

Borge Haagensen, VE7VB, ex. OZ4G, OX3ME, OX3UE.

+++++

### A Lifelong Interest in Electricity and Radio.

The earliest recollection I have of experience with electrical devices stem from 1932, when I was five years old, and was given a small induction coil, which may have been a demonstration toy. It had a coil wound with wire insulated with bright green silk. An interrupter at the end of the coil buzzed away when it was connected to a battery. Two cylindrical brass handles were used to give the unsuspecting victim a good shock. I believe these devices were common around the turn of the century, when electricity and its effects intrigued people. Many medical uses were found for electric shock, and expensive apparatus was made for the purpose. Later, about 1939, I found one of these devices in the attic of a farmhouse. It consisted of a large magnet, inside which rotated an armature, turned by gears and a hand crank. On the armature shaft was an interrupter breaking the circuit to a couple of brass handles.

In 1933, when I was six years old, my Father gave me a box of radio parts, left from his earlier experiments, when radio broadcasting in Denmark started, around 1924. At that time, my Father and several family members had helped each other make crystal radio receivers. I experimented with crystal sets, but progress was slow in the early days, because I had very little pocket money to spend on parts for my constructions. We lived in an old part of town, on the ground floor of a five-story apartment building, where the only possibility was to use an indoor antenna. I had a crystal receiver next to my bed, and found it exciting to listen to stations in Germany. The selectivity was such that for this, I had to wait until the Danish and Swedish radio services had shut down for the night. In the early 1930's, homemade radios were still being built, and there were a number of radio parts stores in Copenhagen. I would often bike around to these stores and admire the parts displayed in the windows.

A friend of my parents was an old machinist, who had worked in the maintenance shop of the Shell Oil Company before he retired. He knew a great deal about mechanical and electrical devices, and as an old age pensioner, he had a part time job in a junkyard near our apartment. I often went to see him there, and he would give me things from the yard to play with. I had automobile windshield wiper motors, electric turn indicators of the kind installed on most cars at that time, and electric power meters, removed when districts in Copenhagen were converted from 220 volt DC mains to 220 volt AC. The windshield wiper motors were the 6-Volt type and drew so much current that I could not run them with my limited resources. The direction vanes were operated by a solenoid, which would pull a wing out of its flat housing, which was mounted on the side of the car. The wing had a metal frame and an internal lamp illuminated its red celluloid sides. The power meters were beautifully constructed. A large horseshoe magnet surrounded an armature supported by jewel bearings. The armature was wound with fine wire on a cylindrical aluminum form. In one end of the armature was a small commutator contacted by silver springs. The other end of the armature had a worm gear, which through brass gearwheels turned a digital counter. There were so many parts in the devices that I had plenty to play with. The power meters would run on a 1.5-Volt battery.

The battery, which supplied the most power for the money, was a large cell, about 7 cm in diameter and 16 cm long. The American equivalent is called a number six cell. The biggest Danish battery manufacturer by far, was Hellesens, who exported batteries to many other countries. The labels on these batteries, with their gold printing on black background, are still very familiar to me.

My other sources of electric power, besides the 220-volt DC mains, were the so-called eliminator, a box that sat in the back of my parent's homemade radio. It supplied 90 and 120 volt for the plate supply of the radio tubes, but only little current, and a 4-volt battery. The filament power came from the 4-volt lead acid battery. This could be used to run the 6-volt motors, but my father took a dim view of my discharging the battery. At regular intervals I had the job of bringing it to a charging shop. This business was in operation long after mains operated radios become common. The 220-volt DC mains were connected, through several large variable resistors, to the series connected batteries. The panel was very impressive with large volt and ampere meters. A new radio was a major expense to most families at the time; so many battery-operated radios were still used until the end of the World War. The charging shop also sold radio parts, which I enjoyed looking at, so the trip to the shop was a nice diversion for me.

The antenna for my crystal set was strung between two windows on the same side of the building. It was rather short, so I could receive only a few stations. A problem affecting, not only crystal sets, but many tube sets as well, was lack of selectivity. In Copenhagen a common complaint was that the Swedish broadcasting station in Hørby interfered with the Danish one at Herstedvester. Only 45 kHz separated the two.

I fantasized about having a large antenna, and in school I could look across a military training field to a very large antenna. It consisted of two high wooden towers, with a cage antenna strung between. This installation belonged to the Army, but in the early years of Danish radio was used for broadcasting. I could imagine the many stations I would be able to receive if I was allowed to connect my crystal set to this antenna.

I brought my crystal set, a number of honeycomb coils, and a big roll of wire on the annual summer holidays with my parents. In some places I was able to string a good antenna, and with the different coils could scan a large frequency spectrum. I listened to ship's voice traffic, which was transmitted from Skamlebæk in north Sjælland. Our home radio at that time was housed in a beautiful cabinet built by a craftsman. My father had built the innards. I remember the look of the chassis inside. When lifting the lid, one could see the brass variable capacitors; the coils, wound with wire covered with green silk, and inhale the wonderful smell of Bakelite. The four tubes had 4-volt filaments and were held in spring sockets to avoid microphonics. As mentioned before, the filament supply came from a wet storage battery, and the plate supply was the homemade eliminator (named so, because it eliminated high voltage batteries).

After years of suffering from shortage of radio parts and money, I had an unbelievable windfall at age ten. One of my father's colleagues visited us one day, and noticed my crystal radio. He asked my father, if I would like to have the radio parts in his attic. He had stored them there since his earlier radio construction activity. At this point my full attention was on the conversation, and it was decided that I should go to his apartment the next day to pick up the stuff. I could hardly sleep in anticipation, and on the next day school dragged on forever, but we finally stood in the attic in front of the most wonderful collection of radio I ever saw. There were half-finished receivers,

several horn speakers, headphones, boxes of vacuum tubes, and miscellaneous other parts. Included were also stacks of old radio magazines, which described the constructions one could make from the parts. I carried a large cardboard box full of goodies to my home, where my mother was appalled to see all the junk. I promised her to store it neatly in our attic, and then cautiously told her that I was going back for another load.

I was now able to play to my hearts content and spent a lot of my spare time building and experimenting and in the process learned a lot about electricity and radio.

At the age of fourteen, preparing for my confirmation, I was asked what I wished as a gift, and one thing immediately came to mind, namely a radio, which I had seen in a shop in the center of Copenhagen. On school holidays I would often cycle around in the city and had discovered a shop, which was called, "Inventors Supply Central". It had the most marvelous collection of technical and scientific second hand items, among which were several radio receivers. The one I wished to have was a Philips model 2517, manufactured in 1930. It was a two-tube, regenerative detector receiver for 220-volt DC, contained in a very nice Bakelite cabinet. It had three frequency ranges from 150 to 1500 kHz and a small sloping window in front through which to view the dial graduated only 0 to 100. My father bought the set, and gave it to me at the confirmation. I had it at my bedside for many years. The frequency range, besides broadcasting, covered the 400 to 500 kHz ship telegraphy frequencies and with the regenerative detector I was able to listen to the telegraph traffic in the busy Baltic Sea area.

In April 1940, when Denmark was occupied by German troops, I was still in school and continued my radio experiments. I had made a one-tube transmitter oscillating at a frequency in the medium wave broadcast band. By now I had learned the Morse alphabet, and was able to send at a slow speed. I then asked one of my schoolmates to listen for me on his home radio after school. He lived about a kilometer away, and reported the next day that he had heard my signals. His father got wind of this and forbade him to participate in such dangerous activity. I also eventually realized the danger of transmitting while we were under German military rule.

After I had finished middle school, the only option for me was to start on an apprenticeship. My father was a printer by trade, and had been able to find a printing shop, willing to take me on as apprentice for a trial period of a couple of months. After this period, my boss was of the opinion that I was not sufficiently interested in the job to continue. My father was naturally very disappointed at my failure, and when I expressed a desire to become a radioman, he told me that it was an occupation with no future!!! He probably meant, that a well-established trade would be best for me.

I was now on my own, as far as work was concerned, and managed to find a small radio repair shop in the outskirts of Copenhagen that would hire me as an apprentice. By a stroke of luck for me, the Institute of Technology had just then started a course for radio technicians. After enrolling in the course, I spent the next four years working in the trade, repairing radios during the day, and studying at night. Private vehicles were not common in Denmark during the war, very few cars were on the roads, so all delivery and pickup of radios took place on bicycle. This meant, that the repairs were done in the customer's home if at all possible. To lie on the floor soldering inside a dusty radio chassis was not much fun. Children, who were getting into my toolbox and generally being a nuisance, would often surround me. My manager had customers in all districts of

Copenhagen, so not only did I learn radio repair, but also developed large leg muscles from all the cycling. A good sense of balance was necessary when cycling, while carrying a large radio set on the handlebars.

One of the common customer complaints from districts with DC mains was, that the radio was completely dead. The repair often consisted of turning the plug on the line cord around 180 degrees. What had happened, of course, was that the plug had inadvertently been removed, and plugged in the wrong way around. Since the mains voltage, after some filtering, was used as the plate voltage, a negative anode supply obviously did not work.

In the summer of 1942, the German interference in Denmark's affairs resulted in the arrest and internment of known Communists. A friend of my manager's was taken away from his small electronics business, and imprisoned in Horserød, north of Copenhagen. The man's desperate wife called my boss, who suggested that I be sent out to take care of the business while her husband was away. It was expected that the prisoners would be released after a short period of interrogation.

My new job was interesting, but mostly involved the usual radio repair. Because of the transportation difficulties during the war I had to do more than repair radio. Upon arriving at the job in the morning, I had to take the family's small daughter to her grandmother some distance away. This was done on the father's bicycle, which had a seat mounted on the crossbar. Her mother could now go to work, and when she came home in the afternoon, I would pick up the child again. This combined baby-sitting and radio job lasted until the owner came home, about a year later.

In this shop I saw the ARRL Radio Amateur's Handbook, probably the 1938 edition, for the first time, and read it from cover to cover. When my boss returned I was so used to the place, that I preferred to finish my apprenticeship there. This was agreed upon by all concerned. I enjoyed working on the special hi-fi projects my new boss was involved in. He had developed a circuit, using the universal tubes available, which would give a very good reproduction of gramophone records. He also manufactured his own copy of the Western Electric studio microphone, used by the Danish broadcasting service. He had made a die on which he could form the very delicate aluminum diaphragms.

