were we going, who would meet us, why couldn't Israeli engineers do the work, where did I attend school, etc. Finally we were approved to go. By then there were no non-smoking economy seats available, so they put us in non-smoking business class seats, which more than made up for the hassles from security. Soon into the flight we were paged to identify ourselves to a stewardess, and John Tayloe came up to see that it really was us on the flight. As we traveled toward the east the night went quickly, and during the day we looked down on England, the snow-covered Alps, Yugoslavia, the Mediterranean Sea, Cyprus, and finally landed in Tel Aviv nine hours later on Tuesday at 4:00 PM.

Isaac Gronberg, an Israeli on the High Adventure staff, met us and took us to his apartment in Tel Aviv where his wife served coffee and desserts she had made. As Isaac drove us north he told many stories about what was happening in Israel as we marveled at road signs with names we recognized from the Bible. It was dark when we arrived at the Kibbutz Kfar Giladi, just south of Metula, where we stayed during the work on the antenna. The next morning, Wednesday, the beautiful Jordan Valley, Mt. Hermon and the Golan Heights presented a spectacular scene in the bright sunlight.

We went to the station studios a few miles away in Metula, and met the staff — Mark Christianson, Pete Riley and Charbel, a Lebanese Christian who would operate the 25 kW transmitter. Charbel took us in his old car along the razor-wired border on the Israel side to a

road that crossed the border into Lebanon. We went up a slight hill called the Mount of the Doves, and there, standing tall against the blue sky, stood the same antenna that had been a curious sight on the Kintronic property in Tennessee. It was comforting to see the Israeli Army installation about 300 yards beyond the site. After setting up the test equipment and gathering data it was time for lunch back in Metula. The Israeli waiters in the restaurant, ready to defend themselves at any time, carried military rifles strapped on their backs while serving the meals. Trenches and shelters were everywhere. Back at the antenna site I continued measurements until sundown and Isaac took us to the kibbutz. After changing clothes Pete Riley took Dr. Meyers, Doris and me to a Thai restaurant in Kiryat Shmoneh, a good sized town south of the kibbutz that had often been shelled from Lebanon. That night I did calculations to make adjustments the next day. Thursday was similar to the day before, except Doris stayed at the kibbutz. Isaac and John took her to Kiryat Shmoneh. She visited an open market, some stores on the streets and a department store where she bought a tie for me to wear to a scheduled business meeting in Tel Aviv. She took a bus back to the kibbutz and later explored around the property, finding defensive tunnels and gun emplacements aimed into the Lebanese valley below.

On Friday we connected the transmitter to the antenna, and when brought up to full power everything worked normally so the programs could be switched to go north to Russia or south to Africa. After lunch we left for Tel Aviv on the road to the Sea of Galilee and Isaac, a former guide, treated us to a running commentary on what we were seeing interspersed with the history of Israel. Fog around the Sea of Galilee obscured our view of it. We passed by Hazor, Turan, Cana of Galilee, Mt Carmel, and Yokneam. John had reserved a room for us in a nice Tel Aviv hotel on the beach of the Mediterranean Sea, and that's where we said good bye to Isaac and John.

I phoned Tom King to report the success of the project, and he asked me to meet with Matt Folkert, a former short termer at HCJB now living near Tel Aviv. John Tayloe had a special treat for Doris, Dr. Meyer and me by arranging a guided tour of Jerusalem on Saturday, the next day.

We were up and ready for the tour bus that day, which went up toward Jerusalem through the corridor where many died fighting the war for independence in 1948. We saw much of Jerusalem from the bus, and walked around inside the walls of the old city for three hours, viewing what we had previously seen only in photos and mentioned in the Bible. The bus took us to Bethlehem, and on the way back stopped for a breathtaking view of the whole city of Jerusalem. We arrived back to our hotel in Tel Aviv tired out and overwhelmed with the awesomeness of all we had seen. At that point we said goodbye to Dr. Meyer, who was flying back early the next day.

Sunday morning and evening, and Monday morning I had meetings with an acquaintance of Tom King to discuss potential Kintronic projects. Doris enjoyed browsing in nearby stores and a long walk on the beach almost to Joppa. In the afternoon Doris and I spent more time on the beach and rested up for the long evening ahead and our flight back home. After we signed out of the hotel Matt Folkhert picked us up and took us a 45 minute drive out of Tel Aviv to his home. We knew Matt and his wife Beth when they were single short term missionaries at HCJB, and it

was a joy to see them and their four children. About 10:00 PM Matt drove us to the Ben Gurion Airport. The security check was quick and easy, and soon we were on the long flight back to Newark. We arrived at Newark Airport around 7:00 AM, and since our flight to Tennessee and home was not until late in the afternoon we rented a car and drove to visit Lorie and Michael for the day. (Bill was at work.) This was the end of a wonderful trip with our Lord watching over us all the way.

Palau

High Adventure had a weak shortwave signal into China from their site in the South Pacific on the U.S. Protectorate Island of Palau. In 1993, shortly after the installation in Israel, they asked KTL to send me to inspect the site. It was a long trip with plane changes in San Francisco, Honolulu and Guam. Traveling west the days are about twice the normal length, and then crossing the International Dateline further complicates one's life. I was met by one of the broadcast staff and we ate in a restaurant famous for being over sea water where we could see many fish from our table as we ate. Small fish frantically fled from larger fish that tried to eat them, and it didn't make my meal more enjoyable. The next morning on the way to the broadcast site I saw that it was a beautiful coral-based tropical island with deep green vegetation and ocean water lagunas and bays everywhere. The site was on the northwest coast with a low island a mile or two from the beach. The antenna was located about 500 feet back from the beach 100 feet or more above sea level. The location seemed good with no obstructions in front of the antenna beam. During my four days there I calculated the location in front of the antenna where the beam would spread, strike the sea water, reflect off the sea and form an upward tilted beam. The calculations showed that only a small part of the lower edge of the tilted beam would be blocked by the low island. The problem was that the antenna was just too small to concentrate the power into China. I returned home, and sent a report recommending that a larger antenna be installed.

High Adventure did order a larger antenna from KTL. I completed the design and supervised making the parts in the KTL shop, which were sent in a container to Palau. I returned to Palau in November 1993, to supervise and help put it all together and get it working. Two young men helped me, not many to handle the heavy work, but, with a geared-down hand-cranked winch, one person could raise a big, tall tower. We jokingly called the man who did most of the cranking on the winch superman, as he by himself raised those heavy towers. We got the four towers up, then assembled the antenna and raised it up using the winch to pull through pulleys on the towers. I did most of the work up on the tower since I knew best how to do it. Lastly, we installed the transmission line and tuned the antenna. It was completed and operating when I left for home 16 days after I had arrived.

Ecuador

That same year, 1993, I went to Pifo to help with a problem. A tree had fallen on a guy cable of the standby antenna in Pifo and the antenna collapsed. Steve Sutherland had prepared a new tower and had it ready to be raised, but had never raised one and needed my help with this first one. With the help of the work crew everything went up and was guyed in place without problems. The antenna required a new tuning unit so we made electrical measurements to get the required data. I then showed Steve and some other HCJB engineers how to use the KTL computer programs to determine the correct parts needed for tuning. Tom had given permission for HCJB engineers to use his proprietary programs with the understanding they were not to be given out to others. When the tuning unit was assembled and connected to the tower it all worked correctly. I had brought some file folders with antenna design information which I gave out and went through with the engineers. I appreciated the opportunity to teach and train so that Steve and others could carry on antenna work without me.

Radio Amuata

Not all of my shortwave antenna work while I was with KTL required travel to distant places, and some requests came to me directly rather than through KTL. Two Christian brothers, their last name Solt, owned Omnitronics, a company that manufactured affordable transmitters for Christian organizations. They had built Radio Amauta, a Christian radio station in Peru owned by the Presbyterian Church of America. When they found that their antenna was inadequate they consulted me for advice. They needed an antenna like the Lazy H I had designed and built for the Quechua Indians in Ecuador. It was simple to adjust the size of the Ecuador antennas to the frequency of the Peru station, make a sketch of the length of all wires, and mail it to them. They built it themselves, and it provided the signal coverage they wanted. That project was rather insignificant, but it led to further work for the Solt brothers that was important to me later on.

A Tower Fell with Me On It

I met Ken Hill when he visited Tom at KTL. He owned and operated WHCB FM, a Christian station located near Kintronics. Ken's interest in broadcasting had been sparked by listening to the HCJB broadcasts from Ecuador. He often called me about small engineering needs around the studio, and asked KTL to install a large antenna on a 160-foot tower on nearby Holston Mountain. KTL built the tower, and I agreed to help raise it and install his new antenna on it with the help of volunteer Christian men mostly from my church. Holston Mountain was public land with many trees which could not be cut down without approval. I advised on the specific tower location and placement of the guy wires to support the tower, picking a spot where the tower and guy cables would be well away from any trees and assuring Ken the antenna atop the tower would be so much higher than the trees they would have no effect on the signal. I saved the trees, and they saved my life.

Ken had everything ready including a boom truck and operator to raise the tower, and on a Saturday morning a group of us assembled at the site. I and two others were ready to bolt the tower onto its concrete base when it was vertical, and other workers were ready to attach the guy cables to the anchors. Everything went smoothly and the tower was soon up, bolted down and securely guyed. I climbed the tower to disconnect the lifting cable from it, and signaled to move the boom away. Then something went wrong. Instead of moving away, the boom pushed against the tower and a guy cable broke. The tower fell slowly at first, and I had time to consider trying to reconnect the boom cable, but I realized I couldn't reconnect it without being pulled off the tower and falling directly to the ground below, so I chose to stay with the tower. Over the years I had often prayed when working on towers, and I prayed then, conscious of the fact that my Father God, the Lord Jesus and the Holy Spirit were with me and knew of the situation. I didn't plead for my life, for I knew that it was for God, the Lord and sustainer of my life, to choose. I registered my deep concern for Doris, whom I dearly loved, and our children. There was plenty of time. The tower had started down toward one of the cleared guy cable paths, but suddenly it slowed, and went in a new direction toward the trees as I watched them getting closer. I was belted securely to the tower in a way I wouldn't be under the tower.

That is my last memory before I woke up, dangling by the safety belt 40 feet from the ground. I wasn't able to breathe, but that was fixed when Ken called out asking if I was alright, and I had just enough air to say I didn't know. That opened my air passages. I couldn't get back up onto the tower, so a worker helped me onto it and helped me walk along it and climb down to the ground. I could plainly see how God had protected me when the tower fell across the two tallest trees, with me between the trees. The trees cushioned the fall so even the tower was minimally damaged.

