IGY 1957-1958: Drifting Station Alpha Transcript

(Narrated by N.Untersteiner, December 2008)

Time Stamp/Scene	Narration
00:00 - 00:53 Title and Credits	(silent)
00:54 Introduction	The International Geophysical Year 1957-1958 has been described as “the most significant peaceful activity since the Renaissance and the Copernican Revolution”. It marked the dawn of satellite technology and the observation of earth from space, global plate tectonics, the setting aside of the whole continent of Antarctica as a scientific reserve, and many other milestone events. It was an amazing achievement of international scientific diplomacy to launch such an effort against the background of the Cold War, and to rally 66 countries including the Soviet Union to participate. Station Alpha was the first long-term scientific base on arctic pack ice operated by a Western country. At the time of its establishment, the Soviets had already operated six drifting ice camps of this kind but, owing to the particular strategic importance and sensitivity of the Arctic Basin, little information from these early Soviet stations had reached the West. It was the variety and vigor of the numerous projects conducted at Station Alpha that went a long way toward catching up with our Russian colleagues. Some of the reports published from this work have become an established and often quoted part of the arctic scientific literature, most notably in physical and biological oceanography, sea ice physics, and air/sea interaction.
02:37 End of introduction	
02:38 Map	If there had been any satellites in the Spring of 1957, they would have seen an arctic sea ice cover that looked like the white area in this map. This ice floats on the ocean, covering about ten million square kilometers, and it is anywhere between a few centimeters and several meters thick. Winds and ocean currents push and stretch and shear the ice around, breaking it into a chaotic array of pieces of different size, separated by pressure ridges and sometimes by wakes of open water. After many reconnaissance flights by the U.S. Air Force, a cluster of thick old ice floes was finally located in March 1957, more than 1000 km north of Point Barrow, Alaska. The green dot in the map marks the point where our drifting station was established. From there, it drifted for 18 months along a meandering and looping path, covering a distance of over 3000 km, to the location marked by a red dot where the project ended in November 1958.
03:53 End of map	
04:00 Sunrise, men with tent	

04:16 Air drop	In April 1957, a ski-equipped C-47 landed on the ice and deployed the first team of workers. It included an Air Force Major as camp commander and several soldiers with technical skills who had volunteered for 6 months duty on the ice, plus four of the typical tough and versatile Alaskan construction workers. Modular buildings, called Jamesway huts, camp supplies, fuels, two small World War II Studebaker tractors, called Weasel, and a small bulldozer, were dropped by parachutes.
04:53 Collecting cargo	It is of course nice when the necessities of life fall out of the sky, but it our case they came scattered all over the so-called countryside, and collecting them was hard work. We learned very quickly that all the supplies and equipment had to be stacked and stored in systematic order. In spring, the snow is still cold and dry, and the almost perpetual, slight snowdrift can bury essential pieces of equipment that won't be found until July when all the snow will be melted. By mid-May, this amazing first crew of workers had built living huts, a mess hall, and laboratory, and the camp was ready for occupancy by the rest of the scientists.
05:56 Bulldozer making runway	The next order of business was to clear away the snow from what was to be the runway. At that time, we had no access to heavy cargo planes on skis, so the runway had to have a hard surface for aircraft on wheels. The finishing touch of such runways is achieved by dragging a heavy wooden frame behind a tractor to smooth out the last snowdrifts. It may seem somewhat foolish to do all this work on a sheet of ice that is only 2 to 3 meters thick and may split apart any day and form pressure rides that can grind down and destroy everything. But we were lucky. This first piece of ice in our camp and all the installations held together for a whole year.
07:00 C-124 first landing	As you can see, on its first landing, this C-124 Globemaster heavy cargo plane came precariously close to breaking the nose gear because there was a long, gentle bulge in the ice that we were unable to level out.
07:46 Jamesway huts	Our camp had 10 Jamesway huts, the smaller ones with a 5 x 5 meter floor, and the larger ones 5 x 10 meters.
08:00 Fuel drum distribution	For power, we had a 20-Kilowatt diesel generator, and the huts were heated with diesel stoves. During this early part of the years when temperatures are still between minus 15 and minus 35 degrees Celsius, these stoves burned about a 200-liter drum of fuel a week. By the time this fuel is delivered to the North Pole, it costs about 5 Dollars a liter or 20 Dollars a gallon, in 2008 currency. The occupants of each hut collected their fuel from the runway where the C-124 in several flights had delivered a depot of 800 drums. When the drums were empty, we chiseled out one end and used them for garbage cans and human waste.

