

PETROLEUM INDUSTRY ORAL HISTORY PROJECT  
TRANSCRIPT

INTERVIEWEE: William Gussow

INTERVIEWER: Susan Birley

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SB: It's September 20<sup>th</sup>, 1983. Susan Birley interviewing William Gussow in the Glenbow Board Room. Mr. Gussow, I wonder if you could just start by telling us where you were born and raised and a bit about your early background.

WG: I was born in London, England and came to Canada at about the age of two. My father was Dominion Botanist of Canada, the first Dominion Botanist of Canada. I actually knew John McCoun???, who. . well, he worked in Ottawa as a botanist too and he wrote quite a bit on the botany and agricultural possibilities of western Canada. He's the grandfather of a very outstanding Canadian geologist, John Wheeler, you've heard of John Wheeler. He's his grandfather, well I don't know whether John Wheeler ever met his grandfather. Anyway, I grew up in Ottawa, where my fathers headquarters were of course, and went to Queens University and took a Bachelor of Applied Science and Masters of Applied Science, then I went to MIT and took my doctorate.

SB: How did you first get interested in geology?

WG: After I finished high school, I had no idea of what the future held. I just was a student with broad interests who didn't know what he wanted to do, I imagine most students are that way. There was an opening with the Geological Survey as a draftsman, so I started working with the Geological Survey in 1926 as a map draftsman. They have a wonderful library and I got fascinated with geology and at that time there were only about 22 geologists and they all urged me to go to university. So after 3 years working, I made a sort of an arrangement, where I went to university and I came back again at Christmas with the Geological survey and again at Easter and I went out in the field with the Geological Survey and I did that for 5 or 6. . .let's see, I guess for about 10 years I did field work with the Geological Survey. And I worked all over Canada, even up in the Arctic. Then I finished my work at MIT in 1937, but the 30's were hungry years and I decided I'd save the \$50. I had to pay for a degree in absentia, so I waited until one year when I was in Boston and took it.

#036 SB: What was your thesis when you were at MIT?

WG: My thesis was on granitization, which was a completely new subject at that time. Only one other person had published anything on granitization, James Gilooley??? a well known American geologist. But I couldn't get my thesis published because people didn't believe it.

SB: Did you find that you were influenced at all by any members of the Geological Survey?

WG: Very much so. I would say all the members of the Geological Survey influenced me, but particularly Dr. Collins, the Director of the Survey. My first two years as a field assistant, I worked for Dr. Collins, because of my map drafting ability. I went in the Sudbury area with him and I think I probably made the first photo-geologic map in Canada in 1929-30. It was a photo-geologic map of the Sudbury Basin. I don't know, there's a book on the Geological Survey, I'm trying to think of the name of it, it's the history of the Geological Survey and it was written by Zaslo???

SB: Reading the Rocks, I think.

WG: That's it, Reading the Rocks. Now, I've thought about writing something on that because they have Dr. Collins all wrong in there. Dr. Collins was a wonderful scientist, he was not a politician. He actually saved the Geological Survey from extinction by the politicians until in '37 when he died. That part of the Geological Survey from '26 to '37, I was thinking of rewriting that because it's not correct. Some people have made statements in there that are not correct. They said that Collins had no appreciation of the use of area mapping and that's completely wrong because the first photo-geologic work in Canada, I'm pretty sure was done in the Sudbury Basin. There's an older geologist who's still alive, Bill James, who's in his 80's anyway, he used some aerial photographs for his work in northern Quebec. Also Dr. Gunning???, now in B.C. Henry Gunning also used aerial photographs and Dr. Collins used aerial photographs. I can remember one day when I was in the Drafting Department, there was a sign posted on the bulletin board, the Survey had arranged for geologists to go up with the Royal Air Force and see what geology looked like from the air. After one week. . . anyone interested was to write their names on a list, after one week there were no names on the list, so I put my name on, I was interested. I got a phone call from the Director's office 2 or 3 days afterwards and they said, have you got your car here and I said, yes. Well they said, if you will drive Oscar Maltie??? our to the ??? airport, you can go along. So I got my first flight in. . . I remember it was a Ford tri-motor plane that the Royal Air Force used and they flew to Montreal and back to Ottawa. That's my first flight. Most of the geologists argued that you've got to keep your feet on the ground if you're going to do geology. Well, it was an absolute foolish thing. There's nothing like aerial photography to help mapping, it's just absolutely marvellous. It certainly would have helped Hector if he'd had it.