The restrictions imposed upon the Danish population resulted in a General Strike in Copenhagen in June 1944. In retaliation, the German Army isolated the city, cutting off water, gas and electricity and closed the approaches to town. I was able to build a simple battery broadcast receiver, using available parts at my work. On headphones, we could then receive the uncensored news from Neutral Sweden.

An interesting activity during the war was to make, and sell loop antennas. It became a successful business, since many people wanted these to receive the BBC broadcasts from England. The Germans had installed jamming stations in many locations around Copenhagen, but by using a directional antenna, much of the interference could be eliminated. We were later involved in the dangerous job of making large power transformers. They were to be used in a clandestine broadcast transmitter secretly being installed for the purpose of informing the public, should the regular broadcasting be interrupted by war activity.

My boss was a member of one of the underground organizations fighting the Germans, so the distribution of illegal papers and participation in weapons training were a few of the things I was involved in because of my job.

The war ended to the great relief of all, and about the same time, I finished my four-year apprenticeship. The final examination took place in the laboratory, on the top floor of the Institute. One of the projects was to build an audio amplifier. As a test record we had Glen Miller's, "In the Mood", and it was played a hundred times by the enthusiastic flock of young technicians eager to listen to new American music.

I volunteered to join the Army in order to get my compulsory service over with. It would be better to look for a job later, and not risk being drafted. I had hoped to get to work with electronics in the army, but after boot camp, I was sent to Tønder by the German border as a guard. There was just a primitive telephone system to look after. I believe the Germans, late in the war, had installed this system. Field telephones were mounted in small huts on the banks of the river, which marks the border between Denmark and Germany. About twenty of these telephones were connected to a switchboard in the barracks. The connecting cable was twisted pair, made from steel and aluminum cores insulated with a very tough covering. I had to maintain the cables, which involved climbing telephone poles with spike boots. Many times, I accidentally slid down the pole before learning the tricks of climbing. The only communications radio in camp, installed next to the switchboard, was a set of German tank units, U.kw.E.e, and 10 W.S.c. Using a frequency around 30 MHz, it was used to communicate with the next army unit, if telephones should be interrupted. A small broadcast radio was installed in the mess hall. I still feel that I am back in the camp when hearing "Sentimental Journey", and other tunes from that time. The American Forces Radio Network in Germany transmitted it.

While in the army, I trained as a driver of trucks and motorcycles, and when time came to pass the examination, we were taken to a former German airport at Skrydstrup, about 50 km north of the border. As was common in the army, we waited and waited in line. I noticed that something interesting was taking place outside a hangar nearby and managed to get over there without being noticed by the officer looking after us. A couple of workers were busy removing German electronic equipment from the hangar and destroying it, using axes and hammers.

Back at the camp, I told a fellow soldier about the discovery. He too, was a radio enthusiast and we were both switchboard operators in the army. We decided that it was worth deserting the army for one day, in order to get hold of some of the goodies, before it was too late. The risk of prison for this offence was highly possible and, unbelievable as it now sounds, the sentence could have been on bread and water only. After arranging for somebody to cover for us, and invent likely stories, if we were missed, we got on the first train towards the airport at four o'clock in the morning. We each carried an empty suitcase and our military shoulder bag.

When arriving at Vojens station we deposited our suitcases there and walked a considerable distance to the airport. Danish soldiers guarded the entrance. Saluting as we entered, we went to the hangar, which fortunately was unoccupied at the time. It was not locked, so we went in and stole as many small items as our bags would hold. There were microphones, headsets, multimeters and many other desirable things. This happened in 1945, just after the war ended. During the war, everything had been in very short supply. It was a thrill to see so much high quality equipment in one place. We went out through the gate, and back to the railway station to empty the loot into the suitcases. Then in again for another load. This went on until we were tired of walking, and by now the suitcases was quite heavy.

A late train brought us back to camp where we, to our great relief, had not been missed. During Christmas leave, the stolen goods were brought home to Copenhagen where it was put to good use in the years to come. I still have a couple of RV12P2000 vacuum tubes from that time.

After the army service, I went back to my old boss, who was not able to pay me journeyman wages. I decided to work for him until better things showed up. While I was away in the army he had hired a man who, after a year's study, had failed the entrance examination to the Polytechnic Institute. We became friends, and worked together on setting up loudspeaker systems at concerts and other events in Copenhagen. Our boss had a Nash convertible automobile, and since I now had a driver's licence, we took the equipment around in the big American car. For two young fellows, who were used to wartime shortages, it was a thrill to cruise through Copenhagen. Large Rola loudspeakers with huge baffles and electro-magnetic field coils were used. They presented a peculiar problem when used directly on 220-volt mains. When disconnected, the back EMF created a five-cm long spark as the plug was pulled, so a switch would not work.

The Navy advertised for radio technicians, so one day, being out on a job with the Nash, we both went to the Dockyard to apply. This was obviously not a nice way to treat our boss, but he did forgive us later. We were both hired as civilian technicians in the Navy. Being anxious to do well in the new job, which would earn us a good salary, we decided that if asked, we would claim to be able to cope with just about any problem.

On the first day, the supervisor asked if we knew anything about automatic telephone exchanges. With one voice we answered yes, and were shown to the basement, where we found a German automatic telephone exchange. It had been removed from a bunker in Jutland, by sawing off the heavy, multi conductor cables. There were no manuals available, but a 24-volt power supply and some telephones came with the monster. We were not about to give up on this challenge, and spent some time at public libraries for a few nights, studying telephone technology. After sweating over the difficult job for a few days, we were able to connect two telephone sets to the central, and could ring and talk from one to the other. This demonstration impressed the supervisor so much, that he left us alone for a while. After about a month's hard work the central was installed in the building and functioned well. This achievement established our reputation in the outfit and we were hired permanently.

The job was the finest opportunity to gain experience with the many developments in electronics resulting from the intense research during the war. It involved work on much of the equipment left in the country after the German occupation, and most of this was of a quality that had no comparison in broadcast receivers. British and German radar was another completely new and exciting field. We maintained the radio and navigation gear in the Navy's ships, and on one occasion, I spent a very pleasant day on a ship outside the port of Copenhagen. The job involved measuring, and recording the deviation of the radio direction finder. This was done in the sound between Denmark and Sweden. The ship was slowly turned around 360 degrees while simultaneously optically sighting the antenna of a radio beacon on Middelgrunden, an island in the sound, and finding the null on the direction finder. This information was used to cut an aluminum disc, which moved the index pointer in the direction finder so as to compensate for the deviation. Another period of work, which was more like a summer holiday, was a trip on several

Navy vessels to the many islands in the southern part of Denmark. Some of these ships were small cutters, visiting the picturesque villages of the islands. I would occasionally jump from one Navy ship to another at sea, in order to get to a new set of radio problems. During the winter, I had an unusual day trip on one of the Navy icebreakers creating a channel through the ice into the harbor of Copenhagen. An American freighter was approaching the harbour, and the icebreaker went alongside in the Sound. At that point all the icebreaker crew climbed aboard the freighter, and a while later I saw them coming back carrying cartons of cigarettes and bottles of liquor. The loot was safely stowed away out of sight of customs inspectors. We then proceeded to bring the ship into port. The radio operator of the ship was surprised that I had been able to decipher the Morse code coming from the speaker in the radio room, and was able to tell him what had happened while he was away.

A very unusual and interesting piece of gear I worked on at shore, was a German submarine sonar. It not only worked to detect bearing and range to ships, but could also use CW emission to communicate with similar installations on other ships. Unofficially, it was mentioned that it would work over distances of a hundred kilometers under the sea. This may have been true, because it had a very large transducer driven by kilowatts of ultrasonic power from the transmitter. While working on transmitters and receivers in the shop, it was a temptation for me to try a few amateur radio contacts using a fictitious call sign. By now I assume that it is forgotten, so I won't be prosecuted by the Danish P&T authorities.

The electrical supply was still 220-volt DC at our home in the eastern part of the city. It was difficult to produce much radio frequency power from the available tubes using this voltage directly as plate supply. I was hoping that our district would be converted to 220-volt AC, which was the supply available in the outer districts. Some amateur radio experimenters with DC power used several audio output tubes in parallel, with filaments connected in series across the 220 volt DC and the 220 volt directly as the plate supply. This arrangement could produce a few tens of RF watts.

More ambitious fellows would have a 440-volt DC installed in their home, thus having twice the plate voltage available. This however, created a very dangerous setup since the chassis of the transmitter would be at minus 220 volt with respect to ground. The DC distribution system in the city supplied two 220-volt lines with a common neutral. This enabled industrial users to have 440 volt available for larger motors. One side of the street in such districts would have 220 volt with grounded negative wire while the other side had the positive wire grounded. My hopes were raised every time a large cable drum appeared in the neighborhood, but the conversion was not done until long after I had moved away from home.

My father had an interest in Arctic exploration, and had many books on the subject. As a boy, I had read many of the thrilling stories. The adventure of Lauge Koch travelling by dog sled around the north end of Greenland was particularly exciting.

In the spring of 1947, the Greenland Department of the Danish Government was advertising for radio technicians to work in Greenland. I realized that there would be a chance to get to that far away and fascinating part of the world and applied.

Earlier that year, I had passed the examination for an amateur radio licence. The local radio club had arranged for Morse code training during the winter and I participated in this very thorough course. It was taught at the Post and Telegraph's school by one of the

regular teachers. He was an older fellow who did not put up with any nonsense from the students. His teaching was excellent, and I am sure that my love for precise Morse code sending stems from that period. After oral and written examination by Post and Telegraph officials, I was very proud to receive my first amateur radio licence with the short call sign, OZ4G.

To get around the problems connected with 220-volt DC, I moved to my Aunt's villa in Hellerup where I rented a small room upstairs, and planted a wooden mast in the back of the garden as antenna support. Now, with a 220-volt AC supply, the various pieces of equipment were assembled and power supplies made. The transmitter was a German aircraft unit, SK-10. It used three tubes, type RL12P35, one as oscillator driving the other two in parallel. The frequency range was 3 to 6 MHz. With the available power, it had an output of about 20 watts. The receiver was a German direction finding unit, a TRF circuit using 2-volt battery tubes, type RV2P800. With this setup I made my first amateur radio contact on March 29, 1947. An old timer, Børge Nielsen in Jutland, OZ2NU answered my call on 3.5 MHz. The next contact, immediately after, was with Viggo Hansen, OZ7WD. Now, more than 50 years later, I still have radio telegraph contacts with Viggo. The distance involved with the first contact on 3520 kHz was about ten km, while our present ones on 14041 kHz span 8000 km. Unfortunately Viggo died shortly after 1999. I managed to make only 75 contacts before it was time to pack everything, in preparation for a year in Greenland.

