



**PETROLEUM  
HISTORY  
SOCIETY**

**ARCHIVES**

*Newsletter of the Petroleum History Society*

*May 2006; Volume XVII, Number 3*

**P.H.S. Lunch and Learn Meeting – Thursday, May 18, 2006**

**Speaker: Wes Abel – Frontier Engineer**

*On:*

**Hibernia – Fish, Icebergs and Oil**

The Hibernia Field is located approximately 200 miles east-southeast of St. John's, on the Grand Banks of Newfoundland. The field was discovered in 1979 by Chevron. It was the first exploration well to be drilled by Chevron on the Grand Banks as part of a farm-out agreement with Mobil. Mobil had previously drilled several exploration wells in the area but they had been unsuccessful. Wes will describe to us how the exploration and development of the field proceeded including the Ocean Ranger sinking, delineation, ownership disputes between the provincial and federal government, The Atlantic Accord and the ultimate development of the field that led to its current production of over 200,000 barrels per day from the Hibernia gravity-based structure (GBS).

*Wes Abel was born at Saskatoon, Saskatchewan, the eleventh of fourteen children in his family. When he was a boy his family moved from their farm in Saskatchewan to a farm at Calmar, Alberta. When he was in high school he went to work on drilling rigs in the Leduc Oil Field and soon was working on rigs from southern Saskatchewan to northern Alberta. Wes's story takes him through a lifelong technical progression with the Mobil Oil organization including many offshore projects. **Please see page 5 of this issue for an expanded bio.***

**TIME:** 12 noon, Thursday, May 18, 2006.

**PLACE:** Fairmont Palliser Hotel (133 - 9<sup>th</sup> Avenue S.W.) – Canadian Pacific Rm. (check marquee)

**COST:** Members \$25.00 and Guests \$30.00 (most welcome) (cash or cheque only)

**R.S.V.P. if you wish to attend to: Clint Tippett, 691-4274 or  
[clinton.tippett@shell.com](mailto:clinton.tippett@shell.com) by noon Tuesday, May 16**

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*THE PETROLEUM HISTORY SOCIETY*  
**THE BULL WHEEL**



**Next Board Meeting:** The Board will meet next at noon on Thursday, June 8 at the Glenbow Museum and Archives – meet in the Lobby just before noon.

**Volunteers:** We are always on the lookout for people with the energy and dedication to help us grow and to undertake projects on the Society's behalf. Please contact Clint Tippett (691-4274), Doug Cass (268-4203) or Hugh Leiper (249-0707) if you would like to get involved.

**Next Luncheons:** We are seeking speakers and interesting subjects. If you would like to consider presenting, please contact Clint Tippett, President P.H.S., at 691-4274.

**Canadian Centre for Energy Information:** The P.H.S. has a "Content, Marketing and Traffic Partnership" with the Centre. This arrangement is an expression of the mutually beneficial cooperation that exists between our two organizations. Please see [www.centreforenergy.com](http://www.centreforenergy.com) for more details. Of particular interest to our members is their on-line historical volume "Evolution of Canada's Oil and Gas Industry" that can be downloaded free of charge.



**P.H.S. Pin Sets:** Our pin sets (of 6) have been reduced in price to \$40.00. Please contact the Society if you are interested in buying one or several sets. These make great and original Calgary- or Western Canada-related gifts. Detailed comprehensive descriptions accompany each plush-boxed set.

**Digital Archives:** As you know, you can elect to receive your Archive newsletter in hard copy, digitally as a pdf or both. We would like to point out that the advantage of going digital on this is that many of the illustrations in the newsletter are in colour, an aspect that is not part of the black and white hardcopy but is yours to enjoy with the on-line version. Why not try it? You don't have to give up your printed version.

**Passings:** Several individuals who made notable contributions to the oilpatch have recently passed away and are brought to the attention of our membership:

**Grant Mossop** (October 5, 2005): Grant was best known as Manager and Senior Scientist in the production of the monumental publication "Geological Atlas of the Western Canada Sedimentary Basin". Grant was formerly head of the Alberta Geological Survey and was instrumental in many outreach and educational undertakings of the Canadian Society of Petroleum Geologists and the

Geological Association of Canada. A memorial to Grant written by Ward Neale was published in the *Globe and Mail* on April 17, 2006.