My face had hit the tower at the end of the fall and a cut on the left side of my face was bleeding. Otherwise I felt O.K. and able to walk around and inspect the damage to the tower. Everyone else was quite shocked by the incident and Ken insisted on calling an ambulance, and then started driving me down the mountain. The ambulance met us part way down and took me to the hospital in Elizabethton, the nearest town. X-rays showed two or three cracked ribs from the safety belt, the doctor stitched up the cut on my face and Ken took me home. I had phoned Doris right away from the hospital to say there had been some problems, I was O.K., and I was just there to have a small cut taken care of and would be home soon. She told me later that she expected it was more serious than I had let on, but was alarmed when Ken, holding my arm, walked me into the house and she saw blood on my stitched up face and clothing. Ken helped to reassure her that it looked worse than it was.

The bruises where the safety belt went around me were not serious, but it was hard to sleep because breathing while lying in bed made a squeaky noise almost like chalk on a blackboard. I had returned from Sudan just before the accident, and had to go back there soon, so I asked our family doctor about the noise in my chest. He said a fluid-filled sack had broken and parts were rubbing together, but it would heal on its own without WD-40. It was better soon, and I went to Sudan on schedule. The work crew there asked about the fresh-looking scar on my face. When

they learned a 160-foot tower had fallen with me on it, they were not impressed, saying their towers were 300 feet. I had worked on the top of their towers before, and did so again with no problems.

What I've written about my work at KTL may leave the impression that short wave designs took up most of my time, but in reality, most of the time I designed custom networks for AM radio stations. Orders for these arrived constantly and kept Tom, the other engineer and me very busy. Shortwave projects were few and far between. HCJB had not found a new broadcasting site, so had no need for shortwave antennas, and Tom's father, Lewis King, told me they had decided not to accept any more orders for shortwave antennas. The antennas we had built had not been financially profitable, and I knew that was the right decision for them.

In the Meantime

Lorie, Bill and Michael moved to a larger house in Sussex, New Jersey. I helped them draw up plans for a new deck and helped build it. It turned out to be one we were all proud of and enjoyed.

Lauren Rose Hastings was born on June 30, 1992. Jim flew us out and we enjoyed fussing over our pretty little granddaughter.

UniSat, a business selling satellite dishes, TVs and related items in the L.A. area of Downey, hired Jim to be their Chief Financial Officer. The business grew when Jim put into place a loan program so customers could borrow directly from UniSat.

David was hired in 1991 by IFR Systems as a software engineer. He started taking night classes at Wichita State University, working toward a M.S. degree in Electrical Engineering.

Retirement

KTL's written policy stated that workers would be retired at age 65, and at the end of 1993 my 65th birthday was well behind me. I didn't feel like retiring and was so busy with the work it surprised me when KTL decided I should retire. Financially we were fine. Our home mortgage was paid off and we had no outstanding loans, so I applied for social security retirement pay in early 1994. I could have simply retired, but I decided to "test the waters" to see what would come up, and contacted those for whom I had done shortwave work to offer consulting services. Tom had given me permission to update his computer programs with new software to use to benefit Christian radio stations, and I worked on that at first.

Quite soon the Solt brothers asked me to analyze a transmitter circuit using transistors instead of big tubes. The circuit would allow them to produce smaller, less expensive and more efficient transmitters. I recommended it and suggested a way to make it simpler.

A Christian group broadcasting from one of the Lesser Antilles Islands in the Caribbean needed help with a transmitter problem, and another broadcaster needed drawings for a high power, reliable balun to connect his transmitter to a transmission line leading to an antenna. A broadcaster in Nashville, Tennessee had problems with interference from another station, and I designed and installed a circuit that eliminated the interference. He has continued to call upon me for help from time to time.

Tom recommended me to a Chicago businessman who planned to broadcast in shortwave to Mexico and South America from property he owned in the northern suburbs of Chicago. I gave him plans for the antennas needed and suggested a location for the transmitter building, all of which would fit on his property. It helped him realize it was more than he wanted to attempt.

In April 1994 High Adventure asked me to go to Israel again to help with their AM antenna located on the same site as the shortwave antenna on Hill of the Doves in Lebanon. They were broadcasting the gospel into Israel, and wanted me to retune the antenna to increase the signal strength into Jerusalem. I redesigned and built the circuits, and to check the signal strength the High Adventure missionary and I toured around the country. We went to the east side of the Sea of Galilee where Jesus cast out the demons that went into the pigs, then along the West Bank of the Jordan where the security fences and military outposts were spectacular, on to Jericho and from there up to Jerusalem. Throughout the trip the signal came in well on the car radio.

What a blessing that I could contribute to propagating the gospel to God’s special chosen people in the land God gave to them.

Chapter 19

At Crown International In Indiana

1994 – 1998

Don Spragg, formerly an engineer with HCJB, was now employed by Crown International in Elkhart, Indiana. He was in charge of a low power FM transmitter project and asked for my help. The FM transmitter was designed by Mike Axman of HCJB to be small enough to take to the mission field in a suitcase, and Crown planned to manufacture a number of them. After I traveled to Elkhart a few times, Don suggested that I work full time for him at Crown, and I received a formal job offer. The job would provide a regular salary working with people we knew, the Elkhart Engineering Center was there, we were still members of HCJB, and the potential for more years of active service for the Lord was great. We believed it was the Lord's leading and His will to accept this job offer from Crown.

Crown International, a well-established business in Elkhart with hundreds of employees, designed and manufactured audio equipment. It was owned by the Moore family. In past years Clarence Moore had been an engineer at HCJB and had invented the well-known cubical quad antenna. Clyde, his son, had recently served on the board of HCJB. In the late 1970s they donated the space where HCJB engineers built the 500 kW transmitter and in 1987 provided facilities within the Crown plant for HCJB to set up an engineering center to build transmitters. Doris and I had worked there briefly that summer during HMA, and later for four months before we returned to Ecuador in 1988.

Move from Tennessee to Elkhart, Indiana

We put our home in Tennessee up for sale in the spring of 1994, and a buyer soon put a deposit down on it. A Christian realtor, David Meyers, helped us find a house on the south side of Elkhart that was not completely finished, so we made arrangements to rent an apartment and store our household goods until we could move in. Crown had a mover pack up and move us, but the day the van came the purchasers changed their minds and relinquished their deposit. We went ahead with the move, our realtor in Tennessee soon found another buyer, we moved into our house, and the difficulties of moving were over. Unfortunately when the colder weather came, both Doris and I discovered we were reacting to chemical fumes from the building materials in the closed, heated house. It would take up to two years for the fumes to disappear, and we knew

we had to move. Our realtor helped us find an older house that actually cost more than we paid for the new one, but the new one had increased in value so much we made a profit on the transaction. When we counted all the places we had lived in Elkhart, this was the seventh. We were content living there for the next fifteen years.

Church

When we moved to Elkhart for me to work for Crown we joined a startup PCA church in the South Bend area. It was a small congregation and we took on some leadership roles. After three years the pastor left, and it took the church a year to call another one. We soon realized we were not in accord with the teachings of the new pastor, so we left that church. It was a difficult decision since we had been a part of the church family for five years. However, the situation was such that many others left also, we kept in touch with each other, and from time to time met together for fellowship.

We joined a well-established, conservative, mid-size, independent church not far from where we lived in Elkhart. We did not get involved in leadership, although Doris served on the Missions Committee. After a few years the pastor retired, and the church called a pastor who focused the church on the purpose driven philosophy. We studied up on the pros and cons of this and realized we couldn't support it. We started to attend a Bible study. It grew into a regular, missions-supporting church which the members named Pine Ridge Bible Church, and soon purchased a building in Goshen. Doris and I had become charter members, although from the beginning we had no desire to take any leadership roles in another church. It didn't quite work out that way, for the church needed everyone to take part in the work. We served on the Missions Committee, and I became a deacon and then an elder.

Sarah, Erin and Kate

Sarah Rose Wendt was born on October 4th, 1994, and we made a special trip to New Jersey by car to see her. Erin Christine Hastings, joining big sister Lauren, was born on December 14, 1994. Jim brought us to California to see her — and then again to see Kate Elizabeth Hastings, who rounded out Jim and Christine's family when she was born on May 21, 1997. We rejoiced with the parents of all our granddaughters and our grandson, Michael, pleased and thankful to the Lord that our family had grown.

Work at Crown International

At Crown, the manufacturing process of the 250 watt FM transmitter began when I made a list of parts for Crown purchasers to procure. It was necessary but tedious work to identify every part including every screw and washer. Crown built the transmitters and sold many to broadcasters wanting a low power transmitter. Small enough to fit into a suitcase, HCJB took them to

Christian stations in different parts of the world to be used to broadcast the gospel. I had been hired to design transmitters with output powers of 500, 1000, and 2000 Watts of RF power. The highest power available from transistors was the 250 Watts of the first FM transmitter, so higher powers required combining the power of the 250 Watt circuits, using them in multiples to build the higher power transmitters. A special circuit was required to correctly combine them, and I had recently analyzed and simplified the best one for the Solt brothers. Clearly the Lord had prepared me in advance for this work.

To manufacture low cost, repeatable, reliable units the circuits were done on printed circuit boards. I had learned the special technique required to do that at Wheeler Laboratories. Two 250 Watt circuits with the combining circuit for the 500 Watt transmitter proved to be compact enough, that 500 Watt packages were combined to get 1 kW and 2 kWs of power. To get even higher powers of 4, 6, 8, and 10 kWs that might be needed in the future, I designed separate combining circuits to which individual 1 kW and 2 kW transmitters could be connected.

The 1 and 2 kW transmitters had a special feature to avoid lost air time during broadcasts. Lightening and other events that caused voltage spikes on AC power lines made transistors fail. The transistor amplifiers were built on four printed circuit boards that plugged into the transmitter chassis. I designed the combiner circuit so that if one board failed, it could be replaced while the transmitter remained on the air. This feature was tested by a visitor one day when he removed three of the boards in succession leaving only one board in place, then replaced them, proving that it did indeed continue to operate. I'd never quite dared to do that! The higher power transmitters were still small enough to transport in a suitcase, and the power supply for them fit into a separate suitcase.

While designing the printed circuit board combiner circuits I worked directly with Crown's draftsman, who drew up the paths for all the RF-carrying metal strips on the printed circuit boards. These drawings were then sent to PC board manufacturers.

After the 2 kW transmitter was in production, the National Weather Service asked Crown to produce FM radios to broadcast warnings of severe weather. The transmitters they had been using were unreliable, and they wanted a better quality Crown product. That was my next project, and it wasn't simple because the frequency of their broadcasts was higher than the regular FM band. Transistors are quite sensitive to increases in frequency, so I had to design the basic transistor pair and combiner circuit board again. It took longer than expected, but resulted in a transmitter the weather service liked, and was a product line for Crown for several years.