#084 SB: A lot of the Petroleum Geologists, that really became major names in the petroleum industry, started out with the Geological Survey, can you think of any that were working with you at that time?

WG: George Hume, of course, who I think was probably the first Petroleum Geologist to work with the Geological Survey. He was a one man department at that time. He joined the Survey, I would think about 1926, when I started with the Survey. They had of course, Dr. Kendall, was a paleontologist, and they had Dr. Bell, who was a paleo-botanist. Most of the geologists then were pre-Cambrian geologists and of course, I was influenced by the pre-Cambrian geologists, so I was not so interested in palaeontology, because I had no thoughts of ever working in soft rocks. All my work up until 1945 was in hard rock, in gold mining, lead, zinc, uranium. But in '45, I went into the petroleum industry.

SB: What influenced your decision to go into that?

WG: Well, I had been teaching at Queens University and at the Royal Military College when the war broke out. The war time bureau of technical personnel controlled where anybody worked at that time, I was married and had a family and they gave Shell Oil a permit to interview me for employment. Then they confirmed the appointment and I became Chief Geologist and Exploration Manager for Shell Oil in eastern Canada.

SB: So were you very involved in what was going on in western Canada at that time?

WG: Well, I was. I think every report I wrote to Shell Oil was that this is what I would recommend for work in eastern Canada, but if you asked me, I would give high priority to western Canada. I think I prefaced every report in something of that manner. In other words, Shell was not interested in western Canada at that time.

SB: Were you involved at all with their decision to pull out of western Canada and move east?

WG: Shell made the first gas discovery in western Canada, the Jumping Pound field. I think it was about 1942. After that there was a tremendous glut. . nobody wanted oil or anything like that. . .nobody wanted gas, because there were no pipelines, there was nothing to do with the gas. Here was the big Jumping Pound field, sitting there, really a liability. Shell actually put that on the market to try and sell it to somebody but there were no buyers. Anybody with \$45,000, I think, could have bought it. When the Leduc field came in, in December, what '47, Shell decided that they better take another look at western Canada. The top Shell management, which was in New York for North America at that time, held a meeting here in Calgary in '48 and it was decided at that time that Shell would reenter western Canada. They still had Jumping Pound, I think there were only two producing wells drilled at that time. But it was a pretty close shave for Shell, they almost. . .it was actually a decision of the Hague, the top Dutch geologists I think, decided that they would rather put their money into eastern Canada. It was a good decision because that's where the oil was needed. Actually the original work in eastern Canada had been done by Darcy Exploration, the early wells drilled there. Darcy Exploration was sort of a front for British Petroleum. BP had a way where they would send out somebody to drill the dry holes and then nobody could blame them for drilling the dry holes you see. That Darcy exploration did that. And they did the same in Persia, in the original work, it was Darcy Exploration before British Petroleum went in there. Their work was sort of obsolete by then, they didn't have modern methods of exploration. So Shell got this big concession in New Brunswick, 10,000 square miles, it covered a tremendous area in New Brunswick. It was a wonderful decision to make because if they'd found oil in New Brunswick it would be extremely valuable. But our work there showed that the problem in eastern Canada was there were no reservoir rocks. We worked in the Hudson Bay lowlands and we worked in southern Ontario, in Quebec, New Brunswick, Nova Scotia, Newfoundland, but New Brunswick held the best potential, because they held a producing oil field there, the Stoney Creek oil field. It had been producing for some 50 years or more, I don't remember the exact period but it was still producing something like a million barrels of oil. Very slow, no major oil company would have considered it economical, but Shell drilled about 5 or 6 wells in New Brunswick and the problem, there were lots of oil shows, but no reservoir rocks that could be used for commercial operations. So it was

abandoned by Shell and I think it was a good decision because although Imperial and other companies have gone in there since, nobody has found any oil. At least we didn't waste their money.