When applying for the job as radio technician in Greenland, I was asked if I was familiar with telegraph communication. When I mentioned that I had an amateur radio licence, the interviewer told me that I would be hired to work at a remote East Coast weather station. I would be both technician and radio operator, and would receive additional pay for doing two jobs. The Department was apparently so short of radio operators at the time, that they ignored my lack of qualifications. Normally, a commercial radio operator would have to study, and pass the examination, in one of the navigation schools in Denmark before receiving an official certificate as operator.

A year in Greenland seemed an eternity for me at the time, so to be prepared, I packed all the equipment I owned into two very large crates. They were so large that I had to put them in the stairway outside my parent's apartment. The crates were, with great difficulty, transported to the ship and loaded at the Greenland department's piers in Copenhagen harbour. My father later complained in a letter to me, that he needed a small piece of wire after I had gone, but could not find any in our apartment. I had taken everything with me to Greenland.

The ship was a chartered Norwegian sealer named "Veslekari". The radio installation was just a radiotelephone for the band around 2 to 3 Megahertz. I chose to sleep in the radio room away from the snoring bunch down below, and could then keep an ear on the radio. We had to go in to Kopervik in Norway, because the ship's cook had a bad cut on his finger and he had to be replaced.

We then continued to Akureyri, in Iceland. Here we stayed for a few days while taking on bunker oil. I wanted to get some information about the radio frequencies used in Greenland, so I went aboard a large freighter, Hvassafell, which was tied up in the harbour. In the radio room a man was busy repairing the ship's transmitter, and he turned out to be a local radio amateur. His name was Thorhallur Pálsson, and his call sign TF5TP. He had difficulty finding the fault in the transmitter so my offer of help was

welcome. After the repair he introduced me to the captain, who asked me if I would repair the radar, as well as the radio direction finder on the ship. I worked on both problems for the rest of the day and managed to get all working again. The captain gave me a considerable sum of money for the work and I used this to buy a good sleeping bag and a few more things in Akureyri. Thorhallur invited me home to see his amateur radio station, and here I tried a National HRO receiver for the first time. The receiver was considered the Cadillac of communication sets, and I was very impressed by the bandwidth on 14 Mhz, which tuned the stations as if they were on long wave. I later had many contacts with TF5TP while I was in Greenland.

Shortly after leaving Iceland, I managed to contact our destination, the weather station Daneborg, radio call sign OYY, and arranged for a daily contact to inform them about our progress through the heavy drifting ice.

We reached the station a week or so after leaving Iceland and the ship anchored well clear of the shore. Using the ship's small boat, we finally got ashore. The buildings had been assembled and equipped by the East Greenland Sledge Patrol and American forces in 1944. The station was established as a weather station, but was also built to prevent the Germans from erecting similar stations on the coast. Both sides in the war were interested in North Atlantic weather observations. These would be used to forecast weather for the rest of the Atlantic.

The largest building had living quarters, kitchen, common room and a small radio room next to a battery room. The radio equipment consisted of a BC 375 transmitter, which later, in a surplus manual, was called an archaic behemoth. There was some truth in the statement, since it was designed in 1935, was very heavy and large, and used a lot of 24-volt power. It had six plug-in tuning units covering frequencies from long wave to 12 MHz. The output was about 100 w, while the input to the large dynamotor was 500 w. The receiver was a BC 348, and a 24-volt battery next door supplied power for the station. There was a large 110-volt battery in the same room, which by now was completely useless. It had at one time been used to provide lights for all the rooms in the building. A small separate building housed several gasoline-fueled generators. Two 110-volt DC and three 24-volt DC. The only other piece of electronics was a BC 221 frequency meter, an essential item considering the poor stability of the transmitter. The three operators, who had spent two years at the station and were now returning to Denmark, told me of their operating methods. I was amused by the disregard for control of the actual frequency used to contact the nearest station to the south, which was Scoresbysund, call letters OXM. Morse code sent the coded weather reports by calling the station on whatever frequency the transmitter happened to be on from the previous contact. If interference was bothersome OXM would say "tune", which made the Daneborg operator twiddle the thumb knob on the transmitter tuning unit a bit one way or the other. If a suitable frequency was found, it was then used until a new tune was called for. Heaven only knows what the actual frequency was. The allocated frequency, according to the documents I had brought with me, was 5274 kHz. The new transmitters, to be installed as soon as possible, had crystal control on this frequency as well as on several others. The batteries in the old station were practically useless by the time I arrived, and the three gasoline generators were in very poor shape. My dislike of small gasoline engines stems from the struggle to keep these going, until better equipment was installed.

A crew of carpenters arrived on the same ship and they built the new station using Danish materials. The building went up quickly, and I installed the two M.P. Pedersen 400 watt transmitters and two receivers made by the same company. The station was to have three 40-meter high wooden antenna masts, but during erection of the second mast, an accident caused the metal helping mast to collapse and everything came crashing to the ground. We had to do with temporary antennas in the remaining mast until new materials were sent up the following summer.

A standard arrangement at these radio stations was an extensive counterpoise supported about 3 meters above ground. The rocky surface in Greenland provides a poor natural ground and this counterpoise worked well, making the tuning of the transmitters stable with changing weather. One transmitter operated from 1.5 to 18 MHz, and the other on long wave, 100 to 600 kHz. The lower frequencies were used during the Arctic radio blackouts, when all frequencies above about one megahertz become unusable. The first time I experienced this phenomenon, I was certain that the receiver was faulty, but realized later that blackouts could occur at any time. Another interesting Arctic radio problem was the very high voltages developed on antennas when drifting snow cover these during storms. A capacitor in series with the antenna would continuously arc until I put a parallel resistor in the receivers to drain off the charge. The developed voltage must have been extremely high since it was possible to draw a 15-cm long spark from an ungrounded antenna.

The electric power for the new station was supplied by two single cylinder diesel engines, driving 10 kW generators with 220 volt, 50 Hz output. This power was sufficient for all lights and other devices at the station and it worked well during the period from October to February. I had great fun installing the heavy marble switchpanel for the generators. With very little experience in power engineering, I used a lot of insulating tape to connect it all. It functioned well, despite the small pile of unidentifiable parts I had left over.

At this time it was realized that we would be short of fuel if engines were kept running 24 hours a day. The power was then turned off during the day and engines were started when it was time for the weather transmission. This was sent every three hours, when the radio operator on duty would start the engine before going to the radio room, and turn it off when he was finished. To avoid this nuisance, I installed an emergency station, a BC 654. This radio, which will be mentioned many times later, operates on 12 volt DC, its frequency range is 3800 kHz to 5800 kHz, its power about 17 watts on CW. It was entirely adequate for the contact with Scoresbysund every third hour. The 12-volt emergency battery was charged from the diesel generators when they were running.

With all my own radio equipment on hand, I was very keen on finding out how amateur radio conditions were in Greenland. Before leaving Denmark, I had been assigned the Greenland call sign OX3ME. I latched on to the BC 348 receiver as soon as the new receivers were installed, and used it for amateur radio. In my room I had the BC 348, the earlier mentioned German aircraft transmitter, a homemade 14 MHz transmitter and a German tank receiver covering the range from about 25 MHz to 35 MHz. I made 471 amateur radio contacts in the year spent at Daneborg. The tank receiver was only used to listen to the local police conversations in Copenhagen. For some strange reason these signals were practically the only ones heard at that remote location. 1947 happened to be a year of a large sunspot maximum, and this explained the good propagation on the higher HF frequencies. It remains a mystery why I did not hear the thousands of

American stations, which must have used the same 30 MHz frequency range. It was a radio amateur's dream to operate a station in such a location. There was very little radio noise and my call sign was considered rare at the time, so one call from me would often result in a so-called pile up, with many stations calling me.

We were three weather observers and radio operators at the station, and soon realized that the necessary three hourly services could be maintained with just two people. One of us could take a trip on foot or with the sledge dogs, and it was a wonderful opportunity to experience the very unusual country. I was keen on making a portable transmitter-receiver, which could be used when traveling. It was of importance to keep in touch in case of emergency, when assistance might come from the weather station. However, several lives have been lost because help could not reach the travelers because of bad weather.

Being in favor of the experimental approach to problems with many variables, I decided to determine how large an antenna, and how much transmit power would be necessary to provide CW contacts up to about 100 km distant. In the first effort I made a crystal controlled oscillator using an American tube, 3Q5. The output was probably less than one watt. This was placed in a packsack with batteries and a rod antenna of Wehrmacht origin, 2 meters long. With this on the back, I walked out across the ice on the fiord away from the station. Verner Hansen, also a radio amateur and one of the other operators, listened to the signals on the station receiver. He used a Morse key connected in series with a table lamp placed in a window. When I called for a report, he answered using flashing light. After walking several kilometers, and the signal report still being good, it was time to try at greater distances. By dog sledge I went to a Norwegian trapper's station, 25 km away. They had a broadcast receiver with a 2 to 3 MHz band, and on this I could listen to the weather station. The frequency used for these tests was around 2 MHz. Contact was still good at this distance, so I made a fairly compact, portable station in a wooden box. In the bottom were the batteries, then the transmitter and receiver, and on top Morse key, headphones, wire antenna and counterpoise. The receiver was using three hearing aid tubes, DF-67, one as regenerative detector and two as audio amplifiers. These tubes operate with only 22.5-volt anode supply and use very little power. The transmitter used a single, crystal controlled output tube, 3Q5, which would produce about one watt output on 2.5 MHz. An interesting demonstration of the small amount of power needed to communicate was made when one of the radio operators had taken the portable set with him to a cabin about 10 km from the station. I contacted him and asked him to leave the receiver on, and to my surprise I could clearly hear his oscillating detector over this distance. The input to the oscillator must have been less than a milliwatt.

Many years later, working for a research laboratory in Canada, a similar check of the minimum power necessary to communicate over an 8 km distance was made. The frequency was around 4 MHz, and the receiver, a remotely controlled Marconi XH-14. The transmitter was a Marconi signal generator. Both antennas were half wave dipoles. Once more, I was surprised that only 7 microwatts was necessary to give a readable CW signal.