**Tom Kennedy** (December 7, 2005): Tom was a journalist who had worked for the *Calgary Sun*, the *Calgary Herald*, the *Globe and Mail* and numerous other publications. At the time of his passing he was editor-in-chief of *DunaNovaPress* in Hungary. He is best known to the petroleum industry for his keen interest in Arctic development and, in particular, for his book "Quest – Canada's Search for Arctic Oil" (1988) that told the tale of Panarctic Oil and its prolonged campaign to discover enough hydrocarbons in the High Arctic to justify development. Tom was the victim of a hit-and-run driver.

**Ted Rozsa** (March 2, 2006): While Ted is best known for his many philanthropic works such as his contributions to the Rozsa Centre at the University of Calgary, his roots in the oil industry ran deep. According to his memorial "Ted was a pioneer in then post-war oil industry. His first and only employment after graduation was with Shell Oil Company where he spent thirteen years managing seismic exploration from the Gulf of Mexico to the tundra of northern Alberta. In 1950, one year after relocating to Calgary to assume the position of Chief Geophysicist for Canada, he left Shell to start his own company, Frontier Geophysical. Over the next forty years, Ted utilized his considerable skills as a geophysicist and geological engineer to build three petroleum companies in southern Alberta." Perhaps one of his greatest accomplishments was his appearance in thirty-eight consecutive "Doodlebug" Golf Tournaments sponsored by the Canadian Society of Exploration Geophysicists.

**Fred Foo** (April 30, 2006): Fred was a builder in the geophysical industry. Following a childhood in Winnipeg, Fred attended Brandon College and then moved west to participate in the emerging oil and gas industry at the leading edge following the discovery of Leduc. In 1968 he formed Airborne Geophysical Surveys in partnership with Bob Galeski and through that company enjoyed many challenging operational issues in the High Arctic, Papua New Guinea, Ghana, Madagascar, Kenya and Nepal.

**Ed Phelps** (May 2, 2006): Ed Phelps was a prominent Ontario oil historian who contributed greatly to the preservation and communication of Canada's early petroleum heritage. Doug Cass, P.H.S. Treasurer, has selected from our Bibliography, the following publications from his many historical works:

Whipp, C. and Edward Phelps. *Petrolia, 1866-1966*. Petrolia, 1966.

Phelps, Edward. *Petrolia, 1874-1974*. Petrolia, 1974.

\_\_\_\_\_. Whipp C. and Pethick, L. *Petrolia: a century and a half of history*, Petrolia: Van Tuyl and Fairbank, 2004.

Elford, J. and Edward Phelps. "Oil then and now" *Canadian Geographical Journal*, v. 77, November, 1965

Phelps, Edward. "Foundations of the Canadian Oil Industry, 1850-1866" in E. G. Firth, ed. *Profiles of a Province*. Toronto, 1967, pp. 156-165.

\_\_\_\_\_. "The Canada Oil Association - an early business combination", *Western Ontario Historical Notes*, v. 19, no. 2, September, 1963, pp. 31-39.

\_\_\_\_\_. "Oil Museum of Canada" *Western Ontario Historical Notes*, v. 16, 1960, pp. 75-84.

Ball, N. R. and Edward Phelps. "James Miller Williams" in: *Dictionary of Canadian Biography*, vol. XI. Toronto, 1982, pp. 929-930.

Phelps, Edward "John Henry Fairbank of Petrolia (1831-1914): a Canadian entrepreneur", M.A. thesis, University of Western Ontario, 1965.

\_\_\_\_\_. *Petrolia's first member of Parliament - J. H. Fairbank in Ottawa, 1882-1887*. London, 1966.

\_\_\_\_\_. "A Liberal backbencher in the Macdonald regime: the political career of John Henry Fairbank of Petrolia", *Western Ontario Historical Notes*, University of Western Ontario Library, v. 22, no. 1, March, 1966, pp. 1 - 45.