#167 SB: So you moved west when Shell decided to come back into Alberta?

WG: That's right.

SB: What year did you come back?

WG: I came back in '51.

SB: Did you . . .

WG: But I worked for Shell, originally, before I came to work in eastern Canada, I worked for Shell in Oklahoma and Texas and California. Then after Shell shut down their operation in eastern Canada, I went back and worked for Shell in west Texas and then I was transferred. I actually came to Calgary from Houston. I worked with Shell in Houston for awhile and then I was transferred up to Calgary in '51.

SB: Had that given you any extra know-how or experience working in Texas first?

WG: Of course it did, yes. Because I spent all my spare time, evenings, weekends, going over Shell reports. Shell had reports, I can remember one very short report that had been written on the Fort St. John area, for example, recommending strongly that Shell go into the Fort St. John area. This report. . . that was about the time that Turner Valley was discovered so that's a long. . . like in the 20's. They recommended 3 places, one was the Fort St. John area, another was, they noticed a reversal in the vicinity of Edmonton, which would have been the Redwater field, if Shell had drilled there at that time, I forget where the third one was, but it was also an excellent place. This was a Dutch geologist who had done some. . . travelled all over the world, sort of a scouting geologist, you know. This is of course, secret information in Shell files.

#197 SB: Do you remember his name?

WG: Off hand, no, I don't. It's possible I might think about it but it wouldn't mean anything to anybody outside of the Shell Oil company. He was . . . I don't think probably many Shell people knew that he had been over here. You know, when these oil scouts go out scouting, they go out very. . . almost incognito.

SB: So when you came to Alberta, did you sense any excitement, Leduc had just come in. . . ?

WG: Oh, of course. Right after Leduc was discovered, the excitement here was just unbelievable. People hardly took time off to go to bed.

SB: So what was Shell's first step to get back into the oil play out here?

WG: Well, then Shell really expanded and they brought E.G. Robinson in here as Exploration Manager and E. G. Robinson was a very odd person. He was friendly enough to face, but behind your back he was unbelievable. E. G. Robinson, I think, started with Shell about 1926 in the Chicago area, when Shell had done gravity work and discovered all the reefs. They leased all these anomalies but had no money to drill them at that time. And at that time nobody knew what they were but anyway these anomalies showed up in their work and these reefs, almost every hole that Robinson drilled. He was brought in then to drill these in '26, this was discovered. . . before the 20's and every well that Robinson drilled

was an oil well. He got a tremendous reputation for that but of course, he was just lucky he came in to drill the wells, he had nothing to do with locating it or anything. It was some of Shell's old timer geologists who had great foresight were the ones that leased this land and found it. Then with that reputation Robinson was sent here to Calgary and they established an office here. I would say the office grew to about 1,100 employees by 1951 when I came here, I think there were about 1,100 employees. Shell just. . when they decide to do something they just go hog wild on it you know. And I remember at that time, Union Oil Company was here and they had a staff of maybe 100 employees. And Union Oil was really running circles around Shell. They were finding oil and Shell wasn't. It was sort of a joke.

#249 SB: What was its first big discovery then, when it came back?