The portable set was used on several long trips from the weather station. On one occasion, to exchange telegrams for one of the trappers living at Hochstetter station, more than 100 kilometer from the weather station. On the way home from this trip, I was able

to call for assistance from the weather station when the going through the deep snow became too difficult. A sledge was dispatched which relieved us of some of the heavy loads.

During the summer of 1948, a Danish expedition was preparing to go to Pearyland, the northernmost part of Greenland. Before they arrived we were asked to provide information on weather and ice conditions at their south camp by Zackenberg, about 20 km from the weather station. The portable American radio station, BC-654, was brought to the south camp where a trapper had his station. As there was no battery power source to run the radio, it was connected to its hand-cranked generator and the trapper would send daily ice reports to us at the weather station. He was able to crank the generator and shout his message into the tied down microphone. The ice report was then passed on to Copenhagen where the Navy's Catalina aircraft were waiting to fly to Zackenberg.

The expedition arrived by ship, and I was able to help the people with their radio equipment and communications. The ubiquitous BC-654, was used by the expedition, both at the south base, in their motorboat and at the north station in Pearyland.

Back in Denmark in the fall of 1948, I again worked for the Danish Navy, but this time at the research facility at Kløvermarken. The work now involved more British and American equipment as well as some antenna experiments. Next spring, in 1949, the manager of the Pearyland Expedition, mentioned above, called and asked if I would join the expedition that summer. I agreed, but continued working for the Navy, preparing some of the radio gear, which was to be loaned to the expedition.

Several radio operators were hired to work during the summer at the expedition's south base at Zackenberg. Their job was to communicate with the north station, ships and aircraft, and the weather stations on the coast. They also collected weather information.

The organizers of the expedition feared, that the professional radio operators involved, might be touchy about their status and protest against my presence as unqualified operator. I was therefore enrolled in the radio course at the Navigation School in Copenhagen, in order to pass the examination a couple of months later. The course was somewhat boring for me since I already had the technical and Morse code skills. The only new areas were international rules of telegram charges and handling of telegrams and some knowledge of the names of coast radio stations in the world. The course was, of course, designed for seagoing radio operators.

The examination was passed, and I was now the proud owner of an international second-class certificate, which came in handy some years later.

On June 28, 1949 the old Greenland Department ship, S/S Godthaab, left Copenhagen for Zackenberg on the North East coast of Greenland. On board were supplies for the Pearyland expedition, a few passengers and a Norseman seaplane. The ship's permanent radio station consisted of Elektromekano transmitter and receiver, but since communication with aircraft was necessary, it also had a Bendix transmitter and receiver installed. This equipment, with its own vertical antenna, could be operated independently of the ship's station. An emergency spark transmitter was part of the installation, and it was used occasionally, when the ship was anchored outside the expedition's south base, and it's crew wanted to get hold of someone on shore. One call on the spark transmitter would bring immediate attention, since any receiver in the camp,

long- medium or short wave, would hear the noisy call. At that time, spark transmitters were permitted only for emergency traffic, but we were very far from any other station.

We landed in Akureyri, Iceland, so the coal-fired ship could take on bunkers. The ship was a barquentine of 287 tons, built in 1898, and had a steam engine of 240 horsepower. The electrical supply on old ships was 110-volt DC from batteries charged by a generator.

After spending some time traversing the ice belt, with occasional ice observation by the Norseman aircraft, we arrived at Daneborg weather station and I spent some hours ashore in the familiar surroundings. The ship then sailed the short distance to the south base of the expedition and anchored off shore for the next two months. A tent town was made on the flat beach in preparation for the flights to Pearyland. The weather forecasts were of the greatest importance, so a couple of meteorologists from the airport at Copenhagen made weather maps and forecasts. These were based on information gathered by several radio operators, who copied coded, short wave weather broadcasts, transmitted on CW by many stations in England, Ireland, Iceland, Canada and USA. The receivers were BC-348, and Danish, M.P. Pedersen. A tent housed the station for communication with the three PBV, Catalina aircraft, and the station in Pearyland. The equipment consisted of several BC-654.



I arrived in Pearyland after a long flight in the Navy Catalina aircraft, Malle muk, OVJBF, piloted by the Arctic veteran, Commander Overbye. The military aircraft had a radio operator as a member of the crew and all the radio traffic was done by telegraphy. On shore, in Brønlunds fjord, we immediately started rearranging the radio station in the small house, in order to make room for several new pieces of gear. The final setup had a little used, monster transmitter, BC-375. A BC-312 receiver. An unusual emergency

receiver, Mullard 209 Mk II, operated on 12 volt DC and covered the entire short wave range. It was watertight and very well constructed. Also, a one of a kind transmitter/receiver, designed by the Danish radio engineer and short-wave amateur, Brøndum-Nielsen, OZ7BO. He had built many such radios used by the Danish underground forces during World War II. Our radio was meant for use by the dog sled travelers, but was too heavy, and used too much power from a 6-volt storage battery to be a practical set. I used it at the station for many amateur radio contacts. We also, of course, had a BC-654, which was the workhorse for sending the weather reports every three hours, on 5274 kHz. A Marconi long wave receiver was used mainly for receiving broadcasts from Denmark and Norway. The 200-meter long antenna for this receiver crossed a valley next to the station. The reception was so stable during the winter, that we could enjoy listening to concerts from Norway and Denmark. One exciting and emotional broadcast from Denmark was the transmission of Christmas greetings to Greenland. These broadcasts took place at night, after normal hours. Relatives and friends of people working in Greenland came to the microphone to deliver their personal message.

Power for the radio station came from several 12 and 24 volt batteries, charged by either a gasoline driven generator, or more often by the three Windcharger generators, one each 6-volt, 12-volt and 32-volt. The wind blew much of the time, and supplied us with ample power. The 32-volt unit charged a very large battery, used for lights in the house.

The other radio operator, Kristen Sørensen, was a member of the Royal Danish Navy, on loan to the expedition for one year. He came directly from the nearest weather station to the south, Danmarkshavn. He had spent his first year in Greenland there, and arrived in Pearyland on one of the last flights that year. We became good friends and later spent a summer at Ella Island as well as two years at Station Nord together. He apparently had some secret mission to perform. He never spoke of this work, and I did not ask him.

He brought with him a German HF receiver, Torn. E. b. I was familiar with this set from my time in the Navy, and it had been the most common receiver, being used by all three branches of the German forces, Wehrmacht, Luftwaffe and Kriegsmarine. It was a very rugged construction with most of the interior taken up by a large turret containing the individually shielded coils and their trimmer capacitors. It had a frequency range of 0.096 to 7,1 MHz covered in eight bands. The frame was die cast magnesium and it used only one type of the military tube RV2P800 in its circuit. Two RF amplifiers, a regenerative detector and an output tube. As was the case in most German war equipment, individual components were marked with a circled number, corresponding to labeling on the schematic diagram. Each end of a component was also marked with a wire number, which would correspond to the numbers found on other components connected to the same wire. The common leads, which went to several components, would have lower numbers, such as 0 for ground, 1 for filament supply, 2 for anode supply etc. This arrangement made it very easy to repair in the field.

Sørensen would listen to this receiver using headphones. After several hours of writing notes, he would put the information through a cryptograph, and occasionally send long coded telegrams to the Navy in Denmark. He could only have been listening to Russian radio traffic on these frequencies, and he was probably Denmark's one man listening post in the Arctic. This took place during the height of the cold war, when all countries were eager to collect as much information as possible from every potential enemy. Canada

established a listening post at Alert in 1958 where eventually several hundred men were keeping a radio ear on happenings in the Arctic area. After many years working for the Navy in southern Greenland, Sørensen continued with the Navy in Denmark until his retirement. I recently learned that he was able to understand and speak the Russian language. He unfortunately suffered from Alzheimer's disease later in life, and he died a few years ago. During a visit, in 1996, to the Navy library in Copenhagen I was unable to get any information about his work in Greenland.



One of the things I brought with me from Denmark in 1949 was a very compact radio transmitter and receiver built in Germany in the period 1943/1944, during the Second World War. It was Agentenfunkgerate, (Spy radio), model SE 109/3. All the components were of German manufacture and the construction typical of electronics made in the period 1935 to 1945.

The light metal box, about 20 by 13 by 5 cm, had English language engravings on it, but there was no indication of manufacturer, model or serial number, inside or outside. A museum in England has a similar radio on display, but the curator there was not able to give any further information.

The receiver was a three-tube design with RF amplifier, regenerative detector and audio output stage driving a headphone. The tubes used were all type DF 11, a very robust Telefunken steel pentode. A cylindrical dial made frequency selection visible through a magnifying lens. The dial was marked 0 to 100, and the frequency range covered was 3.3 MHz to 7.3 MHz.

The transmitter was a crystal-controlled oscillator/amplifier using just one tube, a DDD 11. This was a dual output triode connected as a push pull oscillator and output amplifier. The output power was about 1.5 watt, which was coupled to the antenna through a matching circuit and tuning indicator circuit measuring antenna current. A small Morse key was fitted into a socket on the front, and it keyed the transmitter in the

anode supply lead.

The dry battery supply was connected via a socket on the back. The set required 1.5 volt at 75 mA on receive and 100 mA transmitting for its filaments. The anode supply required was 90 volt for the receiver and 120 volt for the transmitter.

On top of the case was a small voltmeter, which could be switched to indicate filament voltage, anode voltage for either receiver or transmitter, as well as antenna current. As was the case in most German equipment, the antenna current was measured by rectifying the output of a ferrite core transformer surrounding the antenna lead. The banana jacks on top connected to a short or long antenna, ground, and could accommodate an external crystal. A switch chose between the two built in crystals of 3461 kHz and 4617 kHz as well as an external one.

The receiver was very sensitive and I had, on many occasions, established amateur radio contact with Scandinavia from the North East coast of Greenland.

I bought the set from a radio amateur in Copenhagen, Denmark, in 1949. I was to join the expedition to Pearyland, and thought that such a small, portable radio would come in handy. I was not disappointed, as the following story shows.