\_\_\_\_\_. "The Fairbank Collection at the University of Western Ontario", *Western Ontario Historical Notes*, v. 17, no. 2, September, 1961, pp. 89-91.

\_\_\_\_\_. "James Miller Williams" *Canadian Encyclopedia*, 2nd edition. Edmonton, 1988, p. 2308.

## PETROLEUM HISTORY SOCIETY AWARDS FOR 2004

**Petroleum History Society Book of the Year for 2004:** To Paul Chastko for his book “Developing Alberta’s Oil Sands – From Karl Clark to Kyoto”, published by the University of Calgary Press, 320 p.

**Petroleum History Society Article of the Year for 2004:** To David Breen for his article “Atlantic No. 3 Disaster – from Raging Inferno to Beacon of Promise”, published in “Harm’s Way – Disasters in Western Canada” edited by Anthony Rasporich and Max Foran. University of Calgary Press, pp. 157-177.

**Petroleum History Society Preservation Award for 2004:** Not awarded for 2004.

**Petroleum History Society Multimedia Award for 2004:** To the Corb Lund Band for their video of “Roughest Neck Around” shot on the site of the Canadian Petroleum Interpretive Centre, Devon, Alberta.

**Petroleum History Society Lifetime Achievement Award for 2004:** To Fred Stenson for his long involvement in the researching, interpretation, writing and publishing of Canadian Petroleum History. In addition to numerous article and scripts, Fred’s works include the landmark volumes “Waste to Wealth – A History of Gas Processing in Canada” (1985) and “The Last Stack – Entrepreneurism and the Environment” (2000).

### Lyrics to “Roughest Neck Around” by Corb Lund

He got a real long reach in the derrick when he leans  
He’s been all around the world on the big oil rigs  
With the welders and the trucks on the black gold rush  
And the diesel burnin’ Cat motors growlin’ and the mud  
You’d better hire him on, he’s the roughest neck around  
He got the power in his hands to pull the dragons from the ground

It’s 35 below or its 98 above  
And he’s working thru it all, cuz baby this is what he loves  
Drives a hundred-fifty miles make sure his kids are doin’ fine  
And he sees ‘em when he can but he’s married to his iron  
You’d better hire him on, he’s the roughest neck around  
He got the power in his hands to pull the dragons from the ground.

He’s a good hand to have on, and he’s throwin’ on the tongs  
Spinnin’ chain and slidin’ high side all night long  
And he’s tripping in his pipe, and he torques it good and tight  
And ya gotta figure Eddy’s got his mud weight right  
You’d better hire him on cuz he’s better than the rest  
He got the power in his hands and the dragons in his chest

Well, his mind’s a little tired but his back is plenty strong  
Got his Green Kings and filthy, frozen coveralls on  
And he’s drilling by the inch and he’s hauling on the winch  
Takin’ fuel from the tanks on his short change shift  
Yeah, you’d better hire him on cuz he’s better than the rest  
He got the power in his heart and the dragons in his chest

He brings the power to the people  
Petro power to the people  
Cuz he’s the roughest neck around  
He’s pullin’ dragons from the ground.

For more go to [info@corblundband.com](mailto:info@corblundband.com) or [www.corblundband.com](http://www.corblundband.com)

## **WES ABEL – FRONTIER ENGINEER: *EXPANDED BIO FOR MAY 18, 2006 TALK***

In 1955 Wes went to work for Mobil Oil as an oil field tank battery operator at Drayton Valley and two years later he was transferred to the Calgary office. It was there that he finished his high school by attending night school at Mount Royal College, and then going on to take engineering at the U. of A. in Edmonton, graduating with distinction and winning the A.P.E.G.G.A. gold medal in Civil Engineering in 1964.