Retirement from Crown and Back to HCJB

Don Spragg, who hired me, left Crown, and my work designing transmitters was essentially finished. I retired from Crown near the end of 1998 at age 70 1/2, signed up for Medicare and began serving as a volunteer at the HCJB Engineering Center.

Chapter 20

Retirement

1998 and On

This second retirement and beginning of volunteer service changed my life in some ways, yet in other ways nothing changed. We didn't need to move; I worked with and around the same people in my specialty of antennas, and continued to be active in the same church. HCJB and Crown had a close, cooperative relationship. With the approval of Dave Pasechnik, director of the HCJB Engineering Center, I agreed to work certain days on HCJB projects, and had free days to assist Crown and Christian broadcasters when needed. The move was easy. I simply moved from my desk in the main Crown building, to a desk and office in the Crown building across the street occupied by the engineering center. Doris had been volunteering at the engineering office all along, and continued helping in various ways.

Work for HCJB

Requests to HCJB for help with antenna designs came at a steady rate, and I also helped assemble HCJB 100 kW transmitters. One memorable project took place in the summer of 1999. John Stanley asked for help to remove a 10-foot diameter microwave dish antenna and transmission line from a 200-foot tall, self-supporting tower in Southeast Kentucky. It was offered to HCJB free of charge if we removed it, and HCJB wanted it to send Christian programs via satellite to other broadcasters in South America.

Unlike towers where we felt secure inside the structure, we had to climb up a ladder on the outside of the tower, crawl along a big steel girder to get to the antenna at the top of the tower, unbolt it and lower it to the ground using a pulley and rope. Wasp nests on and near the antenna complicated the work. Although tied to the girder by a rope, I knew I might be stung but I must not react involuntarily and topple off the girder. I prayed about it, ignored the wasps, and tried not to threaten them. They buzzed all around me and watched me, but didn't sting.

I went to Ecuador in the spring of 2000, and to Panama in 2001. In Ecuador, the AM station on Mt. Pichincha needed tuning adjustments in order to improve reception in Quito and the valleys beyond. In Panama I helped Steve Sutherland with transmitter and antenna problems, and we installed two FM antennas to cover the Panama City area. That was my last trip to Panama.

In 2002 I was assigned to help dismantle the antennas and transmission lines from a Voice of America site near Greensville, North Carolina. It was a receiving site that was no longer needed, and the salvaged antennas were being given to HCJB with some payment for the removal. I joined friends and volunteers from churches in Elkhart and we worked with the equipment operator of a nearby tower erection company to lower the antennas and towers. It took several days of hard work, and although some of the parts were broken and scrapped, many were in good condition. They were hauled to a Christian man's farm in South Carolina for storage to await the location of some new site HCJB was hoping to find.

From time to time over a ten year period I helped the Assemblies of Yahweh, a Jewish Christian group in Bethel, Pennsylvania, with shortwave antenna and transmitter problems. I recommended a curtain antenna to them, designed it and gave drawings so they could build it themselves. After they installed it I returned to tune and connect it to the transmitter, after which they were able to broadcast for a while without problems.

They asked for help with their transmitter, which was one like the old difficult to tune 100 kW RCA transmitter we'd used at HCJB. I used the computer program I had written in Ecuador to analyze and redesign the circuits, but nothing could overcome the critical tuning problem. They finally bought a used 250 kW transmitter and needed help with that also.

Bailey Joins the Family

Dave and Kelly had long wanted a child, and in 2000 they were chosen by a young woman to adopt her baby at birth. Bailey Rose Hastings was born on April 16, 2000 in Topeka, Kansas. Dave and Kelly asked Kelly's parents and us to join them at the hospital when Bailey was born, so we were ready to make the trip upon hearing the baby was on the way. It was a joyous privilege to hold her in the hospital and all was well until the birth mother decided to keep the baby. We and Kelly's parents went back to Wichita feeling bad, but soon were informed that the mother changed her mind and Dave and Kelly would arrive back home in a few hours with the baby. There was much rejoicing and thanksgiving to the Lord for His provision, and Dave and Kelly had learned to commit their way to the Lord whatever His will might be. We drove back a month later and were at the courthouse with Dave, Kelly and her parents when the judge finalized Bailey's adoption.

Changes in Dave, Jim and Bill's Employment

Dave had received his M.S. in Electrical Engineering in 1994, left IFR Systems to help start up LP Technologies, and then went back to IFR as Software Architect in 1999. He continued to take night classes, and we were present in December, 2000 to see him awarded a PHD in Electrical Engineering from Wichita State University. He felt he could progress no further at IFR in Wichita, and accepted a position with Nuntius, a startup company in Irvine, Orange County, California, and moved into a home they purchased in Rancho Santa Margarita. In two years the

company failed, and he found work as a program manager with GE Healthcare in Tustin, California. It was close enough that they didn't have to move.

Bill's job was eliminated due to reorganization at Nabisco. He accepted a position with Con Agra in the western suburbs of Chicago, and in 1999 the family moved to Aurora, Illinois. Since we lived in Elkhart, we were pleased to be only two and a half hours away. Lorie worked part time as an ICU nurse, and **S**arah and Michael attended a Christian school in the Aurora area. We proudly watched Sarah in ballet and piano recitals, and Michael in some Boy Scout activities.

Jim decided in 2000 to start his own business as an authorized Dish Cable TV distributer. He and Christine had purchased a home in LaVerne, located east of L.A. in the San Gabriel Valley, and at first he worked from there. As the business flourished he rented an office complex in LaVerne and eventually had 25 employees.

To Australia

The HCJB group in Australia planned to build a broadcast site, and in November 2002 I went to help install antennas and transmission lines. My first stop was in Melbourne, where the studios and headquarters of HCJB Australia are located. David Maindonald, the director of HCJB Australia, took me sightseeing, and I stayed overnight with him and his wife. The next day I flew from Melbourne on the southeast tip of Australia to Perth on the West Coast where I was greeted by an HCJB representative. From there I flew on to Broome on the Northwest Coast, where I changed to another flight to Kununurra in the Northeast corner of Western Australia. It had been a full day of flights all around Australia, with a good introduction to Australian hospitality. The HCJB antenna site, on a farm across the Ord River from the airport, had been given to HCJB for a broadcast site by a Christian family.

There were one-room apartments and a community bathroom at the site, and I lived there for my 21 day stay. The goal was to get on the air as quickly as possible. John Stanley had provided designs for simple amateur type antennas, and Ian Williams had assembled them. I helped put up the towers, mount the antennas on the towers, and install transmission lines and switching systems between the transmitter and three antennas. When everything was connected I ran tests on the antennas and tuned them, and the station went on the air. Arcing appeared on the transmission line when operating on 100 kW, but lowering the power to 75 kW corrected the problem. We planned to broadcast on the temporary antennas while funds were raised and a more adequate site found for full-size broadcast antennas and more transmitters. I would provide designs for the future antennas. On my way home Ian invited me to his home where I met his mother, a very gracious woman who wrote a letter to Doris to thank her for lending me to help with the work there.

Other News

In 2003 we attended a special reunion at HCJB headquarters in Colorado Springs of about 100 former HCJB missionary colleagues. We all felt awed and moved to meet with those whom we had shared so much of our life in Ecuador. From there we went to Yellowstone Park for a few days, a gift from our children to celebrate my 75th birthday.

In 2004 Dave accepted a transfer to GE Healthcare in Milwaukee, Wisconsin, with the title of Global Software Manager. He was responsible for software development on telemetry systems, storage systems and gateway servers. They settled down in a nice house in Germantown, and Bailey came to love going to school there. It was wonderful that for the first time we could easily visit Dave, Kelly, Bailey and Dandy, their newly adopted Shih-Chi dog.

Lorie decided to home school Sarah and Michael, and they both thrived in their studies. In 2004 I spoke at Michael's Eagle Scout induction ceremony, as did Nancy and Rex Moses' son-in-law, Jim Mohler, a professor at Trinity College who was also an Eagle Scout. We were saddened when Jim went to be with his Lord in 2010.

In 2005 many of Doris' extended family gathered in the Ventura, California area to celebrate Charlotte's 80th birthday. Her daughter Cheryl and son Larry hosted the activities. Attendees from all over the country included all of Doris' siblings, many nieces and nephews, and Lorie, Jim and Dave and their families. Charlotte's husband, Lou, passed away in 2008.

Papua, New Guinea

In 2005 I was asked to design a shortwave broadcast antenna for a Christian group, Wantok Radio Light, in the capital city of Port Moresby in Papua, New Guinea. HCJB had already put in FM stations for Wantok Radio, but now they wanted to cover the entire country and surrounding islands. The ideal antenna was the Lazy H we had used in Ecuador. It was simple to tailor the design, and in May I traveled to New Guinea to supervise its installation. Papua New Guinea was populated by about 850 different tribal groups, and they had been at war with each other for many years. Governing these people was a problem, and the officials had noted that the people were more peaceful where the Christian missionaries worked and taught. They proclaimed themselves a Christian nation and encouraged Christian broadcasting to help with their people groups. The site the government allotted for the shortwave station was land recently made available at a place called Nine Mile, where two groups had fought, one driving the other out.

Elkhart HCJB engineers Mike Axman and Curt Bender went to work on transmitters, and the three of us stayed in one side of a duplex. Dave and Patti Olson, a short term missionary couple from the United States working at Wantok Radio lived in the other side. Dave assisted with the

antenna work as each day we all rode to the studios and joined those going to the site for work. The local people at Nine Mile were hired to do the work, and we soon had the simple antenna up and tuned. We then ran a buried transmission line to the container that housed the 1 kW, HCJB-designed and built shortwave transmitter. When the work was all finished the broadcast signal was good.

In late May 2007 I returned to Papua New Guinea to repair the antenna, and stake out the location for a second antenna and transmitter to operate on a 90 meter night time frequency. I stayed with HCJB missionaries Alan and Sarah Good, and Alan helped with all the work, which was done without incident.

50th Anniversary Cruise to Alaska

April 22, 2006 marked our 50th wedding anniversary, and the engineering center honored it with some kind remarks, a specially decorated cake, and corsages for Doris and me. Our children also wanted to do something special for us, and in August they treated us, all our grandchildren and themselves to a seven day cruise to Alaska on the huge Coral Princess cruise ship. Together we enjoyed the fun of many activities on board the ship, a varied, delicious cuisine, sights of massive glaciers, and visits to historical Alaskan towns. After the cruise we went by a scenic bus trip to Anchorage, and still feeling a "sea legs" effect did some sightseeing before taking our separate flights home. What blessings the Lord, and our children, allowed us to enjoy as we commemorated our 50 years of marriage.