08:54 Fresh water supply	Just like everywhere, an important ingredient of the quality of life is water. Floating on it, as we did, is not much help, because the salt water from the ocean corrodes the plumbing and leaves a salty residue on everything. The fresh water for drinking, cooking, and washing has to come from melting the nearly salt-free ice from old pressure ridges. The ice chunks were carried into our wash house and put in a large electrically heated vat. Everyone who took a shower or washed his clothes was required to replenish the water used with chunks of ice.
09:41 Radiometers	By the 18th of May, the entire team of scientists was on station and by the 1st of June, the official beginning of the IGY, the entire observational program was in full operation. Many instruments were deployed, including these to measure the intensity and reflection of solar radiation. Both solar and infrared radiation from clouds and atmospheric water vapor are the largest components of the surface heat budget controlling its melting and freezing.
10:16 Tide gauge	Another device was housed in this box. It was similar to a tide gauge, and it recorded the vertical motions of the ice due to the loading of the ice by snow fall or the unloading when surface meltwater runs back into the ocean.
10:36 Bumping the ice	With this makeshift apparatus, we generated tiny earthquakes in the ice. The propagation of the compressional waves generated in this way are used to study the elastic properties of the ice.
10:50 Ice plates	In those days, we knew little about practical sea ice problems related, for instance, to its bearing capacity. This is important to know because it determines how safe it is to land a plane of a certain weight and landing speed on sea ice of a certain thickness. Several scientists were engaged in studying this by taking ice cores and measuring their salt and air bubble content, and by subjecting carefully cut and measured plates of ice to fracture tests.
11:30 Examining thin section	Some of these fracture tests were perhaps more accidental than systematic.
12:15 Observing crystals	This scientist has just made a thin section of ice and is taking it to his “universal stage” that uses polarized light to observe the orientation of the individual crystals. This orientation is also something that affects the mechanical properties. Several other scientists were engaged in measuring ocean currents, the depth of the ocean, the composition of the sediments, and the complex life cycle of phytoplankton and its dependence of nutrients and light.
12:55 Supply flight	Except in the summer, when ponds of melt water make the runway unusable, we had a plane land every couple of weeks with supplies and spare parts and mail and fresh food, and also replacement personnel and people with short-term projects.

13:28 Husky dogs	This was of course always the big event, even for our 2 pet husky dogs.
13: 42 Metal strips	Pulling these metal sheets under the aircraft engines to catch the drips of dirty oil, tragically, one of our men was hit in the head and killed by the last snap of the propeller.
14:00 People arriving	It is a well known phenomenon that people working under adverse conditions and in great isolation sometimes develop a strong feeling of ownership toward their particular projects, and that the arrival of new or replacement personnel can be perceived as something of a not entirely welcome. This was particularly true for those of us who were there for the long haul, that is, for the whole Geophysical Year rather than for a project of a few days or weeks.
15:09 Getting dark, man walking	Toward the end of October, it starts getting dark at 85 degrees north and also cold. Of course, not as cold as on the Antarctic continent, but cold enough to slow down everything. More deliberate planning is needed for all outside activities, what tools or spare parts will be needed, and how long it will take. Even at our relatively harmless winter temperatures of minus 25 to minus 45 degrees C, bare hands and metal objects are not a good combination. Paradoxically, it is also better NOT to work up a sweat because wet thermal underwear loses much of its insulating value.
16:08 Weather observation and balloon	Careful weather observations were taken every 3 hours. They were coded and immediately sent to Alaska by radio to be included in the global weather network. Twice a day we launched a weather balloon to record wind and temperature up to near the top on the atmosphere. Helium to fill these balloons was too expensive in those days, so we had to use the somewhat more risky hydrogen, which we made on station in a pressure tank filled with aluminum chips and caustic soda.
16:57 Sunset time lapse	Before the sun goes below the horizon and it gets completely dark, the visitor to the Arctic is treated us to a spectacular sunset, lasting for many days. These time lapse shots show how the sun spirals down, almost parallel to the horizon before it stays down for the next 2 months.
17:32 First cracks	On the 27th of April 1958, it finally happened. Several cracks appeared in camp, the first one right next to our laboratory, stretching and breaking the electrical connections between the lab and the instruments out at the observation sites. Then, more cracks ran all over the camp damaging the maintenance shack and other buildings.
18:00 Long shot of open lead	A wide lead opened, separating us from our air strip, cutting through the stack of fuel drums and sending many of these precious commodities into the ocean. All this doesn't happen suddenly, but fast enough so that within a few hours it was clear that we were in serious trouble.
18:23 Ridge at radio hut	On the other side of the camp, a large pressure ridge formed near the radio hut and pushed over the antenna tower. You cane see how the boulders of broken ice are piling up and how their weight pushes down the ice in front of the advancing ridge. While this was happening, we frantically tried to bulldoze the deep snowdrift around the hut, but the tracks of the dozer were too narrow, and it got hopelessly stuck and had to be shoveled out.