Upon graduation, he went to work for Mobil Oil in Edmonton and was transferred to Calgary as a reservoir engineer in 1966. He soon found himself working at Mobil's research lab in Dallas doing advanced research on fluid flow in high pressure and high temperature reservoirs. During his stint at the lab, he participated in the development of Mobil's first compositional reservoir simulator computer model. He then published a technical paper describing his work in the S.P.E. Journal of Technology. He continued to liaise with the Mobil Engineering group in Dallas and within a short time was involved with engineering and installation of offshore production facilities in the Gulf of Mexico. Shortly thereafter he was Mobil's structural engineer during the construction of the SEDCO J semi-submersible drilling rig in Halifax and was in charge of engineering and installation of the first six-well drilling platform offshore Nova Scotia on the beach of Sable Island. In November of 1974, he went to Norway as Structural Engineering Manager for the Statfjord A project and in 1976 went to work offshore as Platform Manager. In 1979 he and his family moved to London, England where he was overall manager for the development of the Beryl B project.

In 1983, he was transferred to Halifax, Nova Scotia, as Engineering Manager for the development of the offshore Sable gas project and in 1985, was transferred to St. John's, Newfoundland as Area Manager where he led the development plan and engineering team for the Hibernia project. While there, he also led the development team for the Environmental Impact Studies and statement filings as well as the engineering studies for the reservoir depletion plan and construction of the offshore platform for an ice-protected production facility. He was a lead participant in the negotiating team for the Hibernia group of partners in the development of the Hibernia agreements with the two governments and was the lead negotiator for the Canada Benefits and the Bull Arm agreements.

He was an active member of the community, participating in professional, local business, education, charitable and sports associations. He was a member of the advisory committees to the Faculty of Engineering and the Faculty of Business at Memorial University, Chairman of the Board of Governors for C-CORE and served on the C-CORE research advisory committee for six years. He was a member of the Rotary Club, the YMCA, curling and other sports associations. In 1993, he returned to Calgary as senior advisor to management and elected to take early retirement in 1996. He is the recipient of numerous industry awards, including an Award of Merit from the Canadian Petroleum Association (Chairman of the Frontier Committee), and a Frontier Committee award from C.A.P.P. In 2002, he received an Outstanding Contribution Award from the Newfoundland Ocean Industries Association in recognition of outstanding and lasting contribution to the establishment and growth of the oil and gas industry in Newfoundland and Labrador. After several years of consulting, he now enjoys full retirement and is active in sports; bowling, skiing, curling and golfing. He lost his wife to Alzheimer's in 1993 and now lives alone with his pet cat, Willow. Wes enjoys looking after his yard in the summer and occasionally is able to take trips outside the country.

# MEMORIES OF FIELD WORK IN THE CANADIAN ARCTIC & ROCKIES 1959-1961

by Ken Glennie, Geologist

*Dr. Ken Glennie is a Shell geologist who joined the Shell Group in the mid-1950's and experienced a wide range of international postings through which he has come to be known for his encyclopedic knowledge of petroleum basins in general and the North Sea and Oman in particular. Ken visited Calgary in June 2005 where he received the Sidney Powers Memorial Award from the American Association of Petroleum Geologists in recognition of his lifelong accomplishments. While he was in town he visited Shell Canada's offices, met with some of his former (now retired) co-workers and gave this presentation. Thanks to Ken for allowing the P.H.S. to publish it here.*

Having cut my geological teeth in New Zealand (1955-1958) I was transferred to Shell Canada in Edmonton early in 1959 to lead a field party in the Canadian Arctic. My first task was to make a photogeological map of an area flanking the Mackenzie Delta between the Arctic Circle and the Arctic Ocean - no published large-scale topographic map existed at the time. Our task was to calibrate that map tectonically and stratigraphically, the latter supported by palaeontologists based in Calgary.