Central African Republic

Integrated Community Development International (ICDI) asked HCJB to install a shortwave radio transmitter and antenna to cover the African nation of Central African Republic (CAR). In February 2007 four of us went from HCJB in Elkhart; Jeremy Maller and I to erect the antenna, and Curt Bender and Dan Anderson to install a microwave dish and internet system for program distribution and e-mail. Again the best antenna was the Lazy H, this time to operate on a daytime frequency in the 49 meter band.

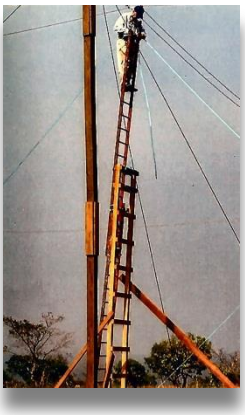
We flew to Bangui, the capital city of CAR, where ICDI members met us and took us about 70 miles north to Boali, the broadcast site. A house had been rented for our use, and we had brought safe food with us, so we were quite comfortable during our stay. Daytime temperatures were in the 90s. My co-workers were concerned that a 79 year old could collapse at any time, but I handled the heat and work as well as they did.

While in Elkhart we had designed and built the wire antenna which would be supported by six wooden poles. The antenna, poles, 1 kW HCJB transmitter and everything needed was shipped to CAR. With much help from the African workers, we staked out the placement of the antenna, dug holes, and mixed and poured concrete for the bases of the poles. While the support

poles were on the ground we attached the antenna to them. A crew on each pole raised the poles and antenna at the same time.

After burying ground wires and connecting to the transmitter, tuning the antenna was the final step. As sometimes happens, the test equipment for tuning failed. In my early days at Wheeler Labs we did things experimentally, as I would have to do this time without the test equipment. I had the workers prepare a wooden frame to hold a 30-foot ladder vertical, went up the ladder to the tuning part, and manually moved it to find the tuned location. That worked perfectly, and after the fifth adjustment the antenna worked very well. At that point two Africans sat down before the microphone and began to broadcast. They introduced the station to the public with great enthusiasm, while the Africans at the site with radios broke into joyful dancing as they listened.

Since then, instability in CAR grew, with rebel groups taking over towns and cities. As uprisings increased, Boali radio equipment was stored at the main ICDI office in Bangui for safekeeping. In March of 2013 rebel forces took over Bangui, ICDI staff members' homes were looted, two member's sons were killed, and the stored equipment stolen. While there continues to be limited broadcasting from the station, the ICDI staff is determined to get all the gospel programs back on the air as soon as possible, and HCJB is helping by sending a good bit of equipment to help replace what was lost.



Tuning antenna by hand in Central African Republic

***Central African Republic*-In 2007, HCJB Global Technology Center engineers helped local ministry ICDI install a radio station, providing health information and the gospel to a nation beset by poverty & disease.**

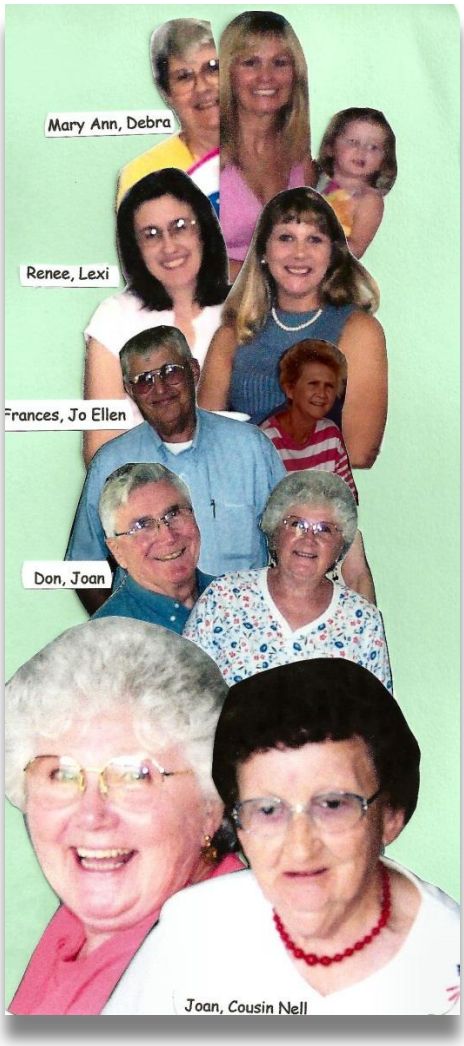
***Voices and hands-working together for the cause of Christ.* ***

Mike Axman (2nd from left), Don, Curt Bender (4th & 5th from left) with Papua, New Guinians 2004

Steve Sutherland and Don testing antenna at new Australia site, 2011

HCJB Australia Site *

***HCJB Global Photos**



Hastings Relatives

Grandmother Hastin and Aunt Pearl – Grandma lived to be 93

Don's brothers and sisters – Joan, Don, Betty, Darwin, Jo Ellen, Robert, Billy (Gary not present)

Don, Darwin, Dad, Robert, Gary

Hastings Family Reunion

Work for IREC

In March, 2000, Clyde Moore sold the audio section of Crown to Harmon International. He kept the FM transmitter part, moved it to a new location in Elkhart, and called it IREC (International Radio and Electronics Company,) which was the original name of Crown. At that time Clyde donated to HCJB the Crown building located across the street that the engineering center had been using. I continued to help IREC with FM transmitter design problems from time to time as a self-employed engineer. In 2008 IREC hired a new engineer to head the FM transmitter design work, and he began a cost reduction plan. I helped to select new, lower cost parts and materials, redesigned the printed circuit boards, and supervised the draftsman as he completed the new drawings. That kept me busy from May through August.

Pifo Site Has to Move

For years HCJB knew Ecuadorian officials had tentative plans to build a new airport in the Pifo Valley not far from our transmitter and antenna site, and in about 1997 officials informed the mission it would have to move away from Pifo. Then the officials considered other locations for the airport and the mission awaited their final decision. In 2002 their decision was final, we had to move. A search began in many areas of Ecuador for a new broadcast site. The most feasible seemed to be property in Santa Elena on the Ecuadorian Coast, HCJB purchased it, and plans began in earnest to move the equipment there. Doris and I stayed in Pifo for a month for me to work with Steve Sutherland, who was in charge of planning, to check the coastal site for broadcasting suitability, help select the antennas to move and plan for design changes. After more than a year, specifics of all that would need to be done convinced mission leaders that the costs of building a new site would be excessive, and in late 2003 plans for that site were abandoned.

Broadcasting from the Pifo site continued through 2005. In 2006 the towers and antennas began to be lowered, and the task was finished in December 2008. The transmitters were removed, some to be reworked in Elkhart, others to be scrapped. The Pifo site was sold and the new owners took it over in late 2009. Presently, HCJB is broadcasting only from Mt. Pichincha, on one shortwave transmitter into Ecuador, and on AM and FM. With the shut-down of broadcasting from Pifo came a reduction of staff and reorientation of mission activities in Quito.

I felt sad that the message of salvation in Jesus would no longer be heard in countries around the world from Pifo. I didn't feel bad about the years of work to design and build the antennas and transmitters, for that was all done for the Lord, for Him to use as long as He chose. They had served God's purposes for many years, as evidenced by hundreds of letters that told of people's changed lives. God is in control of everything, and He permitted Pifo to be closed.

According to HCJB Global president Wayne Pederson, "the way people consume media has changed, so we have the opportunity to change to delivery systems such as satellite, AM/FM and the internet. The closing of shortwave in Latin America is strategic because of the planting of

local radio stations across the region and around the world. These stations are staffed and programmed by local Christians who can speak to the culture in their own communities."

80th Birthday

When my 80th birthday drew near in 2008, the engineering center recognized it with a decorated cake for all to enjoy. Dave and Kelly invited us to their home in Germantown, Wisconsin for the weekend and a special dinner out. I didn't know that Doris, Lorie and Kelly had written to all my friends and relatives to ask them to send greetings to put into a book of memories. I expected Lorie and the kids to be there, but upon arriving, what a pleasant surprise when Jim, from California with his family, answered the door. Later, when the doorbell rang, I was asked to answer it and my brother Darwin and sister Joan stood at the door. They had driven all the way from Missouri. We did have that special dinner out, but even more special was the time with those I loved.

Hastings Reunions

When I was a child my family often visited my grandparents, aunts, uncles and cousins. As the extended family grew, relatives on my mother's side organized an annual Frye family reunion so everyone could be together at the same time, and we went each year. When Doris and I were married, that is where she first heard me called by my boyhood name, Donnie. My father's side was too widely spread for reunions, but later my brothers and sisters organized Hastings family reunions held near the Bronaugh, Missouri area every year on the first Saturday in July, and we attended when we were not in Ecuador. It is a well-attended, popular event for my siblings and their families. Dave and Kelly were able to attend when they lived in Wichita. Even from as far away as New York and California, Lorie, Bill, Michael and Sarah, and Jim, Christine and their girls attended once. As we get older the long trip gets harder and harder. In 2011, Sarah went with us and helped with the driving.

More News of our Children

David:

In the years around 2007 Dave and Kelly felt a growing interest in adopting another child, and asked us to help pray about it. They decided to pursue adopting a girl from China, and requested one who would have some physical limitations. They went through the necessary long, extensive process and finally learned they had been matched with a little girl about three years old who had had surgery to correct a heart defect. They named her Jaclyn Kaye Xuerong Hastings, Xuerong meaning beautiful snowflakes in Chinese. We agreed to stay with Bailey and in November 2009 they flew to China to get her. They e-mailed almost every day so we knew what was happening, and that Jaclyn couldn't use her right arm, hand and leg and could not walk. They were reassured

that with physical therapy and personal attention she couldn't get in China, she would quickly be able to walk and over time regain use of her arm and hand. They were in China three weeks. Jaclyn could not understand English, nor Dave and Kelly Chinese, but she bonded with them quickly, and was a happy, shy little girl when they arrived back.

Dave had gained a lot of experience and progressed to a global leadership position at GE Healthcare, but felt he was at the point where he could go no further there. Besides that, he didn't like the harsh, cold, long winters in Milwaukee and wished for a warmer climate. When he saw an ad in a scientific magazine for an open position in San Diego requiring his experience, he applied for the job, and after interviews the company hired him. We were sorry to have him move so far away, but wanted what was best for him and his family. In January, 2010, soon after they arrived back from China with Jaclyn, they moved to San Diego and he began work at Hospira, a pharmaceutical company that develops generic injectable medications and infusion pumps. Bailey missed her friends at first but has adjusted to her new life and now is in 7th grade. Jaclyn quickly started to walk and her right leg has strengthened. She has recently had surgery to allow her to open and close her right hand. She understands English well now, speaks it pretty well, and goes to a K–1st grade class in school.