19:02 Advancing pressure ridge	This shot shows the actual speed of advance of such a pressure ridge. You can walk away from it, but it will grind up everything in its path, and it is about to do just that with our fuel drums. The noise that this makes is disconcerting, to say the least, and unlike any other, ranging from a deep grumble to high squeaks, mixed with occasional pistol shots generated by the cracking ice.
19:39 Bulldozing snow from buildings	Most of the huts had been put on heavy 8 x 8 timbers that would allow us to drag them over the ice if necessary. This was of course impossible as long as they were half-buried in snow. So for a day or two we did nothing but clear the snow around the buildings and cut all the cables connecting them to each other and to the power generator. And of course we had to salvage as much as we could, including food, equipment, and lumber. We don't have much footage from these events because every pair of hands was needed, and standing around with a film camera was, shall we say, not socially acceptable while all the other men were breaking their backs.
21:15 Inspection	When the ice came to a temporary standstill, we did a thorough inspection of the open leads around us and all the cracks in our floe. This made it clear that there was no way to continue in that location. The mess hall was destroyed, several other buildings were damaged and, worst of all, our landing strip was broken into many pieces. Besides the D-6 Cat, we had only one other piece of heavy equipment, a road grader. It was parked on a piece of ice on the other side of the runway that was now almost out of sight, and there was no way to reach it, let alone bring it back. There was another heavy piece of ice only a few hundred meters away, and we decided to move everything there. In many days of backbreaking work, we managed to haul the surviving buildings, supplies, food, lumber, and equipment over to that other floe.
22:22 Mobilizing the lab	A special problem was our laboratory building. It was 10 meters long, and when we put it together, we didn't really think that we would ever try to move it. But with the ice cracking all around us and pressure ridges popping up here and there, we had no choice but to try. When the snow was pushed away from the base, we jacked up the building and pushed long 8 x 8 beams under it and nailed them down though the floor. This was tricky work, and it attests to the competence and experience of these men that, despite their exhaustion, no one sustained any serious injuries. Inside the lab, we had built all kinds of shelves, instrument racks, and work benches and taking them apart would have been tantamount to total destruction. So we had to leave everything inside the way it was.
23:41 Moving the lab	Dozens of wires had been strung from the lab to our instruments out in the field. There was no way to untangle and identify them, so they were just cut. It was a truly nasty job, but in the end, we got the lab going and were able to drag it to the new location, with all the furniture and everything inside.