WG: Well, of course, Shell moved into the Jumping Pound area and developed that. Shell's work in western Canada, I would say, was very pioneering work when they discovered Jumping Pound. I don't think there was any oil company in North America other than Shell, that could have tackled that. That was a really far out idea that paid off. I would say that Les Clark is the one that has to get credit for developing Jumping Pound and Les Clark drew the first really good geological sections of western Canada, of the Rockies. Based on seismic work of course, he drew cross sections across Jumping Pound and he saw, it's really what we call, this skinned tectonics. The Rockies are just sedimentary sections shoved over the basement. Then of course, other companies got into the foothills and Gulf went into Pincher Creek. . .was it Husky Oil. . . anyway Jim Scott got into. . I can't think of the field now. You know, one thing, my computer is slowed up, in about an hour or two I'll think of all these things. Jim Scott was involved in some of the early work. Of course, Jim worked for Shell, he worked under Les Clark and Jim was a very good field man, he learned from Les Clark and then when Jim was moved to eastern Canada, to work for me in New Brunswick, he was very upset because he just loved the field work. I don't think the field work in eastern Canada hurt him any. Anyway he came back and he started working for another company, again I can't remember the name, but he ended up working for Husky. Jim was responsible for discoveries in the foothills too. I suppose you've talked to Jim have you?

SB: No, he'd be a good candidate though. What was your job when you came to Alberta with Shell?

WG: I was only in a position of staff geologist at that time. Unfortunately Shell and I didn't see eye to eye and in 1952 I set up my own consulting office and I was a consultant from '52 to 1956, when one of my clients, Union Oil Company, wanted me to work for them full time. Because they wanted to open their files to me.

#306 SB: You've contributed a lot to the theory of petroleum exploration, when did you first start thinking about these ideas?

WG: Actually when I was in Houston. I had a hunch that Shell was going to send me up to Canada because I was a Canadian. I had been watching while I was in eastern Canada, I had been watching the developments in western Canada and when the Leduc reef trend

started . . .the picture started forming on that you know, of course, everybody was puzzled by the distribution of oil and gas. I was working for Shell in Houston at the time when finally it dawned on me how the explanation was. And the explanation was so simple, I usually say, it's just like if you had a cup of water and you tell your kids you've got to hold it carefully, if you tip it, it will spill out. It was just as simple as that. Then when I was consulting in Calgary, I was talking with Cam Sproule one day and I told him that this secret of mine I thought would help the industry in finding more oil and gas, more oil particularly. So he set up. . I think he was program chairman and he set up for me to speak to one of the luncheon talks. I can remember Earl Abbott was the President of the Society at that time.

SB: Which society was that?

WG: Then the Alberta Society of Petroleum Geologists. They've changed it now of course.

End of tape.

Tape 1 Side 2

WG: I don't know if he was actually Exploration Manager, but something like that, of Hudson Bay. Anyway, it would be in, I think it was in April '52, something like that when I spoke to the Society. It's recorded in the footnote of the paper that I published with the AAPG. Anyway I thought we had half an hour, because after lunch you've got half an hour and then you've got to go back to work you know, and I thought to myself, I'll just take five minutes and outline it because it's very simple. Then I would like to have a question period. Well, they had a restaurant called Pennelly's???, where all the luncheon talks were held at that time and when we came to the luncheon meeting, all the seats were taken, people were standing, there was no room for the waitresses to go around, you know, it was absolutely jam packed. So what Earl Abbott suggested is that people wouldn't all be able to sit down and eat lunch, that they go to surrounding restaurants and have their lunch and come back and he would hold the talk until 12:30 and I would start. So I started and I outlined the whole thing in five minutes and then Earl Abbott said, are there any questions. People were sort of thinking, well he said, there are no questions, the meeting is adjourned. It was a five minute talk, the shortest talk I ever gave. I was even invited to go on a distinguished lecture tour with the AAPG and my talk, I spoke for an hour and usually discussion went on for two to three hours afterwards. They were mostly evening, dinner meetings.

#039 SB: Was there much reluctance by the industry to accept your theory?

WG: Oh yes. Esso, the Jersey company, Park Dickie, who was with them said, it's too simple, it can't be so. For me, just because of its simplicity it was so. . .