*1949/50 in Brønlund Hus.*

*From left to right: Eigil Knuth, Børge Haagensen and Jens Geisler*

Shortly after arriving in Pearyland, I was to accompany the archaeologist leader of the expedition, Eigil Knuth, on a trip on foot to Midsummer lakes. They are located at the head of the Midsummer River, about 50 km from the base camp. We carried all the necessary supplies, food, tent, sleeping bags etc., for a three-week trip in our packsacks. I also carried the radio, which Knuth, from that time on, called the Spy transmitter. Knuth had an enormous correspondence concerning the expedition's ships and aircraft, which were returning to Denmark after a summer's work. There were long notes about

missing reports and film, and instructions for future plans. All this exchange took place by radio, when we in the evening were camped somewhere in the interior of the Midsummer valley. The antenna was simply a wire from the top of the tent to the ground. This arrangement provided solid radio contact with the base. Knuth was very happy and impressed with this facility. It was probably the first time that he, on a hiking trip, had both radio and radio operator with him. Any other available portable radio set, and its power source, would, as far as I know, have been completely impractical to carry for a long distance. The German set was, thanks to the use of small components such as ferrite core coils, so much smaller and lighter than contemporary equipment, that it became a small part of our load.

Returning to the Midsummer River, Knuth suggested that we should sail down the river in a rubber dinghy that was deposited in a cache nearby. The circular vessel was inflated with great difficulty, and when floated was found to have a leak in the floor. Knuth was not about to give up, so he turned it over, so that the floor was out of the water. We cast off, and soon sped along sitting on top with our entire luggage. The sea trip could have been the end of the radio, and perhaps of us, because we soon neared a waterfall. We did not have any idea of the size of the coming falls, so it called for split second decisions on whether we should take a chance or portage. With time, we became more and more reckless, and wet. Luck was with us, and we, and the radio, survived.

During the year I spent in Pearyland the radio was often used on trips by dog sledge in winter, or by boat in summer.



*Børge in a Catalina-aeroplane bound for Iceland*

In 1952 the radio went with me on a two-year tour to establish a weather station in North Greenland. It was very useful on many occasions, and the visiting sledge patrol Sirius, in the spring of 1953, took the set with them further north. They used it to keep contact with their home base Daneborg, about a thousand kilometers to the south. The radio now

had a wooden case, which also housed a long antenna, counterpoise, key and headphones as well as the batteries. The weight was still only about 7 kilogram, much less than other available equipment.

Before I left the station in 1954, I again was with Eigil Knuth. This time, it was on a trip to nearby ancient Eskimo settlements. We were away for a couple of weeks and I kept in touch with the weather station for messages and weather reports. Knuth celebrated his 51st birthday at this time, and I was able to surprise him with congratulations from his friends in Denmark, delivered on official forms, which I had brought for the occasion.

A short time later we had a chance to fly by amphibious Catalina aircraft to an archaeological site about 100 km away. The aircraft left us on the beach and flew away to other tasks. The radio was now a necessity, because our pick up depended on the condition of floating ice in the fiord as well as visibility in the area. The information was passed to the returning aircraft, and we were soon back at the station.

The following year saw Knuth back by the fiord with Kristen Sørensen as the radio operator. The two spent a couple of months on the isolated shore, but kept in contact with the weather station regularly. Once more, the departure by Catalina depended completely on radio reports of conditions for landing on the water.

Some years later I emigrated to Canada. I gave the radio to Eigil Knuth before departure and he used it for many years on his frequent expeditions to Greenland. When visiting him in 1982 I got the, now obsolete, radio back and in year 2000 I gave it to the Polar Center museum in Copenhagen together with the story of its Greenland adventure.

Some distance from the expedition camp in Pearyland, a cache was built. It contained tents, sleeping bags and provisions, and was to be used in an emergency, if the station should be destroyed, for example by fire. This cache also included a so-called, Gibson Girl, emergency transmitter. It was a unit developed during WW II, for use in lifeboats by shipwrecked crews or downed aircrews. In use, it was strapped between the knees, so that the operator could crank its handle, which turned a generator supplying 24-volt and 300-volt to a two-tube transmitter. The package contained, besides the transmitter, a 100 m long antenna wire, a ground wire with weight, a hydrogen generator, and several balloons as well as a kite. Depending on the weather, the antenna could be held aloft by the kite or the balloon. Switches on the front panel could be set to provide automatic transmission of SOS on the international emergency frequency of 500 kHz, or allow manual keying on the same frequency.

Before winter set in, I was curious to know if this transmitter could reach the nearest coast station, LGS, on the Norwegian islands of Svalbard, so I set up the transmitter on the beach, together with a receiver. A call to LGS brought immediate reply and I explained our situation to the operator. This again demonstrated how little power is necessary to cover great distances. The transmitter output was around 5 watts and the distance 800 km. Fortunately the winter went without catastrophic events, so the emergency cache was not used.

There were many memorable amateur radio contacts made in the year I spent with the expedition. The radio propagation conditions in the Arctic are influenced by, among other things, the Aurora Borealis, Northern Lights, which in Pearyland appear on the southern sky. The Aurora belt lies around 70 degrees north. At times I would be able to make a solid radio contact with the only station heard on the band. This could be Hawaii or New Zealand. I had, of course, many contacts with radio amateurs in England, and

one comes to mind as being particularly interesting. Around Christmas I contacted a man in Cornwall, who jokingly asked me how Santa Claus was doing with his preparations. I gave him a believable story, and forgot the episode until next summer, when I received a letter from him. He was the City Clerk of Penzance, at Lands End, and had given the local paper the story of our contact and Santa Claus. This was printed, and he sent me a copy.

I had, and still have, a nostalgic and emotional feeling for the Morse code means of communication. When my father died in August 1949, while I was in North Greenland, the operator at Scoresbysund made certain that I was at the key, to receive the devastating message. He did this in order to save Kristen Sørensen, the other operator, from the unpleasant job of delivering the message. Later, in 1954, when working at sea, I had to keep watch on the emergency frequency, 500 kHz, on which one keeps a sharp ear, especially during bad weather. The eerie background in the ether during the half hourly silence periods was especially strange.

In 1950, back in Denmark, I worked as a technician for Radiometer, a company manufacturing instruments for the electronics industry. The company was known the world over since much of their production was exported. Some of the more interesting instruments I worked on were Frequency Analyzers and Q meters. Several practical jokes worked at the company, and an experimenter had discovered that a running vacuum cleaner, inhaling ether from a soaked rag would jump around the floor. The volatile fumes were ignited by the sparking commutator, and blue flames shot from the exhaust. The ether was used by the laboratory to dissolve red cerin for marking inspected solder joints. A joke played on newcomers who were doing final inspections on instruments, was to solder a low value resistor across the power line. It was placed inside an instrument while the victim was having lunch. When he returned and plugged the device in, a loud bang and a cloud of smoke would scare the poor fellow.

I had an unusual fault in a vacuum tube voltmeter when the instrument came from the assembly room and I plugged it in. The pointer on the large meter instantly disappeared. I tore the line plug out, expecting the meter to be damaged. The pointer came back, just as suddenly as it had disappeared. After some searching I found that wires had been connected wrongly on the back of the meter. The 6-volt wires for the illuminated dial were connected to the moving coil. This made the pointer vibrate so violently that it could not be seen.

In 1951, the Geodetic Institute in Copenhagen mounted a summer expedition to Ella Island on the east coast of Greenland, a few hundred kilometers south of Daneborg. I was once more hired as technician/operator on this aerial photo mapping trip. We flew from Copenhagen to Reykjavik in Iceland, by commercial aircraft, and then by military Catalina from there to Ella island. In Reykjavik, I needed to send some information to Daneborg weather station in Greenland, and went to the air traffic station, TFW. I did not expect to get any help with the message, but to my surprise I was offered an operating position by a vacant receiver with remote control of a transmitter located about 50 kilometers away. The traffic was sent, and on this occasion I experienced perfect break-in telegraphy for the first time. The circuit was perfect, with my own signal at a comfortable level, which even made it possible to hear an interrupting signal with the key down.



*Børge with the teodolitte. The expedition by Lauge Koch at Ella Island.*

The purpose of the expedition was to photograph a section of the East Coast, north of Ella Island, from the air. The island had an old scientific station at a sheltered bay, which became the base for the three Catalina aircraft, which made the photo flights. A temporary radio station was set up, again using the BC-654. It was used to keep radio contact with the aircraft during the flights. In a larger building several M.P. Pedersen radio receivers were installed, and they were used to receive weather information from the stations in England, Ireland, USA, Greenland and Iceland. GFA in England would, for example, send these reports on CW on 3800, 4302 and 8600 kHz. This collection was, as in the Pearyland expeditions south base, used to produce weather forecasts for the areas involved in the flights. I was usually working with the aircraft communication, but had the occasional session receiving the five number weather codes. It was a very boring job since the information being written down meant nothing to the operator. Once, while doing this, I fell asleep for a few moments, and when waking, found that I had copied the numbers while sleeping, and had continued writing over the edge of the paper and on to the table. This probably meant, that much of Morse code reception takes place on a subconscious level. I had similar experiences while on duty at the weather station, Nord. Here I sometimes took a nap on a table while the receiver was beeping away in the background with traffic of no interest to me. When my station's call, XPL, came from the speaker, I woke up and swung into action. The Morse code is perhaps stored in the brain as another language.

While at Ella Island I had the unusual experience of making one short flight, as crew, on a Norseman aircraft. The small plane had to have a radio operator on board while flying on the remote coast. Since all aircraft contact took place using Morse code, this was necessary, even though the pilot could easily have used telephony instead, and flown

without the extra crew member.

One day, a large iceberg floated into the bay where the three aircraft were anchored close to shore. It was possible, that the huge chunk of ice could topple when hitting the sea floor. The resulting large wave could damage the aircraft, and even throw them up on the beach. It was then decided to move the aircraft around a cape, to another bay nearby. During taxiing, one of the planes hit an underwater rock, and sank to the bottom in shallow water. The engines were above water, but the propellers were damaged. It was possible to float the aircraft, using empty fuel drums for buoyancy, and it was towed back to the beach. The total population of the camp, about fifty men, then by block and tackle, hauled the craft up on dry land. It was found that there was a large hole in the aluminum plates at the bottom. The damage was repaired, while all the radio and radar equipment, which had been submerged in salt water, was removed and flushed with fresh water. Replacement engine, propellers and other parts were sent up via Iceland, and after much hard work, the aircraft was flown back to Denmark. The radar set could not be used, but the radios, after thorough drying were functioning normally.

After returning to Copenhagen in the fall of 1951, I again worked on test equipment for the electronics industry at the company Radiometer.