Shell Canada Geological Field Party 128 at Canoe Lake Campsite, August 1959  
Ken Glennie third from left. (Photo courtesy of Shell Canada Photo Archives)

In the first week of June, a thirteen-hour flight in the Company DC3 brought us to Shell's supply base south of the newly-formed town of Inuvik on the east side of the Delta. We could not start earlier in the year because ice on the river would sink the float planes which brought supplies to our field camps, which were always sited next to a river or lake. As we saw later, several feet of

the banks of the Mackenzie River had been planed clear of vegetation by floating ice at the time of 'break-up'. After a night's sleep, we flew to Fort McPherson on the Peel River, our first camp, where we erected our tents adjacent to the school. Our tents were mosquito-proofed, but it was impossible to get inside without the company of a swarm of the insects. I think that by the end of the summer, the liberal use of Shelltox gave us all a degree of dieldrin (now banned) poisoning.

For the first six weeks or more the sun circled us for 24 hours a day, a little higher or a little lower. Leaving the 'office tent' in broad daylight at perhaps 11 p.m., reading a book for a little until the realization that it was 4 a.m. and breakfast was scheduled for two hours later. Mid-afternoon temperatures could rise to about 90 degrees F when we were decidedly drowsy. Our field transport was a D-model Bell two-passenger helicopter piloted by Egan Agar of Okanagan Helicopters.

A month later we relocated to 'Canoe Lake' southeast of the Richardson Mountains. The last night at Fort MacPherson we were joined by the Chief Engineer of Okanagan Helicopters, who gave me a half bottle of whiskey to split among my crew; this I left sticking out of my briefcase by the helicopter pad. The temptation was too much for our alcoholic French Canadian cook, who helped himself to the bottle and drained it. Georges had also persuaded the Chief Engineer's pilot to buy him a couple of bottles of whisky at Aklavik while on the way to Canoe Lake. I was the last to leave the old camp to ensure that everything was left clean and tidy. On arrival at Canoe Lake I found that Georges had already consumed one of his two new bottles; the other geologists had put up his tent around him and got him to bed. By the following evening Georges was still in his camp bed, so I visited him with my biggest geologist Jay Gould (went through college on an ice-hockey scholarship); Georges was cuddling his last half bottle, which I removed and emptied onto the muskeg. He wanted me to fire him so that he could get back to civilization and more whiskey; instead, I ordered him to start cooking. I was told that the next day he was drinking neat lemon and vanilla essence, which has an alcohol base - that too went onto the muskeg and our food suffered.

Here we were snowed in for a week under white-out conditions, so no flying and no fresh supplies from Inuvik by 'fixed-wing' plane on floats - a single-engined Beaver if I remember rightly; a hole dug into the permafrost and covered with a sheet of plywood and sphagnum moss made an excellent deep freeze. Fishing was very boring. The only fish seemed to be a large pike, which took the hook but had no fight; thrown back into the water, it immediately took the hook again. The snow melted but left us with the feeling of an early Fall; mosquitos were soon replaced by blackflies, which unfortunately crawled inside our shirt cuffs and collars to suck blood rather than having to pierce clothing to get at us.

Our third camp was by a beautiful lake east of the Mackenzie Delta southwest of Tuktoyaktuk. Here was a good supply of excellent rainbow trout but, although we caught them, Georges never cooked them. When I tackled him on the subject he claimed that gutting fish gave him the 'jeebie weebies'. We volunteered to do the gutting and from then on fed very well. The magnetic pole at that time was on Banks Island, far to our northeast, so that even on the Arctic Circle, our compasses had to be deviated (declination), if I remember correctly, by about 44° to get True North, and this figure varied geographically; on the Arctic Coast it was even more. As a result, although we used our clinometers to make dip measurements, we reckoned that strike lines were probably plotted more accurately by visual comparison with similar features on our photo-geological map than by relying on the compass.

Field work had to end in the first week of September when the lakes began to freeze over at night; either we left when the float-plane pilots said so or we would have to wait until November when the ice would be thick enough for the planes to land on skis. We were ready! Unused canned and dry foods were buried, and on our way out via Inuvik we informed the Canadian Mounted Police of the location of our caches and of any unused helicopter fuel - someone might need it during the coming winter. Back in the office in Edmonton, the summer's work had to be collated into a report. Logistically, it took a year to plan these field trips, with three parties operating in adjacent areas. In 1960, I was to lead a team into the Rocky Mountains of northeast British Columbia. Once again, a photo-geological map had to be prepared of a rectangular area between the Rocky Mountain Divide (essentially the Finlay River) and the Alaska Highway, with the Sikanni Chief and Muskwa Rivers forming the southern and northern boundaries. This time we had a topographical map of the Rockies to help our photo-geological construction.