Jim:

Jim and Christine had joined Grace Church in Glendora early in their marriage, and through the years they as well as the girls have had various responsibilities in the church. For example, in 2002, 2004 and 2006 Jim led church work groups to Kenya and Tanzania, and took work groups twice to Ecuador. Jim is now an elder in the church.

Russ Cline, Jim's former school friend from the Alliance Academy, leads a ministry called Extreme Response (not related to Grace Church), and Jim is on its Board of Directors. He often goes to Ecuador for related ministry and has participated in trips to raise funds. Christine went on an Extreme Response work trip to South Africa in 2008.

Jim's Dish cable business eased off in the economic downturn and he added another business, Vivint, selling home security and automation systems throughout North America.

Many times Jim provided tickets for us to join them for Christmas or other special occasions, or for us to stay with the girls while he and Christine were away. It's been a joy for us to watch the girls grow up. When we visit we often hike with them in the nearby canyons, taking along our walking sticks that have been saved for our visits. An important part of their family is their petite Goldendoodle dog, Ellie.

Lauren has begun her senior year at UCLA majoring in Economics, and Erin her freshman year at George Washington University in Washington D.C. majoring in History. Kate has begun her junior year in high school.

Lorie:

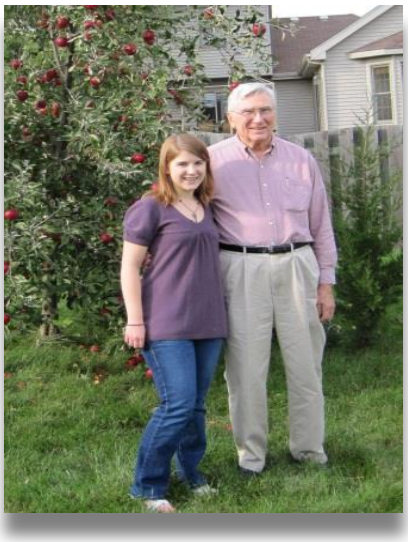
Lorie suffered two ruptured disks in her neck at work while trying to restrain a man coming out of a drug overdose, and had to have surgery to replace the disks. She recovered well, but for three months was not allowed to drive. Michael, who had finished high school under Lorie and Bill's home schooling, was attending the College of DuPage and living at home, and was able to help out a lot. We spent about a month with the family to help.

The downturn in the economy developed about this time, the new company Bill worked for went bankrupt, and he had to find a new job at a time when businesses were cutting back. He was hired by Blaine's Farm and Fleet, to work at their headquarters in Janesville, Wisconsin as their logistics manager. They put their house up for sale and looked in the Rockford, Illinois area for another one.

Lorie earned a M.S. degree in Nursing from Lewis University in the Chicago area in 2009, which qualified her to take the Adult Nurse Practitioner (NP) boards. She soon passed the boards, and by then had a job as an adult NP working with Dr. Gary Oberg in his Integrated Medicine practice in Crystal Lake, northwest of Chicago. After another year of study, she passed the board test to qualify as a Family NP and now is a Family Nurse Practioner at the Walgreen Take Care Clinic in Sycamore, IL.

Michael attended the College of DuPage for two years, went on to Liberty University in Virginia where he graduated in 2010. In 2014 he will finish law school there.

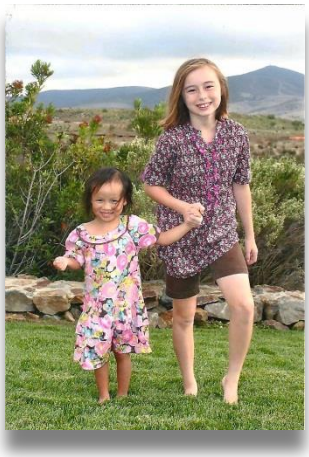
Sarah has begun her freshman year at Liberty University, and lives in the same two bedroom apartment as Michael. She is able to have her cat, Ebony with her there. She is interested in the field of medicine.



Don and Sarah by apple tree they had planted

Erin, Kate and Lauren liked to hike in the canyons

Doris with Chuck, Ken, Charlotte, and Jerry



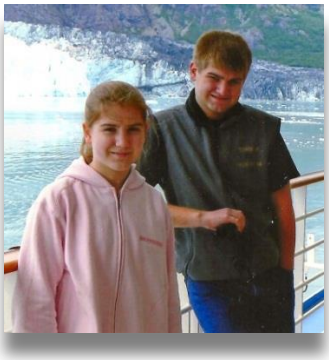
Jaclyn and Bailey, 6 & 12 years old

Michael became an Eagle Scout

Celebration of Don's 80th birthday – from left: Bill, Michael, Lorie, Sarah, Erin, Joan, Bailey & Dandy, Kate, Dave, Kelly, Doris, Jim, Lauren, Darwin, Christine

Erin, Lauren (with Ellie), Kate

David Russell of HCJB Global Technology Center honoring Don with 80th BD gift



Sarah & Michael

80th Birthday Celebration Darwin, Don, and Joan

Bailey & Jaclyn

50th Wedding Anniversary Cruise with family

Lorie and family

Dave and family

Don and Doris

Jim and Family

Bailey

Erin

Jaclyn

Kate

Lauren

Michael

Sarah

Bailey

Erin

Jaclyn

Kate

Lauren

Michael

Sarah

Bailey

Erin

Jaclyn

Kate

Lauren & Ellie

Michael

Sarah & Ebony

Chapter 21

Loves Park, Illinois

2010 and On

Move to Loves Park

It was becoming more and more difficult to handle the tasks required to keep up our home in Elkhart, Indiana, and we knew that at some point we would need to live in a smaller, less task intensive place. My HCJB work mostly involved communicating by e-mail, so I could contribute to the spread of the gospel wherever we located. Ideally it would be in an area where the cost of living would not be too high and not far from one of our children. We considered California where both Jim and Dave live, and Illinois where Bill and Lorie live. With Bill and Lorie's approval we decided to find a place in their area. Lorie had finished classes, had a nurse practioner job in Crystal Lake, had put their house in Aurora up for sale, and were looking for a house to buy in the Rockford, Illinois area to be closer to Bill's work in Janesville, Wisconsin.

Three days after our house was advertised for sale a missionary family who had looked at the house before we advertised it made an offer, and we accepted it the next day. Doris quickly went condo hunting with Lorie as she was looking for a house in the Rockford area. Their house in Aurora had not yet sold. It was a busy time for me at the engineering center, so I encouraged Doris to find a condo she liked. She found one at 5326 Sand Piper Place, Loves Park, IL 61111 on the northeast border of Rockford, I checked it out and thought it was fine, we made arrangements to purchase it, and set April 8 as the closing date and day we would move in. I'll not go into the many details involved in the move, but Lorie was a great help and encourager, went with us to the closing, and helped us handle all the confusion of our things being moved in.

Lorie and Bill's house in Aurora sold, and they found a nice house in Belvidere, northeast of Rockford. It's a half hour drive to Bill's work, 45 minutes to Sycamore where Lorie works, and only 10 minutes from the condo we had moved into.

We enjoy living close to Lorie, Bill and Sarah. Michael is away at college most of the time and now Sarah is there also. Lorie keeps watch of our health and has good advice and help when we need it.

Our condo, on the first floor in a building with four condos, is on a small hill in a beautiful area with nice lawns and trees. Other condos are to the north and west, but there is a forest to the east and south of us that is very special because plenty of wildlife comes out of the woods onto our back lawn. We see many birds, squirrels, rabbits, wild turkeys, coyotes, and occasionally deer. It's a pleasant place to live, with none of the yard work or snow shoveling to do.

One of the special bonuses of living in the Rockford area is that we've been able to reconnect with missionaries we've known through the years, John and Mary Doerfer and David and Joan Anderson. David has since gone to be with the Lord.

Australia Again

During the years after my 2002 visit to HCJB Australia the mission leaders selected nations they wanted to target with broadcasts, and I designed antennas for them to use. These included New Zealand, Japan, China, India and Middle Eastern countries, as well as countries in Indonesia and the South Pacific Islands. In 2005 the state government granted HCJB Australia a long term lease on a 1,250 acre parcel of land to be used for shortwave broadcasting. By that time I had designed nine antennas, ready to be constructed and installed. Steve Sutherland, his wife Kathy and two of his children moved from Ecuador for Steve to supervise installation of antennas on the new site. I worked with him via e-mail and Skype from Elkhart and later from our new home in Illinois. After installation of electricity, buildings, a suitable road, tower bases and anchors, Steve oversaw the assembly and erection of the support towers, and construction and attachment of the first four antennas to the towers, one of which was a commercial antenna I had not designed.

Steve and an Australian crew put up the commercial antenna first without my help. In September 2011 I went to help with the first three of the antennas I'd designed. My main task was to train Steve and other Australians how to tune the antennas. I also provided tuning network design programs I'd written. We mounted the antennas on the standing towers, then ran tests, designed the tuning parts and connected them to the antennas. I was there a month, and returned home while transmission lines and a 100 kW transmitter built at the HCJB Global Technology Center in Elkhart were being installed. The new site went on the air in 2012, and Steve reported that the antennas had been properly tuned and were operating with no problems. Listener reports showed that the signal strength is much better using the new antennas which are sending the gospel to Japan, China, India and the South Pacific.

Although I was 83 years old, I was able to take the long trip to Australia and work long days in plus 90 degree heat. How thankful I am for the excellent health the Lord has continued to give Doris and me throughout the years, allowing us to have a part in sending the saving gospel of Christ to the world.

The HCJB Global Technology Center

When we moved to Loves Park the technology center honored us with a farewell program, dinner and money gift. We continue to receive news of the center as they send weekly e-mails.

Dave Pasechnik, former director of the technology center is now VP of HCJB Global Media, and David Russell has replaced him.

In December, 2011, the technology center celebrated its 25th anniversary. Initially the center focused on building shortwave transmitters for ministry partners, and produced nine 100 kW

transmitters. Later the center designed and produced 1 kW shortwave transmitters and special antennas to be used by Christian groups to broadcast to their entire country, as with the antenna and transmitter we installed in 2005 in Papua, New Guinea and 2007 in the Central African Republic.

Broadcasting from Ecuador had been diminished, and the Elkhart technology center became the base for conducting research, development, training and technical support for AM, FM and shortwave radio stations around the world, as well as satellite distribution and satellite-based internet services. In recent years the technology center staff developed station automation systems and a fixed-tuned, solar-powered SonSet radio that can be pre-tuned to pick up a specific Christian radio station. They are active in pioneering equipment and software for a form of digital radio broadcasting called DRM. A media center was recently built and will provide training opportunities for young technologists to create content for new media such as YouTube, Facebook, blogging, texting, Twitter, and mobile phones.