24:27 Bulldozer sunk	On one of the many trips to the new campsite, our precious D-6 caterpillar hit a thin spot in the ice and broke halfway through. As I look at this 50 years later, I have no idea why we went to this precarious effort to attach a cable to the hitch. It was just an act of frustration, because we had nothing strong enough to pull the tractor out. So, after a while, we gave up and went to sleep. When we woke up the bulldozer was gone and it now rests on the seafloor in 4000 meters of water.
25:13 Tractor airdrop	Back in Fairbanks, they found another tractor that was quickly rigged to be dropped at our camp from a Globemaster. Unfortunately, the rigging done badly, and the tractor somehow slipped off the pallet. It didn't free-fall, but it landed nose-first, and the impact broke off the pony engine. Without it, it was of course impossible to start the engine. So they had to drop us yet another one with which we were able to finish moving the rest of the camp. After one month of backbreaking work, the new camp was back in full operation.
26:06 Submarine	On the 15th of August, suddenly and seemingly out of nowhere this ominous object appeared in the wide lead next to our camp. We have to remember that the IGY happened in the middle of the Cold War. We knew that in 1955 the first nuclear submarine, the Nautilus, had been launched, but we were unaware that she had crossed the Arctic Basin, submerged all the way from the Pacific to the Atlantic, while we were on the ice. Our visitor was the second ship of its kind, named SKATE. The day before her arrival we had been puzzled to see that one of the military people kept running our motor boat up and down the lead for no apparent reason. Now we realized, that what he was doing was making noise in the water for the submarine to hear and to home in on our exact location. It was an exciting and historical event: The first time in history that an American nuclear submarine surfaced in the middle of the Arctic Ocean. The visit turned into an enormous event. Groups of the ship's company were allowed what one might call "shore leave". The impressive captain, Cmdr. James Calvert, and his officers visited the lab and our installations and we briefed them on our research. The ship stayed for almost a day, but when the lead showed signs of closing up, the sailors were hastily summoned back on board and the black colossus of the SKATE slowly disappeared from the surface to continue her historic journey across the Arctic Basin and out to Norway.
27:58 Start talking about aquaplaning	The men at Station Alpha were a remarkable collection of dedicated and disciplined individuals. Even so, living for months on end in the confinement of a small village, surrounded by this seemingly endless and frozen no-man's land was stressful. So, now and then, some of us felt the urge to do something a bit out of the ordinary.
28:08 Aquaplaning	As you can see here, out of the ordinary was not always the same as safe. Having grown up in the middle of the Alps, I have to admit that I was always a little afraid of the ocean when it was not frozen and deeper than up to my neck. So I have no longer any idea what possessed me to do this without a wet suit. Someone sent a picture of this to Sports Illustrated, but I don't know if anyone ever noticed. I do know, however, that plywood aquaplaning in ice water at the North Pole did not become a popular sport.

29:48 Seismic excursion for refraction shot	Later in this summer of 1958, we tried to do a seismic refraction shot to study the layers of sediment below the sea floor. This required that we had to get away from the station at least 7 or 8 kilometers and fire a small charge of dynamite there. There was a great deal of open water all around us, so for some distance we were able to use our little fiberglass boat and take a meandering course among the loosely scattered ice floes. However, there is a limit of how far on can go this way. For the rest of the trip we used a combination life raft and banana sled to cross both the ice floes and the open leads. At the appointed time, we set off a stick of dynamite. We had no radio, and our watches were not very good, so it turned out that, we set off the charge far too late, and the experiment failed.
31:03 Visits to old camp ruins	The ice where our first camp stood was broken in many pieces that had moved in an almost turbulent fashion. We could see parts of it in practically all directions. It became another recreational activity to visit these scattered ruins and look for pieces of wood or wire or any other useful debris. All during that summer, the ice around our camp never came to rest and frequently forced us to re-deploy our scientific instruments. Pressure ridges kept slowly but steadily chewing away at the edges of our floe. We hastily had to build two more runways that survived only a short time, and we were running out of useful real estate around us. By October, it was clear that we were in no shape to make it through another winter. With the official end of the IGY approaching, Headquarters back in Washington decided that we should quit. On the 7th of November, a C-123 landed on a marginally short piece of runway and evacuated all personnel with all their scientific records and took them to Thule air base in northern Greenland.
32:26 Hold sunset picture	The work at Station Alpha yielded a wealth of new science that has become the permanent stuff of textbooks. It also marked the beginning of a new era of arctic ocean research by the United States. Drifting camps of this kind have become routine since the IGY. Station Alpha was a milestone for science, but for many of us who had the good fortune to participate; it was also a life-changing experience.
33:01 The End	