My friend, Kristen Sørensen, who had spent the winter at Ella Island as a member of the Greenland Sledge patrol, was asked if he would participate in a large project in north Greenland. This, so called weather station, was to be built on the northeast corner of Greenland, and it would need several radio operators as well as a radio technician. He suggested me as radio technician and – operator, so I was once more hired by the Greenland Department in this capacity. The real reason for this station was revealed many years later. The U.S. had pressured the Danish government into providing an alternate landing strip for the strategic bombers, which were located at the Thule Air Base. Since it happened during the cold war, the station was camouflaged as a Danish weather station called Station Nord. The U.S. Air Force provided the expensive transportation of men and equipment from Thule to the new station.

Kristen Sørensen and I had the only ESP experience either of us had ever tried. The circumstances were the following: Kristen was at Nord with a primitive radio setup using the BC-654 transceiver. I was at Thule Air Base, about 1200 km away. We had arranged a nightly contact at 20:00 hours, because Kristen, running the station on battery, had to conserve power. One night, some time after ending the regular contact, an American came to me with important information for Nord, which he wanted me to pass on immediately. I told him that the operator at Nord had turned off his radio, and was not available until the next evening. The American pleaded with me to try to make contact now, so even though I knew it was impossible I called Kristen. To my surprise, he answered, and I sent the traffic. After this I asked why he was listening at that time, and his explanation was rather strange. He had been sitting on the bed, when he suddenly got the urge to turn on the receiver. He was as surprised as I, by hearing my call.

The only other curious thing about our many radio contacts in Greenland was that it was very often possible to make contact without pre arrangement.

The project at Nord started with a large group of people, construction workers and weather station personnel, traveling from Copenhagen to Thule in Greenland. The plan was to build the new weather station near the North East corner of Greenland, about 1200 km from Thule.

For various reasons, weather, aircraft problems, and lack of coordination between Danish and US operations, the project could not be finished in 1952. It was decided to establish a small station and have four people spend the winter there. Weather observation could then be started, and the station be well prepared for the spring and summer effort in 1953. My trip from Thule to Nord was interesting in that I flew on a C-119 US Air Force plane to Alert in northernmost Canada. Here the freight for Nord was transferred to a C-47 aircraft on skis, able to land on the unprepared snow at Nord. While at Alert, I visited the joint US-Canadian weather station there, and borrowed their nice Collins radio station to make a few amateur radio contacts. Little did I know that I would emigrate to Canada, and return to this remote place many times, twenty-odd years later, as a Canadian citizen. The first primitive radio station at Nord was outdoors, and used the often-mentioned BC-654 transceiver with its vertical 4 meter long antenna and ground plane. It was an advantage to be able to watch the air traffic while communicating. Shortly after, I assembled a station using the BC-654 as well as an M.P. Pedersen receiver, both connected to antennas held up by wooden masts. The weather reports were sent by telegraphy every three hours, to Danmarkshavn, OXQ, on the common Greenland frequency 5274 kHz, and to Thule, AKX50, on a frequency around 5 MHz. Some amusing misunderstandings took place on the Thule circuit because the American military operators there were rather inflexible in their procedures. These were obviously learned at military communications schools and used the military abbreviations in the so-called Z code. Kristen Sørensen and I used the commercial Q code, and from amateur contacts we were familiar with unusual operators in the other end. Later, from 1953, the weather observations were sent to the Danish radio station at Thule, OZZ. The extensive aircraft communication took place by AM telephony on the US Air Force frequency, 4220 kHz.

During the first few days at Nord, we operated outside, because the weather was quite mild for Greenland, and because many aircraft were making parachute drops of equipment around the station area. Often, a pilot could not see the small station and asked us in which direction we were located. Sometimes our answer was, that several aircraft were within sight, but if he would tip the wings we could give him the needed information.

An interesting radio event took place in the fall of 1952. We received a message from Denmark requesting radio watch at a certain date on the air to ground frequency, 6543 kHz. The Scandinavian Airline System planned a test flight for their polar route to the Orient, and wanted as many radio contact points as possible in the remote Arctic region. Our station, located between the regular air to ground stations at Reykjavik, Iceland, and Thule, Greenland, would fill in the gap between these two.

Unfortunately, the BC-654 set did not cover the frequency in question, so ham radio ingenuity had to swing into action. During our stay in Thule, on the way to Nord, I had begged some radio parts from the Air Force electronics shop there. The workers, from the land of plenty, took pity on a poor ham radio operator from an underdeveloped country. I walked away with several tubes, a dynamotor, crystals and other useful parts. With this I was able to assemble a simple CW transmitter as described in the ARRL handbook. It used a single 6AG7 tube as crystal oscillator/amplifier with an input power of about 7 watts. It was mounted on two strips of plywood and the high voltage came from the dynamotor. None of the available crystals were of the right frequency, of

course, but by grinding a promising one carefully on sandpaper, I managed to move the frequency. There was no frequency meter available, but by listening to the North Atlantic air to ground frequency, it was possible to get the crystal to zero beat with the stations TFW in Iceland and EIP in Ireland. The big day arrived and I was happy to contact the aircraft as it flew over our small station.

Many years later, when visiting Denmark, I told the story to an assembly of radio amateurs at a hamfest, and was surprised when a fellow stood up and told us that he had been navigator on that flight. On the same occasion I also met Henrik Kurt Carlsen, W2ZXM, and the Danish American captain and radio amateur, who became famous when his ship, Flying Enterprise, sank off the coast of England, 10. January 1952. He was the last person to leave the ship before it went down. For several days, after his crew had left in lifeboats, he kept in radio contact with rescue ships using his amateur radio set on battery power. He was soon back at sea with a new ship, Flying Enterprise II.

At Christmas, the U.S. Air Force kindly included our station in the number of stations in Canada, which were having parachute drops of mail and gifts. Navigation in the dark was difficult so we started up a 50-watt radio beacon, located about three km from the station. When the gasoline out there ran out I decided to bring a drum of fuel out. Not knowing what was involved, I tried to start one of the two D-4 bulldozers buried in the snow. This vehicle has a small gasoline engine used to start the large diesel engine, but at about minus 30-degree weather, everything was solidly frozen. By using blowtorches for a while, the small engine started, and after several hours work the machine would move. It was a trick to get it out of the deep snow hole, but it finally came up on the surface of the snow, and was used to transport the fuel. How easy the same job would have been with the help of a Ski-Doo, but they were not invented yet. Speaking of things not being invented, I joke about how I wished the transistor would be available when I built the portable radio at Daneborg.

I was in the habit of listening to, and copying, the Canadian weather reports on 5625 kHz. The reports were collected by Resolute Bay shortly after I had sent ours to Thule. One night the radio conditions were quite unusual. I heard the Resolute Bay operator at CHW; call the northern stations in vain. He was apparently unable to hear them, so the stations sent the codes without confirmation. Since I had copied all, I called CHW and offered him the reports. This was highly irregular, and he was puzzled by my call sign, XPL, but after a while accepted it. I continued to listen while CHW tried to pass the reports to Edmonton. This was also unsuccessful, so I broke in again and offered to pass all to Edmonton, who could hear me well. It is again strange to think that I eventually should come to live permanently in Canada and visit all its Arctic weather stations.

The small weather station functioned well through the winter, and the next summer, the planned large station was finished. Its radio installation consisted of separate transmitter and receiver buildings with towers and antennas, separated about 200 meters. Four 400-watt transmitters, two short wave, and two long wave were installed. One of the long wave sets was permanently used as a radio beacon for aircraft. It sent the identification NO on 404 kHz, 24 hours a day. The remaining three transmitters were controlled from the receiver building. Normal traffic was on short wave, but on a few occasions, during radio black out, long wave was used.

Three Hammarlund Super Pro receivers and two M.P.Pedersen receivers were placed at the operation position in the receiver building. As emergency sets we had the well used

BC-654, as well as an AN/ART-13, a Collins Autotune transmitter supplied by a 24-volt battery. A paper tape perforator and transmitter were also installed. Before leaving Copenhagen, I spent some time at the Great Northern Telegraph Company's imposing building at Kongens Nytorv in the center of the city. The company manufactured the equipment for tape telegraphy. I was presented with a transmitter, and asked to take it completely apart. A supervisor watched, and warned me to put the parts in order, so I could assemble it later. The exercise was intended to enable me to cope with a possible breakdown of the complicated mechanical device while in Greenland. The Morse code tape transmitter was used very little at the weather station, since we seldom had enough traffic to make it worthwhile punching a tape before transmitting. I had a similar training session at a telephone equipment factory. Automatic, manufactured automatic telephone exchanges. A 25 party, exchange was installed at station Nord, and functioned perfectly while I was there.

Returning to Denmark in the fall of 1954, I had an idea about avoiding some Danish income tax on the money earned in Greenland, by going to Sweden immediately. I went to Malmø by ferry thinking, that getting a job in Sweden for a while would provide an alibi. With my telegrapher's certificate, the obvious choice would be as radio operator on a merchant marine ship. The hiring office in Malmø had a job and I would have to board the ship at Helsingborg, about 50 km north, along the coast. After medical checks, I went to Helsingborg by train, and by pilot boat to the S/S Katia, SJIA, an iron ore carrier, while it was passing through the sound between Denmark and Sweden.

The ship came from Luleå in the north end of the Bay of Bothnia, and was bound for Newcastle in England. A new captain was coming on board, and the old captain and his wife, the radio operator, went ashore for a holiday. For me it was a matter of hello-goodbye to the operator before we were on the way towards the North Sea. Now my technical knowledge came in handy since I had not seen any of the radio equipment before. The first couple of days I suffered from seasickness, but it disappeared, and afterwards I enjoyed the luxury on board. My cabin was cleaned and made tidy by the deck boy, and being considered an officer, I dined with the Captain and the Chief Engineer. It was quite a contrast to the rather scruffy conditions in Greenland. The work, besides keeping watch, and passing telegrams and the odd telephone call, consisted of office work with the crew payroll etc. This last part of the job was extremely involved and tedious because of tax, and for some, alimony deductions. Receiving and typing the daily news from a Swedish coast station was at times difficult because of the rolling of the ship. When it leaned to starboard I had to hold the typewriter carriage with one hand while typing with the other. On one occasion, in the middle of the night, the automatic alarm receiver woke me up. We were in the Baltic Sea and in rough weather. However nothing was heard on 500 kHz, so after about an hour's listening, I went to bed again. After unloading at Newcastle, we went back to Luleå for more iron ore, and then to Port Talbot in Wales. The cabin boy, who had come to Sweden from France during the war, asked if he could talk to relatives by radio, while we were in the English Channel. Being more technician than radio operator, I said that it would be easy. Little did I know about the complications of paying for a phone call from a Swedish ship to France. In Greenland I had on several occasions been in trouble for assuming that, if something is technically possible, it can be done, forgetting the bureaucratic problems.