I continue to serve under the center by responding to requests for help with antenna problems or questions about how antennas and transmitters work, and will continue as long as the Lord gives me strength and ability.

In Conclusion

"This man is just like you," a pastor said of me to his congregation after a presentation I made at his church while on home ministry assignment. It's true. I'm simply one of many who set aside their secular work to follow the Lord's leading to use their God-given skills to help proclaim the gospel. What a privilege for Doris and me to have known and worked alongside mechanics, engineers, doctors, nurses, teachers and many others (even an explosive expert) who followed this same path.

As I wrote these stories, I enjoyed reminiscing about my life and the lives of my family. It helped me to view my span of 84 years not only as individual events, but as God working out His loving plan in us. It is my hope these stories encourage others to see God's plan being worked out in their lives as well, and to experience the resulting peace and joy that comes from trusting Him.

ACKNOWLEDGEMENTS

I have never attempted to write anything like these stories, and I'm an amateur at it. Still, I wanted to try, and the previous pages are the result.

Lorie kept all the letters Doris wrote to her after she left for college while we were still serving at HCJB. Those and the letters we wrote to supporters brought to mind many details I would have forgotten otherwise. Thanks to Doris, Lorie, Jim, and Dave who helped so much when I needed information only they could supply. This is their story as well as mine. Also, many other friends were helpful in the same way.

I'm especially grateful to Doris for the many hours she devoted to typing, proof reading, editing, and her encouragement along the way. I could not have done this without her help.

Dee Wilson, a longtime friend, gave valuable editorial assistance. Barb Lindeman, a friend in our Maranatha Sunday School class, compiled, edited and printed the stories and photos. An experienced professional, her knowledge, advice and skill was essential to complete this project. I say a special thank you to both Dee and Barb.

Appendix 1

In 1984 a church asked Lorie to say something about being a "missionary kid"

MK means missionary kid. I am an MK — my parents went to radio station HCJB, the pioneer missionary broadcaster, ten years ago. I lived in Quito, Ecuador, South America four years and attended high school there. Those years have changed my life, and I would not have had things any other way.

Often I am asked, "Which is home, Ecuador or the United States?" I developed a sense of "home" in Ecuador and a commitment to both the U.S. and Ecuador. For example, now when I visit Ecuador I become teary about going home, but when I return to the U.S. I become teary about coming home.

Being an MK has given me many opportunities. I feel my horizons have been expanded by living in a culture other than my own. In an impoverished yet rich third world country I have seen and done many things that most people can only dream of, such as trips to the jungle, alligator hunting, dugout canoe trips through the tropical forests, Inca ruins in the high Andes Mountains, and colorful Indian markets. Summer jobs in the HCJB hospitals led me to pursue nursing as a profession. Being in the midst of all phases of mission outreach gave me a close view of how God uses ordinary people to accomplish His will.

Along with the advantages of being an MK came frustrations and pressures. While living in Ecuador there were things I needed that were not available, such as new clothes, or a driver's license. When I returned to the U.S. for college, I had to suddenly deal with a different culture. The abundance of consumer goods in stores, slang words I had never heard before, different clothing styles, different popular music, all took time to adjust to. I felt different from kids my own age. I did not always fit in with them and felt isolated at times. Gradually this became less of a problem as I adjusted to life here. College vacations were a difficult time for me. While other kids went home to be with their families, my family was far away in Ecuador. People opened their homes to me and cared for me which made the separation manageable.

Looking back I see how these times served as a valuable growing experience. As an MK I am definitely an advantaged person. I am thankful that the Lord chose my family to serve Him in Ecuador and I marvel at how He has guided my paths. I look to the future with excitement and anticipation to see what He has in store for me.

Appendix 2

Excerpts from

Harold A. Wheeler's Legacy

Recollections of Wheeler Laboratories During the Heyday of Radar

The editors, David Dettinger, Chief Engineer, 1947–61, & Henry L. Bachman, President, 1968–70, introduced "*Harold A. Wheeler's Legacy"* as follows:

In the 50 years of Wheeler Laboratories' existence, first as an independent development laboratory and later through its association with the Hazeltine Corporation, the organization achieved a strong reputation among its peers, a reputation that surfaces even today. It was known not only for its creative and elegant designs of antennas, microwave assemblies, and other RF components, but also for the professionalism and cohesiveness of its staff; in short, for the excellence of the entire organization.

Those fortunate enough to launch their careers at Wheeler Labs, as it was usually called (sometimes abbreviated to WL) found it an exciting place to work and a training ground of the highest order. One example of this regard has been the occurrence of three reunions since the dissolution of the company, drawing former employees from all over the country. Another is the flow of correspondence among past employees not only in holiday greetings, but also in exchanges covering myriad topics.

It is hardly surprising that when in 1994 Dr. Wheeler suggested the preparation of an historical account and requested inputs from former staff members, there was an outpouring of interest and a flood of responses. Wheeler himself began organizing a book and drafting segments. So great was the volume that he determined to prepare not one book but two, the first covering his personal experiences during the period of the Labs and the second incorporating the submission of others.

Unfortunately for all concerned, Dr. Wheeler died unexpectedly in 1996 at the age of 92, in the midst of preparing and organizing the material for publication, leaving folders full of incomplete papers. It fell to some of the "old timers" to pick up the task. A decision was made to focus on the second book, including within it a chapter covering Wheeler's central role. This volume embodies the result of that effort.

My response to Mr. Wheeler's request in 1994 to write recollections of my work at Wheeler Labs was as follows:

I began working at Wheeler Labs in mid-August 1954. One of my first challenges was to get through the traditional WL initiation of new engineers with my sports jacket intact. One afternoon I found my jacket with one sleeve inside the other, with an eight-inch long 4x4 wooden block inside the inner sleeve. Neither sleeve could be pulled over the 4x4. I worked at it at home most of the evening and finally discovered how to remove it. I feared at times I would have to cut the jacket, as I later found out others had done.

My first work assignment involved the design of vehicular and base station communication antennas for Communication Products Company in New Jersey. These antennas operated in the VHF and UHF bands and required experimental adjustment of element lengths for proper matching. The work was under the direction of Ned Spencer with direct supervision by Bob Wengenroth, who had worked on these designs prior to my arrival.

These antennas were tested and adjusted on the roof of the WL building, a welcome change from working at my desk. There were a few logistic problems, however. It was necessary to run a long extension cord from the test equipment through a window to an electrical outlet in the office below. I had to drop the cord, run down to the office, open the window, fish the cord through and plug it in. Some working in the office decided it would be simpler if I just rapped the extension cord on the window and they would bring it inside and plug it in. That was a great advantage for me, but it soon became a distraction to those working in the office. One day I couldn't get any AC power on the roof and checked back in the office. Someone whose patience had worn thin had cut off the plug at the end of the extension cord!

Over the years we at WL designed a whole catalogue of high quality antennas for Communication Products (CP). Many were conventional skirt-dipole antennas, including two-element directional as well as single-dipole omnidirectional types. The lower frequency antennas required more space for testing than was available on the roof of the WL building in Great Neck. Consequently, these were tested at the New Jersey farm of the owner of Communication Products. We later greatly improved the antennas for CP. One such improvement was the coaxial-collinear array antenna, reinvented when Bill Bryson, Chief Engineer at CP came to Wheeler Labs to discuss future antenna design work. He had the idea of cutting gaps in the outer conductor of a coaxial line to allow current to flow to the outside and radiate. Mr. Wheeler explained why that wouldn't work and went on to suggest modifications that made it into a workable antenna. CP sold many thousands of these antennas. When they applied for a patent,

however, they found that a man from Germany had invented it back in 1934. They were able to get an improvement patent for it, though, and this antenna is still widely used at base stations.

Bill Bryson thought of another antenna idea that he said came to him while eating a plate of spaghetti. Many CP antennas consisted of a quarter-wave radiator over a ground plane of radial spokes. When the antennas were mounted on vehicles these spokes were hazardous. Bill's idea was to coil the spokes into a spiral similar to heating elements on a stove, making them compact and less dangerous to work around. Tests proved that the spirals worked, with only some reduction in bandwidth compared to straight spokes.

Two more antennas for CP are important to remember; both were suggested by Mr. Wheeler. The first was an antenna to compete with other suppliers of communication antennas. It consisted of a radiating wire several wavelengths long in which the out-of-phase portions of the wire were wound into a coil too small to produce significant radiation. In this way the in-phase portions radiated with just enough out-of-phase radiation to produce some super gain effect. CP sold many of these base station antennas and others market them today as well. As for patenting, this time it was an Englishman who had invented it in 1936.

The second antenna was for radio broadcasting in the FM band. CP needed a low-cost, simple antenna that would radiate circular polarization in all directions and provide as much gain as desired by stacking elements one above the other. The antenna devised was a horizontal open loop with one half bending down and the other up to look somewhat like the thread on a screw. This antenna worked quite well, was widely used, and is still marketed today.

Another project I worked on in my early days at Wheeler Labs was related to guidance antennas for the Hawk and the Sparrow III missiles. The work was for Raytheon, with Pete Hannon directing my efforts. The key feature of the antenna was a rotating disk spinner with three slots, which resulted in a narrow radiated beam that spun at three times the rate of the disk. Our goal was to improve the antenna performance by finding the optimum spinner shape. Many different configurations were tried. The tests were done on a range in the basement of the Great Neck building, where absorber panels were strategically located to prevent unwanted reflections. The spinner was turned by hand a few degrees at a time and the resulting signal on a detector across the room was recorded. The technician turning the spinner was behind an absorbing panel, and it was comical to see his arm appear periodically as if from nowhere to make each adjustment. Many hours were consumed in this operation, but no improved shapes were identified. Instead, a polarization filter was devised which absorbed the objectionable radiation generated by the spinner slots. (This is a good example of how the staff at Wheeler Labs often found alternative ways to achieve a desired result when the first approach was unfruitful.) The polarization filter consisted of conductive strips on a fiberglass sheet. These strips absorbed polarization parallel to

them, but passed perpendicular polarization with no noticeable loss. The technique was used on later projects as well.

I was among those who transferred to the Smithtown laboratory when it first opened in 1957. This new facility had a pattern range to test precision tracking antennas. We also installed the roof-to-ground pattern range for CP communication antennas. Initially several of us carpooled together for the long drive from our homes near Great Neck to Smithtown, something none of us will forget because of the traffic on Route 25A. Later other roads were built and it became easier, but by that time we had all moved to the Smithtown area.