Shell Field Party loading Single Otter, Fort Good Hope, August 1959  
(Photo courtesy of Shell Canada Photo Archives)

Being south of the Arctic, our new field season was lengthened from three to four months. We were to operate with four helicopters amongst three field parties, the extra helicopter rotating between them. We were flown, first by DC3 and then a single-engined De Havilland Beaver to Trimble Lake, where our initial supply of helicopter fuel had already been brought ashore during the winter (the previous February, the party chiefs had a long reconnaissance trip in the DC3 to select their camp sites). Our camp was located on a terrace 10-15 feet above the lake level, so, after erecting our tents, an early task was to build a simple dock and steps up to the camp site. Again, the photogeological map had to be calibrated, and many mountains had to be climbed and sampled; on one occasion, an Austrian student, Hans, and I had just reached the flat top of a mountain where the helicopter would pick us up; Hans took off his sample-laden rucksack to relax only to watch in horror as it rolled several hundred feet down the mountainside. No rest for him! He had just regained the summit with his samples when the helicopter arrived. A couple of times that summer, Peter Ziegler (who led the next Shell field party to my south) and I sat together on a mountain top to compare our geological boundaries across the map boundary; a very useful



exercise. I noted that sharp-eyed Peter could discern colour differences in some rocks that I had difficulty in seeing.

Towards the end of the field season, forest fires, started by lightening strikes to our west, began to cause a permanent haze, which made it more difficult to recognise rock formations using subtle colour changes. Egan and I landed on one hilltop that was smoking slightly with the idea of stamping out a few hot ashes. When a nearby tree shot up in flames, however, it was clearly too dangerous to pursue our task and we took off in a hurry. I had to inform the forestry officials, and was worried that they might take my helicopter and geologists to fight fires; when they realized where it was, however, they lost interest - it could burn itself out. The timber would not be needed for felling for another thirty years, by which time it would have grown again. Our helicopter engineer, Hans Nixdorf, never left camp. Apart from being base radio operator, he also befriended a clutch of ptarmigan chicks to the extent that he could pick them up to feed from his hands without mother getting into a rage.

A few weeks before the end of our mapping season, we were just coming in to land at our own campsite when, about six inches from the ground and with slightly increased engine revs, one of those rotating wings flew off and cut three more helicopter landing pads through the scrub ahead of us. The remaining blade went into full pitch, ripped out the transmission mast, which took off aft, slicing through both gas tanks just behind the plexiglass bubble (landing at the feet of Hans Nixdorf, who always watched our landings) and we were lying tilted to one side and on fire. Once Egan and I remembered to unbuckle our seat belts (and to take my brief case with the summer's mapping in it), we would have beaten Jessie Owens for the first thirty yards in case it blew up. With the gas tanks split open, however, we realized that it would not explode. I had the fourth helicopter sent up to me the next day by Peter Ziegler. A few days later, snow drove us out of the high mountains and we spent the last few days of September operating from the comfort of a motel on the Alaska Highway.

My third field season in Canada was spent in the Yukon, west of the Richardson Mountains. Most of the time we were camped beside Bonney Lake, where we built a crude bridge of ten-gallon fuel drums and planks to the helicopter pad across the narrow stream draining the lake. The lake provided bathing facilities (just a few degrees above freezing); our helicopter pilot that year (Bill, whose other name escapes me) was decidedly thin on top and had to wear a baseball cap to keep the mosquitos at bay. He hoped to swim in the Arctic Ocean, which he achieved around mid-August a little east of Herschel Island; had he seen the small iceberg floating offshore before he went swimming he said he would not have gone in.