SB: Is it possible to just briefly explain how you came about, how you developed it?

WG: I was just working on a scratch pad and trying to figure out how. I already believed that

oil and gas had to migrate, because they had to move in to fill the reservoir. I also felt that it didn't matter how long your pipeline was, in other words your carrier beds, that oil could migrate just as long as your pipeline extended, as long as you had a carrier bed. So I could visualize long distance migration, I had no problem there. Well, then I had one reservoir that was full of gas, and I said, well, if oil comes along here it's full, there's no place to go, it has to keep going. So it goes up into the next reservoir and if that's empty then it would fill up with oil, and you'd have one filled with gas and the next one filled with oil. It was just as simple as that. Then of course, there are all kinds of modifications you can put on that. If erosion is reducing the thickness of the overburden, the gas would expand and if there was any oil under the gas it would push it out. Or if any more gas came along and there was still some oil left in it, the gas would be trapped and the oil would be pushed out. When that one was filled then, gas would go on to the next one and if it's full of oil the gas would form a gas cap on top and gradually fill up the whole reservoir and all the oil would move up dip. It was just that simple.

SB: How long did it take before people started applying it?

WG: I can't say that. I think that. . . well, for awhile there I was very popular and I was invited to speak all over the world. The first invitation was for me to go to Italy and help them with their problems and then I was invited to go to Moscow and invited to go to China and India and Japan and all over. I know that my original AAPG paper had been translated into every language where they were doing oil exploration.

#070 SB: Did you see the professional societies in playing a major role in the development of the industry?

WG: Very definitely yes. The Alberta Society of Petroleum Geologists was for me, very exciting. They got people to publish. That of course, stimulated other people's thinking. They published lots of cross sections and lots of papers on oil fields and they had annual field trips, they published memoirs. They stimulated the whole thinking very much. You originally asked about people in the Geological Survey and I mentioned George Hume. Well, George Hume was then the only petroleum geologist and he was doing work, and he did an awful lot of work up in . . . and of course, the foothills was most interesting for him. Then there was Bert Mackay, who was really a coal geologist. Bert Mackay had field parties for the Geological Survey in western Canada, doing a lot of mapping. Then the Geological Survey would have some senior assistants helping with parties, mapping, like Cam Sproule, was one of the those. There were quite a few, I could give you a whole list of them but the names don't just come to me like that. But anyway I think that Jim Scott also worked for the Geological Survey. Then of course, in 1935, the Geological Survey got this million dollars for field mapping. Then, a great number of the people who went into the oil industry came and worked with the Geological Survey. Hugh Beech is one, a very strong one for me. Hugh Beech. . . you should get out the field guide book in which Hugh Beech wrote an introductory chapter on the early history of Alberta. That's one of the best. Hugh Beech, of course, was in Ottawa with the Survey in 1935 and he had use of the geological library there and he did a lot of work digging out the early history. It's a very good contribution, I don't know if you know about it but you could find it easily. It's

in the second or third guide book the Society published.

SB: This was the Alberta Society of . . . ?

WG: Yes, right.

#105 SB: You know there are other societies that have been formed, such as APEGGA, are you aware of the controversy that exists right now between the geologists and the engineers in APEGGA? How do you feel about that?

WG: Well, I'm an honorary member of the professional engineers and I served on the executive for two or three years. When I went to California they gave me an honorary membership, so that was very nice. I, as a consultant of course, have to join and I felt very proud of the way the engineers. . . it was really an engineering registration act, which included the geologists. The geologists were included very early in the formation of the professional engineers because of John Allen, who was a professor at U. of A. all of the professors at U. of A. were members of the professional engineers. I think it was a good thing but the thing that made me proud was the way the engineers tried to lean over backwards to give the geologists an equal say with the engineers. Although they were maybe 100 to 1 engineers versus geologists. But they always arranged their bylaws in such a way that at least one or two geologists were on the executive. They really are looking out for the welfare of the people of Alberta. It costs money to run something like that. Now, membership fees are probably quite high, being an honorary member I haven't had to pay any.