I became involved in one of the Nike-Zeus projects soon after transferring to Smithtown. My project was to design a new Missile Tracking Radar (MTR) antenna for the system. It was to be a precision tracking steerable parabolic antenna of the Cassegrain type, similar to the earlier Nike-Hercules antenna but only four feet in diameter. The work was done for the Bell Telephone Laboratories Murray Hill group. The design met specifications, but after it was completed a new multimode comparator was designed at Wheeler Labs that was incorporated into the MTR design, giving it added capabilities. The new comparator required the redesign of the antenna sub-reflector. Later the MTR design was used in other applications. I also designed a new sub-reflector for the Nike Hercules antenna to enable it to function with the new comparator. This same design was then used on the Air Force Titan 107A-2 radar antenna that was used to guide NASA missiles during launch.

Shortly after the Nike work I was assigned to a Navy antenna project which became the SPG-55A. The purpose of the project, which was contracted through Raytheon, was to modify an existing Navy gun-laying radar antenna to give it missile-directing capability. A memorable part of this project was my trip to the Boston Navy Yards to see one of these antennas on a Navy destroyer. The design accomplished all goals despite the lack of precision on mounting surfaces of the old antennas being modified. (We even had to re-machine the mounting surfaces.) One distinctive feature of the antenna was its very prominent white nose cap. The antenna required some very careful study and design work as well as judicious use of absorber material to prevent holes in coverage that could lose a missile.

Two interesting events occurred following this project. The report on the SPG-55A antenna, which three of us on the project helped write, was sent through Navy channels; I received a note from a Navy official that was very complimentary. He stated that by reading our report he understood for the first time how this type of Navy antenna really worked. That was a great encouragement, and I have always been grateful for the training in report writing I received at Wheeler Labs. The second event took place several months later when I received a phone call from the Philadelphia Navy Yard asking what was in the large crate stored there. The irony of

this really hit me as I remembered how hard we had worked to meet a very urgent shipping schedule many months before.

The SPG-55A antenna was produced for many years. Since Wheeler Labs had done the design we were best equipped to certify the antenna's performance, so for several years we redesigned it for new manufacturers.

Another item developed at Wheeler Labs was a polarization-converting panel. I was assigned to one such project when an Army group from Langley, Virginia asked Wheeler Labs to design a panel to convert the radiation from the Nike-Ajax lens antenna to circular polarization. This was achieved by mounting a flat panel with a polarizing wire grid onto the front of the antenna. I remember this small project because some time later I saw one of the polarizing panels on a Nike-Ajax antenna when vacationing in the Outer Banks of North Carolina. One of the rewards of our work is to actually see our designs in use.

In the mid-1960s I was assigned to the DAZZLE radar antenna project, which perhaps was my most adventurous. This was a parabolic reflector antenna 87 feet in diameter, operating in the VHF frequency band. The data-gathering channel for the system operated at a rather low frequency in the VHF band, and a monopulse tracking channel at about three times that frequency was used to steer the large dish. This had been built at another company but had failed to lock on and track targets. The feed system was a cluster of dipoles that proved to have so much interactive coupling that it failed. Wheeler Labs proposed to design a new antenna feed that would avoid the problems encountered with the original feed. The contract was for the Army Missile Command in Redstone Arsenal and Wheeler Labs subcontracted through Collins Radio. It was a very intricate system with special need to preserve symmetry. One key feature was the decoupling loops that were located to shield dipole ends from each other. The peak power levels also required special globes on the ends of dipoles to prevent corona, and in addition, some dipoles were angled in a slightly dogleg fashion to separate the ends adequately. When this feed was assembled over a circular ground plane and painted white it was rather spectacular.

It was on this project that I attended my first conference at the Pentagon in Washington, D.C. Collins and Wheeler Labs personnel presented a summary of the results and success of the project to that time, and we were proud of our achievements. However, representatives from another company were present hoping to sell their radar system, and they tried to cast doubt on the ultimate success of our project. The Pentagon official seemed inclined to believe them and complained that companies such as Wheeler Labs made a profit of 30%. Actually, Wheeler Labs never charges anything like that. Ultimately we were completely vindicated when the new feed worked perfectly as we had predicted, and the other company did not get their sale.

Not only did I go to the prestigious Pentagon, but as the DAZZLE installation was at the Woomera Missile range in South Australia, Harry Redlien, Fred Van Daavelar and I had the privilege of going there to help with the installation. We had opportunity to do some sightseeing in Adelaide and Sydney. The missile range was in the outback desert where the kangaroos run wild and the Australian national flower blooms. It was fun to climb up onto the giant antenna pedestal and install the feed and coaxial line system. One incident took place when I was high up in the structure preparing for the installation. I looked down to see a large group of Australians examining the newly assembled feed, and I wondered if they had spotted some problem we had failed to identify. I hurried down and asked if anything was wrong, but they simply replied, "It's pretty." I felt good about that and noted what a contrast it was to the original feed nearby.

One test technique developed on the DAZZLE project was that of measuring the impedance of a single element in an array of active elements. I have used this technique many times since.

During the last half of the 1960s I led a project to develop an improved built-in antenna for battlefield intrusion detectors for use in the Vietnam War; Hazeltine produced these detectors. Many thousands were deployed in the jungles and gave warning of enemy troop movements. It was very satisfying to have a part in protecting our troops.

About the same time, Hazeltine and Wheeler Labs worked on a project from RCA to develop an alternative feed system for the array antenna for the Navy Aegis program, later called SPY-1. The phased array radar antenna for the system required a very complex feed system to divide the transmitter power between the hundreds of elements in the array. This feed system had to provide monopulse operation which utilized both sum and difference mode patterns, and the space available was very limited. The feed network consisted of two parallel sections of reduced height waveguide with cross-guide coupler branches leading to the array elements. Since the elements were closer together than the waveguide width, it was necessary to put the coupler branches on both the top and bottom walls of the waveguide in an overlapped arrangement. This proved to work quite well, although it had not been tried before. We were able to achieve a feed system that excited the elements with an excitation taper for very low side lobes and independent control in both the sum and difference modes. Later the Aegis feed system was designed using stripline transmission and couplers instead of waveguides. This project gave me experience that was very valuable when I worked on the design of the Navy SPG-30 antenna after leaving Wheeler Labs.

The projects above were the most memorable ones I worked on, but there were many more. These included:

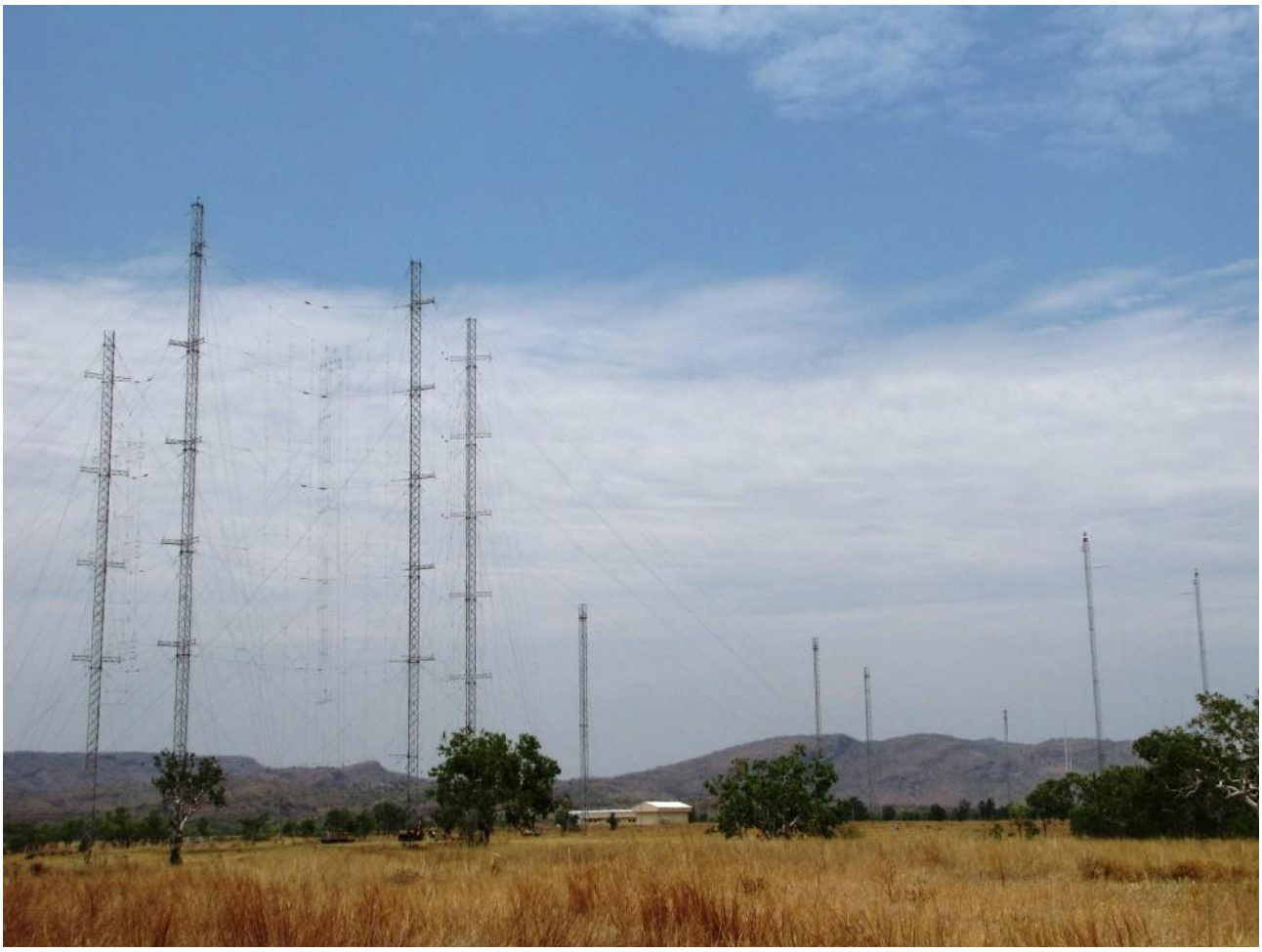
- The SEMTR monopulse Cassegrain antenna that improved on the Nike-Zeus MTR
- Special short-circuit choke joints for the petals of the Nike-Zeus target track radar antenna
- The study of, and solutions for, reflection problems in the HAPDAR phased array antenna feed chamber
- Design of array elements, feed chamber and transmitter feed for the Missile Site Radar phased array antenna
- Study of reflection effects and design of a personal protection shield for the SAM-D phased array system
- Design of "invisible" radome support hoops for the Nike-Zeus and Titan radar antennas
- Analysis of captured Russian aircraft antennas to identify their operating bands and capabilities
- A number of electromagnetic countermeasure (ECM) antennas
- IFF antennas and add-on IFF antennas, both omnidirectional and unidirectional types, for airborne applications.

In addition, I designed many waveguide and coaxial line components such as directional couplers, hybrids, filters, mixers, dual and circular polarized devices, etc.