The ship's lifeboat transmitter and receiver was located on the upper deck, and looked as

if it had not been touched for years. Its batteries were completely dead, so I thought it would be good to give it a thorough checkup, and order new batteries. I hoped the regular operator would appreciate it, when she came back at Helsingborg as I left. Back in Copenhagen, I decided to live on money earned in Greenland, while studying electronics at the Teknikum. Graduation would have resulted in a technical engineering diploma, which probably would have changed my career. Unfortunately, after a year at college, I found that I could not keep up with the technical drafting, which had to be done as homework. There was also a bit of stubbornness involved, since I could not understand the importance of drawing steam engines while studying electronics. When I told the Dean about my dilemma, he showed no sympathy at all, but said, " There are many people outside the college waiting to get in. So, goodbye!!".

The Post and Telegraph ministry, which controls all telecommunication in Denmark, wanted technicians for the newly established television service, so I applied.

The test for suitability took place, at the organization's laboratory in Copenhagen. There I was presented with a broadcast, HI-FI, fm receiver, and asked to write a report on its performance. The laboratory was well supplied with test instruments, all of which were available for my use. Left alone for a couple of days, I came up with information on the receiver. This was apparently satisfactory, and I got the job.

The new television station was located in the outskirts of Copenhagen, at Gladsaxe. British Marconi supplied the ten-kilowatt transmitter and associated equipment. A turnstile antenna was mounted on a 200-meter high tower. The chief of the station, Weitemeier, was an old hand at broadcasting, and taught us the interesting details of maintaining the equipment. In the morning, before we arrived, and before broadcasting began, he would for example, insert a small piece of paper between relay contacts, somewhere in the transmitter. It was then our job to find this fault by logical tests and measurements.

Just before the start of the day's programs came a series of tests with the transmitters on the air. A test pattern on the video, and a series of frequencies on the audio transmitter. Modulation level was checked as well as the distortion level of the sound system.

Once broadcasting began, we had to monitor video and audio levels continuously. The program period was seldom more than three or four hours, starting at 1800 hours. I volunteered to climb the antenna tower to replace the aircraft warning light, and while up there I took a panoramic set of photographs of the view. In the flat country I could see very far from the 200-meter high perch.

While in Greenland, I had had many amateur radio contacts with stations in northern Canada. The operators had given me an idea of wages and living conditions in that great country, so when wanderlust again struck, Canada became the new destination.

Before leaving Denmark, I had to get rid of a considerable amount of radio equipment and parts. I had collected this through many years. It was with a heavy heart that it was sold or given away, but I realized that I would probably start a new and better collection in the new country. As I write this, in the year 2001, I wonder where my pack rat instinct came from, but usually blame it on the shortage I experienced during the war. It has been very difficult to part with much of the obsolete stuff, I have collected here, and the collection has been the largest ever. What remain are a fairly modern amateur radio station and a workshop with test gear. There is also a great deal of obsolete, stored parts,

which I slowly get rid of, as time passes.

Jytte and I were married in 1956 and soon after started the journey to Canada by train. In Rotterdam, Holland, we boarded the luxurious ocean liner, Ryndam, for New York. I now wonder why I did not visit the radio station on board.

In New York, we had to visit Radio City and go to the top of Empire State Building, on top of which several large television antennas are mounted. The view was fantastic and we took many photos.

We arrived in Vancouver early in October, and I started looking for a job, preferably something to do with electronics. It was not easy to get into radio broadcasting, and the only television station in town was the government operated Canadian Broadcasting Corporation. The CBC, at that time, hired only Canadian citizens. I tried to get a radio repair job in Kelly's piano store at Granville Street. There the owner took me to the repair shop in the back of the store. He showed me the chassis of an ordinary AC/DC table radio and asked me to identify the different parts. I am certain that I answered correctly in this test, and that I was overqualified, but I did not get the job. There was probably some reluctance to hire an immigrant with no work experience in Canada.

The first job I managed to find was with Rogers Majestic, ( Motorola ) on Terminal Avenue. Their shop was installing and maintaining VHF police and taxi radios. I had gone to one of the local radio parts wholesalers, L.A. Varah, to hear if they knew of a job for me. Varah himself came to talk to me, and after a while asked me to wait while he made a telephone call. He then gave me the address of Rogers Majestic where the shop boss, Rey Fritsche, hired me. He and I went to Kamloops to install a VHF repeater station on a hilltop near town. This was to be used by the Department of Highways. In the same small shack was installed several Wilcox, fixed frequency, CW, HF, receivers used by the police. For many years, the Royal Canadian Mounted Police had a network of HF telegraphy circuits throughout Canada

While working there, I made applications wherever there could be a chance of more interesting work. A new private television station in Victoria, CHEK-TV, had just come on the air. It was an interesting possibility, and I applied for a job as technician. In Canada titles become inflated and the position is called Engineer.

While searching for work I had contacted Trans Canada Airlines, (later Air Canada), where radio operators were needed. I passed a Morse code test at the Airline's school at Vancouver airport. TCA telephoned a while later and offered a job as weather observer and radio operator at Norman Wells, in the North West Territories. The working conditions would have been similar to the weather stations in Greenland. I had to refuse, because there was no married accommodation at the remote place. Shortly thereafter, TCA again telephoned with a job in Yellowknife, a town where we could both live and work. I had already accepted the job at CHEK-TV, and we moved to Victoria on the first of January 1957.

The television station had been on the air only one month, had a staff of 32, and was the first private station in British Columbia. The cost of building the complete station was \$ 120,000, hardly enough to buy a house today. The studio equipment was very simple compared with today's stations. There was one PYE image orthicon camera, a vidicon camera chain with optical input from two Bell and Howell 16-mm projectors and two slide drum projectors. The channel 6 transmitters were Westinghouse units, 1800 watts video, and 900 watts audio. The turnstile antenna was mounted on a 220-foot tower, and,

of course, I had to climb to the top and photograph the surroundings, as I had done in Denmark. Unlike Denmark, television programs ran day and evening, so we were two technicians on alternate duty. We usually had to answer the telephone in the evening when the office was closed. The calls were often abusive, since many people complained about our interference to channel five, in Seattle. Television receivers were not very selective at that time, and, despite the vestigial sideband filter in the antenna feed line, the station radiated a small amount of the unwanted sideband, thus competing with the weak signal from Seattle, about 100 km away. Our supervisor, the chief engineer, was Norman Bergquist, and he was very friendly and helpful to me. The twelve-hour shifts consisted of four days on and three days off, so the one of us who was not at the station, had a daytime job at a small company, making control circuits for the telephone company. There was very little maintenance work at the TV station, so the job was a bit boring. To my surprise, I was entitled to some holidays in the month of June, and we were invited to go with the station's photographer to Calgary, Alberta. On the way, we came through a small town, Kelowna, located on the Okanagan Lake in the interior of British Columbia. Here a new television station, CHBC-TV, was to be built. The photographer wanted to try for work there so we went in to see the manager and during the conversation, I casually mentioned that I was a technician working for CHEK-TV. We were all very impressed by the beauty of the Okanagan Valley and agreed, that it would be a nice place to live.

After returning from Calgary, a letter from Kelowna waited, with an offer to become the assistant engineer there. Titles are thrown around freely in Canada, after all they cost nothing. I accepted, and we moved to Kelowna in July 1957.

The studio equipment was assembled during the next couple of months, and at the same time the main transmitter, on top of 5000-foot high Blue Grouse Mountain was built. The site was across the Okanagan Lake from Kelowna, and at the time of the first broadcast, on September 21, ferries were still running between Kelowna and the West Side of the lake. A microwave link transmitted the video and audio signals from the studio to the mountain. A visit to the transmitter site started with a trip on the ferry and then a long trip on a dusty road, the last part involved climbing a narrow rocky road, built to reach the site. The station also installed two repeater stations, one in Penticton, and one in Vernon, both about 50 km from Kelowna. At these stations, the channel 2 signal, received on rhombic antennas, was converted to channel 13 or 7. The transmitter used a couple of 4X250 tubes in the final, supplying about 100 watts to the antenna. These repeater sites were also difficult to reach, and in the coming years I spent much time reaching the places for maintenance. A Land Rover vehicle, with four-wheel drive, sometimes with chains on all four wheels, was used to get to the sites. The winter trips through deep snow were especially challenging. Here the Greenland experience was very useful. In snowy weather I often towed a snowmobile on a trailer behind the Land Rover, and when the going became too hard in the car, continued on the ski-doo. On one occasion later, when the station had a number of smaller sites to look after, I remember a trip to a site near Keremeos. The station there had been reported off the air. I reached the town in the evening, and realized that with the amount of snow in the area, I could not drive in. I reached the station after a couple of hours of skiing, and found that the inner conductor of the coaxial cable to the antenna had contracted in the cold weather, pulling out of the bottom connector. The trip down the mountain, after the repair, was

wonderful. The sky was clear, there was a full moon, and the scene reminded me of the Greenland years.

In 1958 i got my Canadian amateur licence after a brief test, VE7AFW, and i immediately made my first contacts. The first CW was with the well-known transmitter using the one tube circuit with 6AG7. The same as long ago in Pearyland. I later bought a very good transmitter, Johnson, model Navigator.

A big event, which happened July 19, 1958, about a year after the station started, was the opening of the Okanagan Lake Bridge. Princess Margaret of England appeared at the official ceremony by the bridgehead, together with British Columbia's Premier, W.A.C. Bennett, and the Kelowna Mayor. This ceremony was televised live, even though the station had no outside broadcast facility. The station went on the air as usual, in the morning of the big day, and later it was announced to the viewers that it would now leave the air in order to bring the broadcast from the bridge. The studio camera, as well as a great deal of the studio equipment was carted to the site. The microwave dish and transmitter was taken down from the roof, and set up, aiming the dish at the transmitter site across the lake.

The transmission went off without problems. Afterwards all was taken back and set up again at the studio. I wonder how many viewers appreciated the effort made to bring them this special broadcast.