Mosquitos are a decided menace. We were asked by the Canadian Mounted Police one day if we had sighted an Austrian who had canoed down the Mackenzie River, made a portage across the southern Richardsons via the Rat River and was overdue at their post halfway down the Porcupine River to the Yukon; we had not seen him. We heard later that two Mounties canoed up the Porcupine as far as they could go and, on the way west again, espied a canoe wedged among reeds near the river bank; it contained the Austrian who was completely unconscious from the effects of mosquito bites - but he recovered.

In 1959, we rarely saw any caribou, but in 1961 we had two herds each of 5,000 to 10,000 beasts that migrated past our camp, and they were followed by grizzlies that helped themselves from time to time to a meal of the fittest, never a weak straggler - and if you approached a feeding grizzly too closely with the helicopter, he would have clawed you out of the sky.

It is a great temptation to photograph grizzlies from the safety of a helicopter. But in 1959, geologists of another oil company left their helicopter in the field and were flown back to a distant camp by float plane. On returning next morning they found that their Plexiglas bubble had been smashed, so back to camp again. Out again next day with their engineer they found that the instrument panel had been ripped out; this noisy flying creature was offering no resistance. They returned the next night and shot the grizzly, which was about to do more damage. This reminds me of an incident in 1961 when landing to check the lithology of an isolated hill. I noticed a grizzly with two almost fully-grown cubs on the other side of the hill from where we landed. So before starting work, I climbed the hill to see what mama was doing, only to be faced by mama just over the crest; she obviously had the same idea. By that time the cubs were half a mile away and still running; she must have decided that I was pretty harmless, so she turned away and followed her cubs.

Radio communication in the Arctic is often wrecked by magnetic storms to the extent that we could communicate with our supply planes only when within line of sight. And yet we often heard very clearly what we presumed to be Russians speaking on the other side of the Arctic Ocean but sounding as if they were just over the hill. More worrying was that we sometimes heard the airport landing circuit at Minneapolis-St. Paul, 1300 miles to the south and were worried that we might interfere with their operations. On enquiring, we were told that our radios were so weakly powered by comparison, that they had never heard us. An Arctic fog occasionally gave us white-out conditions even 100 miles south of the coast. In late August a breeze blew up in the early evening so pilot and I set off for a little more geology. Not far north of our camp, however, we suddenly seemed to stop in mid-air; we had flown into a very violent Arctic Front. The pilot immediately headed back camp where we roused everyone to batten down all tents plus the helicopter. Within half an hour the front had hit us with gale-force winds. By morning, a panel had been ripped out of Jim Lawrence's tent and, as he removed his baggage to sleep elsewhere, his tent was ripped out of the ground and, as it collapsed in midair, landed down-wind about 400 yards away. Our mess tent had also been ripped beyond repair, the radio mast had snapped in two, and so much water had been blown out of Bonney Lake that we could cross the stream to the helicopter pad dry shod. We were also buried under six inches of snow. I radioed our base camp in Inuvik telling them that once the weather improved, they had better evacuate us as our two year-old tents would not survive another gale force wind such as we had just experienced. So we left the Arctic and returned to Edmonton a week earlier than originally planned.

The following February, after completing a report on my third field season in Canada, I returned to the jurisdiction of Shell International in The Hague. There I was told that I would spend the next winter (accompanied by Martin Ziegler, the youngest of the three geologist Ziegler brothers) walking in the Himalayan foothills of Nepal to study the Siwaliks, the erosional products of the rising Himalayas following continent-continent collision; no helicopter, and walking because over most of the area there were no roads. But that is another story.

**Comment from the editor:** *The story of both industry and government mapping in the remote Cordilleran and Arctic regions of Canada during the 1950's and 1960's is one that tells of the strong desire by both parties to understand the complex geology of these Frontier areas. In the former case the objective was to capture any obviously interesting opportunities and in the latter to fully describe the entire country as per the mandate of the Geological Survey of Canada. There was also an explosion of technology during this period, such as the widespread use of helicopters, that allowed geologists to cover, in a few days, distances that would have taken months before. Generous Frontier land leasing terms also encouraged activity. Significant amounts of this basic geological knowledge still remain in the coffers of these organizations.*