SB: Did you ever come across any problem with people that were working in industry accepting professionals advice, such as professional engineers or geologists? Did you feel that in the early days there was any kind of resistance there?

WG: No. But I can remember one case when professional engineer was accused of being unethical. There was a hearing of the discipline committee and I happened to be a member of the discipline committee that year and this fellow was a personal friend of mine. My first reaction was, I'll have to resign. I went to the Chairman of the Discipline Committee and explained to him that this chap was a personal friend of mine and I debated whether I should resign or whether I should stay on and saw that he got a fair trial. I was very glad I stayed on because he was completely exonerated. It was a small company that he was working for and when he signed the reports the reports were altered, falsified by people he was working for. The charge was brought by the Conservation Board and I remember George Gauvier??? made a public apology to this fellow. But I wanted to write it up in the journal so that people could see how the professional engineers were working for the benefit of the members as well as the public as an example. But this fellow's lawyers advised him to forget it. The quicker the public forgot it the better it would be for him. So he wouldn't give permission to write it up. I wanted to write it up as a wonderful example of what they can do for the people, you know, the members.

#157 SB: So when you started your own consulting company, who were some of the clients that you had then?



WG: I worked for some of the major oil companies and a lot of the small ones. It just happened that there was a company which was fighting Trans Canada for the right to build the Trans Canada pipeline. I was sort of a thorn in the side of Trans Canada at that time because it was then when I presented my theory explaining they oil fields and the gas fields and so on and I remember one of the down dip reefs was being drilled and I said that those would be gas fields. And Triad was drilling a discovery well on the next down dip reef and I was consulting for them that they'd get gas, that there would probably be no oil. You know there's a column that is usually 6-8 hundred feet. In this one they drilled in and sure enough, they got into wet gas and it kept on and on and on and finally we got 20 feet of oil at the bottom. It had almost been completely flushed. And I said that the next one down dip would be only gas, there would be no oil in it. Actually this one was a little bit of a puzzle to me because already the next up dip reef had a gas cap. I would have expected all the oil to have been flushed up dip but it wasn't and I had to argue that after the gas flushed out all the oil, there was what they call irreducible minimum saturation in the gas cap. In other words there was oil still in there but that oil with geologic time could drain down and form a 20' oil column at the bottom. I think that's still a valid explanation. But you have to get experience by the problems that you run into.

#190 SB: So after awhile you decided to join Union Oil Company. Was there any reason you decided to give up consulting and go with them?

WG: No. Union, as I told you were running circles around Shell. I had a high opinion of Union Oil and so the only way that they could open their files to me, I had to become an employee. I consider that was Union's first merger, then they took over Pure Oil as their second merger.

SB: So were you allowed to carry on with your research?

WG: Well then I worked for Union Oil and in 1960, Union decided that they wanted me to go into research and they asked me to go to California then. I went there until I retired with Union in California.

SB: Did you continue coming out with new controversial theories?

WG: Oh, I always come up with controversial theories yes. I came up with one on how the salt domes of the Gulf Coast area are formed, for example. The problem there is that most of the Gulf Coast geologists visualize, because they've been taught this for say, 50 years, that salt domes actually rise slowly with sedimentation. I guess the concept now is that the salt domes rise by buoyancy, because the salt gravity is so much less than the surrounding sediments. Well, if that's the case why aren't there any salt domes in Alberta. Because you've got thick. . a couple of thousand feet of salt in Alberta and you've got no evidence of any salt domes in Alberta. So I figured that it couldn't be that way and because I did my geology in engineering, my thinking is governed by engineering principals. I decided that salt is a solid rock, just like limestone and it can't flow, and the only way the salt could flow is if it's buried deep enough so that it gets heated. So that heat triggers the rise of salt domes. As soon as the salt is heated up about 300 degrees centigrade, which is around 500 farhenheight. . I'm just giving approximate round figures. . salt becomes unstable and then it moves horizontally until it comes to a place