We lived in a rented house close to the television station. It had a long back yard on which I was able to put up an antenna for the amateur radio activity. I bought a long wooden pole from someone living in the other end of town. To get it to our house presented a problem, but early on a Sunday morning a friend carried the thin end of the pole, walking behind the Land Rover, while I slowly drove through the town. The pole was planted in the yard and I could make my first amateur radio contact using my new call sign, VE7AFW. The receiver was a BC-312 and the transmitter similar to the one I had made in Greenland. It used a 6AG7 tube, crystal controlled, which with a 350 volt supply gave about 5 watts output. Later I assembled a Johnson Viking Navigator transmitter kit, which was a very nice set capable of operation CW on all the HF bands available to amateurs at the time. During this period I received and recorded the sound of the first artificial earth satellite, Sputnik, which was transmitting on a frequency near 20 MHz



It did not take long before several small communities near the Okanagan Valley, but out of reach of the three main stations, wanted television. If a good signal from the main channel 2 transmitter could be found on a nearby mountaintop, and the site could be supplied with power, it was possible to establish a small repeater station. Eventually many of these were built using 5-watt transmitters. The most unusual of these was installed at Malakwa, on the Trans Canada Highway. It would have been very expensive to build a power line to the site, so the local people, being mostly loggers and heavy equipment operators, built a small dam on a stream. A pipeline was constructed to a turbine and generator that supplied the necessary 50 watts or so of 120-volt power. One day a man showed up at the TV station, carrying a small box. He claimed that it was an amplifier, which could be used to bring TV to the small community, Nakusp, by the Arrow Lakes. He would not open the box and went away with his invention. Near Nakusp, he then installed a channel 2 antenna on a high mountain aimed at the transmitter in Kelowna, ran a cable through the amplifier, over a hilltop to a similar antenna pointed at the town. The arrangement worked very well until bureaucracy interfered, and he was ordered to remove his TV station. It was now winter, and he replied to the letter, that it was impossible to reach the mountaintop through the deep snow. The authorities were determined to get him off the air. The local radio inspector, on orders from higher up, hired a small aircraft, loaded it with sandbags, and flew out to bomb the illegal antennas with the bags. They were not able to hit the target and had to return. Next summer, the

population of Nakusp opposed the order to shut down their television, and via the government in Ottawa, obtained a licence to install a repeater station.

A few more of the 100-watt repeaters were also built. In order to get a license to operate these, it was necessary to prove to the Department of Transport that the received signal at the proposed site was sufficient to give satisfactory television. Jytte and I spent the required week of monitoring at several of these places. The necessary gear, such as, generator, gasoline, antennas, electronics, mast, tent, sleeping bags, water and food, was loaded on a trailer pulled by the Land Rover. Once every hour during the broadcast day, signal levels and noise levels were measured, and Polaroid pictures were taken of the waveform monitor and the screen. This information was used to make up the application for the DOT.

We lived on the West side of Okanagan Lake, and I kept the company Land Rover truck at home, in order to be able to drive up to the transmitter site in case of trouble. The problems included frequent power outages caused by lightning strikes on the long power line to the transmitter. This line ran through the forest and up the steep slopes of Blue Grouse mountain. It was the job of West Kootenay Power Company to make any repairs. Since a television outage, according to the TV manager, was a serious problem causing loss of advertising money, it was necessary to find and repair the fault quickly. I often started walking along the power line from the top, and reported any problem to the linemen. The most common fault would be a tree branch across the line. On one occasion I reached the transmitter and found that the main overload breaker had tripped. Checking the incoming three-phase power, all was well, but the transmitter would not stay connected. Being led astray for a while, checking irrelevant circuits, it suddenly dawned on me that I ought to measure the incoming voltage between the phases rather than from each phase to neutral. Sure enough, two phases were tied together. The fault on the power line, far from the transmitter, was, that a branch had fallen and wrapped two of the wires together.

From friends I had heard of the research laboratory, which was located inside the Dockyard in Victoria. After nearly ten years with the television station it was tempting to look for something more challenging. I applied for a job as electronic instrument repairman, and was hired, so we moved from Kelowna to Victoria in October 1966. The first day on the new job, the Defence Research Establishment, was a great success, and I could not believe that I could be paid for such interesting work, with the most agreeable people. I continued with instrument maintenance until I was asked to join the Arctic group. I had, during a lunch hour, shown slides and told stories from Greenland. This caught the attention of the Arctic Section Head, who asked me to move to his group, and I was naturally keen on more Arctic adventure. I was not disappointed, and continued making Arctic field trips twice a year.

Although most of the work, as had been the case in Greenland, consisted of necessary housekeeping, I thought it very interesting to see so much of the Canadian High Arctic. Of necessity, a lot of time is spent shoveling snow, drilling holes in the sea ice, putting up tents, installing heaters as well as raising antennas, connecting electronic equipment, making radios work and charging batteries.

I managed to get to many of the Arctic weather stations, and was amused to see my call sign appear in an old radio log at Eureka station. I had had many radio contacts with Eureka and other Canadian stations while in Greenland. Now in 1969 and onward, all

our long distance radio contacts used Single Side Band modulation, but I usually brought my CW amateur station north, in the form of a Heath HW-8. The ultimate in good radio environment was enjoyed, when camped on the ice of the Arctic Ocean and operating my HW-8 on a car battery. Having endured power line noises in many places, it was very nice to be a thousand kilometers from the nearest noise, and able to hear the faintest signals.

While in such a camp, I listened to the frequency 4550 kHz, which was the one used by my friend Eigil Knuth, who was still working on his archaeology in Greenland every spring and summer. I was able to make contact with him on several occasions. He was confused by my call sign, CYZ 84, but eventually realised who was calling him. Another Greenland adventure happened when we were working on the ice between Ellesmere Island and Greenland. During a pause in the work I walked across the ice and picked up a stone from the beach in Greenland, enjoying a few minutes in my native country before walking back to Canada. The shortest distance between the two countries is about 15 kilometer.

The Arctic work involved much flying in both helicopters and fixed wing aircraft of different kinds. We had an unusual radio setup on one occasion, when hopping by helicopter across the ice, landing every few kilometers. Needing radio contact with the base on shore for a few minutes while on the ground, we used a Twin Otter aircraft cruising overhead as relay station. A lot of radio equipment was used for contact with aircraft, other bases, and our supply station at Resolute Bay. VHF, UHF and HF were used both fixed and portable, unfortunately no CW at all.

A major problem in the early years was the inaccurate navigation by the aircraft. Often an unmanned camp was set up on the ice, and it proved to be very difficult to navigate well enough to return to the camp later. Of course, it did not help that usually, a camp could not be seen from the air unless it was within a kilometer or so, and furthermore, the icepack moved, so the camp was in a different location day by day. Back at the laboratory, I built a number of small radio beacon transmitters, the use of which eliminated this problem. To make the size of its antenna manageable, a frequency range was chosen just above the AM broadcast band, 1600 to 1800 kHz. It turned out that a five-watt transmitter supplied by a 12-volt automobile battery could operate for a week or two on one charge. The range, using the automatic direction finder installed in all aircraft, was about fifty kilometer, entirely adequate for finding camps, even with poor navigation. The antennas were crossed dipoles held up by three meter long bamboo poles.

Later I was sent to a course on satellite navigation at Marconi's factory in Montreal. One of the earliest systems were bought for many thousand dollars. It was hoped that this would overcome the navigation problem, but it turned out to be too cumbersome to use in the Arctic. Flying out in a Twin Otter we would land on a suitable piece of ice, set up the 20-kilogram heavy equipment and connect it to two car batteries and its antenna. After about 15 minutes, a location fix was obtained, which invariably showed that we were many kilometers from the wanted location. After loading everything into the aircraft we flew to another suitable landing strip to repeat the performance. Compare this with today's situation. It is now possible to buy a hand held instrument for 150 dollars, which will give your location within ten meters.

After retirement in 1987, we built a house on a hillside, 13 acres with almost ideal

amateur radio conditions. A couple of rocky bluffs on either side of the house happen to be a half wavelength apart on 1800 kHz, and a couple of towers hold up a large dipole. This antenna, fed with open wire line, can be used on all the HF amateur bands. I enjoy radio contacts with, among others, OZ7WD, in Denmark.

Through the years, traffic on the MF calling frequency, 500 kHz, has gradually disappeared, much to the regret of old CW radio operators. So when I once more heard signals on 500 recently, it was a nostalgic treat. The American radio club encourages operation with hand morse keys, on New Years Eve. During this event I was in contact with W6KPH who turned out to be an old operator from the coast radio station, KPH, near San Francisco. He was using the now closed station's transmitters on this occasion on the 3.5 MHz amateur band. While chatting with him, he suddenly disappeared from the air, but came back a little later, explaining that he accidentally had keyed the 500 kHz transmitter with the amateur transmission. Very surprised I asked him if the old 500 kHz setup was intact, and he said that it was used to contact old Liberty museum ships when necessary. He kindly agreed to send the current weather report on 500, just for my benefit. I made a tape recording of this broadcast, received on my old MacKay ship receiver. This is the only remaining piece of my radio gear, which uses vacuum tubes.

In August 1993, long after retirement, I unexpectedly, had yet another trip to Greenland. While contacting OZ/OX3FV, who usually lives in Greenland, but was on vacation in Denmark, I learned that he was flying back to the Thule Air Base the coming Saturday. Interested in the details, he told me that my old friend, Eigil Knuth, was to celebrate his 90th birthday in Pearyland. A number of dignitaries were to fly up to congratulate him. The Danish military flight would be done in a C-130, Hercules aircraft. This piece of news was so exciting to me, that I, after the radio contact, called Defence Headquarters in Denmark. After telling a Captain in the Air Force about my interest in this occasion, he surprised me by inviting me to join them in Copenhagen.

A quick flight via London to Copenhagen was arranged, and as many times before in Canada, I stood before the same aircraft, but this time a Danish one. Arriving in Pearyland, we landed at Station Nord where I had spent a couple of years in 1952/1954. To my surprise, I found that the transmitters I had installed in 1953 were still in the old building. Not only that, but some of my notes from forty years earlier were still there. The following day we flew the 200 km to the house where my old friend was waiting. He was naturally very surprised to see me show up in this, End of the World place, but he immediately put me to work receiving telegrams from Denmark via Station Nord. We had a very good celebration later, and soon I was back in Canada after this unbelievable experience.

After this we had a very good retirement with many trips to Europe and a trailer trip to the east coast.

Unfortunately my wife Jytte became sick with cancer, and she died in 2007. Shortly before i had a stroke, which resulted in a lame right arm. So the result is that i had to sell all the radio equipment.

Borge Haagensen  
Victoria, B.C., Canada.

(Billeder er venligt stillet til rådighed af Vagn Jensen)