After working for Wheeler Labs I went on to ITT Gilfillan to work under a former Wheeler Labs colleague, Bob Hanratty. From there I went in a new direction that was unusual for an engineer. With my family I went to Costa Rica to study Spanish, and then we went to Quito, Ecuador for me to serve as an engineer with the pioneer missionary short wave radio station HCJB. Upon joining HCJB I learned that one of their technical officers knew about the excellent reputation of Wheeler Laboratories and judged antenna engineers trained by Mr. Wheeler to be the highest qualified of any in the world. That reinforced my conviction that working with Mr. Wheeler was indeed a privilege. Most valuable of all was to be taught how to achieve new, innovative designs. From a set of requirements, I learned to devise a simple, cost-effective design that would provide the desired performance.

While at HCJB I designed and supervised the construction of numerous curtain arrays and directional AM and FM antennas for radio broadcasting, and designed several short wave transmitters. After 15 years HCJB had no need for additional antennas, and I joined Kintronic Laboratories in Bristol, Tennessee. At the beginning of 1994 I retired, and am currently working as an electrical engineering consultant.

Appendix 3

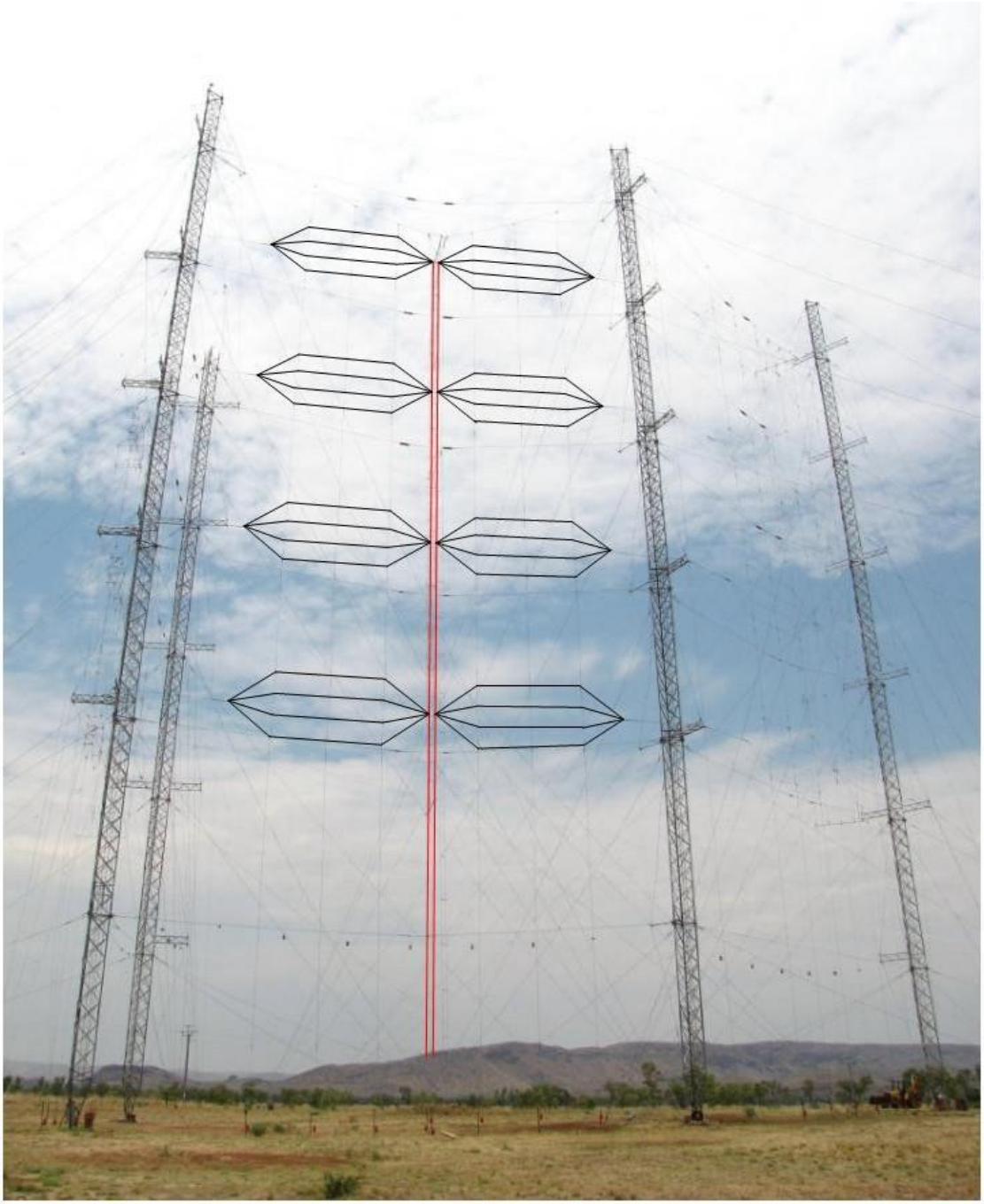


The following is an explanation of HCJB Australia antennas, by Daniel Forrer

First an overview of the **antenna farm**: to the left the antenna-trio built this year. We call them the DP antennas (DiPole antennas). The middle one that faces the viewer (just been finished this 23 October 2011) is ready to go. It is aimed at China.

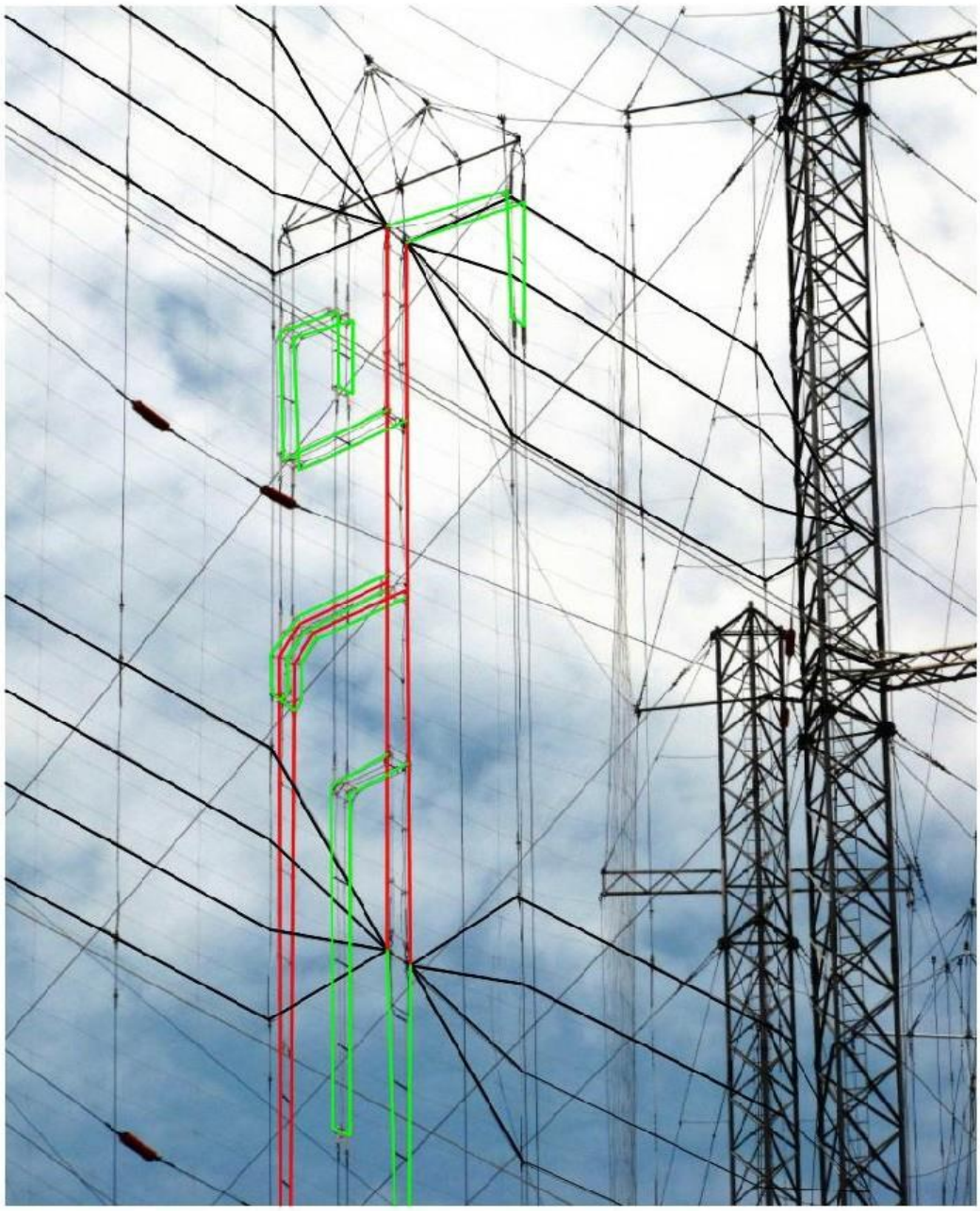
To the left is the South Pacific antenna, and to the right the India antenna. Both of them still need tuning.

Further back you see 4 shorter towers ready to hold up next year's antennas. To the far right is the versatile TCI antenna that is able to direct the radio beam towards any country within a 60 degree angle. This antenna is ready to go as well.



So what exactly makes it possible for an antenna to convert an electrical signal from a transmitter into a radio beam that can travel through the air? In the case of the DP antenna it is (as the name suggests) the **dipoles**. To be precise, 4 dipoles stacked on top of each other (highlighted in black). Using several dipoles increases the strength of the radio beam.

Each dipole is fed by the feeder line coming up through the centre (in red). One thing that we still have to build this year are the transmission lines. They will connect the feeder line across the paddock to the transmitters in the transmitter building.



And now to the fun bit:
Zooming further into the dipole area we will find the explanation why we still had to spend another 2 weeks on the antenna, even though the physical structure was already up and finished. In this picture you see the same antenna slightly from the left. The dipoles are highlighted in black and the feed lines in red.

Highlighted in green are the electrical structures that are called "stubs" and "transformers". Their job is to "match" the antenna (also called "**tuning the antenna**"). The reason for tuning is to eliminate all electrical obstacles from the feed path, so that the radio signal is able to travel up to the dipoles without being distracted.

Just as a comparison: an unmatched antenna, even as big as this one, still would not be able to send off a strong radio signal, simply because the signal would arrive weak and disturbed at the dipoles. That is where the stubs show off their muscles (highlighted in green). Placed at the right spots (making sure they are built to exact dimensions) they will match the antenna and the full power generated by the transmitter will leave the antenna and travel to its destination in India, China and (with these new antennas) beyond.

Photo credit: Dave Brewster