where the overburden pressure is less and then breaks through. Once it breaks through, with buoyancy then, it just shoots to the surface. In other words, if there's enough plastic salt at depth, it will go up to the surface and flow out on the surface, just like a lava flow. In Persia there are salt domes that reached the surface in the mountains and the salt flowed down the sides of the mountains. They call them salt glaciers, because the salt is white, just like snow and it looks like a glacier. But it's actually not a glacier because it was soft and plastic. 300 degrees is about half the melting point of salt and at that temperature it's just like tooth paste. It's not liquid you know, it's like tooth paste and it will flow. At 600 degrees centigrade it would be liquid and then it would flow like a river. So at half the melting point temperature, most rocks become plastic and they'll flow. It's unstable and it tries to escape.

#250 SB: So you've travelled around. . or I guess I should ask how long you worked for Union Oil?

WG: I retired from Union in '71, so about 12 years ago. As soon as I retired, within one month I got a phone call from Tokyo and the Japanese government wanted to know if somebody could come and interview me. I said, that's okay with me. I remember it was between Christmas and New Years in '71, I retired in August and they came between Christmas and New Years. Which is a time, in Japan, they have long holidays over Christmas and New Years. The fellow phoned me from Los Angeles and wanted to know if he could come and see me between Christmas and New Years and I said that was all right. He came and asked me whether I would be willing to sell my house in California and move to Tokyo. So I went to Japan till '74, when I came back to Canada.

SB: And have you been spending your time continuing with research?

WG: Well, when I retired from Union Oil, I had my pension and while I was consulting I'd saved quite a bit of money too, so I was really independent and I only took consulting work that interested me. I thought going to Japan would be an interesting thing. My wife and I, for the time we were there, we travelled all over the Orient. You could in four hours be in Hong Kong and spend a weekend in Hong Kong. The Japanese had long weekends. In their religious way, they have extra holidays, usually on long weekends, three or four day weekends. So I saw all of Japan from Okinawa up to Wakinai, where they plane was shot down. My wife and I went out onto Kaouri??? Island and ??? Island, which were only a couple of miles away from where they were looking for this plane.

#290 SB: So did you continue travelling around the world?

WG: No. I usually do two or three major trips around the world. I don't mean around the world but in different parts. I've made many around the world trips but like, I would go to South America and back, that's not around the world. My wife and I are very fond of seeing the world and we've seen it. The only country that I haven't seen really is Iran and it doesn't look like I'm welcome there. We just returned from Tibet actually. We had a wonderful trip through Tibet. I'm doing research, I'll probably write a paper on Tibet. I've been all around. I've been up in Cashmere and Missori???, where John Wheeler was born and up in Darjeeling and Sikkim???. I've been in the Timshom??? Mountains, that's where

Russia borders China, right up to the border. Then I was invited to lecture in China in '77 and spent a month there. But I couldn't go into Tibet then. In '77 they still had control of things. The Chinese sent armies in there to subdue the Tibetans and they call it liberate the Tibetans, but that's not the way the Tibetans look at it. But now, they've been suppressed and they're allowing tourists in because this is money for the Chinese. Travel in Tibet is about ten times what it is in the rest of China, very expensive.

SB: So looking back over your career, is there anything that you consider your greatest achievement or something that you feel is more significant than others?

WG: Well, I thought it was an achievement to get into the oil industry. Actually you asked whether differential entrapment has been used. It works like a charm in the . . . what do you call it. . the Zama Lake, Rainbow Lake area. In the Rainbow reefs, it works just like a charm there and I know people there that have used it because when they drilled a reef there that was full of gas, they figured you have to go north or up dip to find oil and they did and found oil. You can ask John Andrechuk???, it's been used in many places and paid off.

SB: It certainly made your name well known in the oil industry I think.

WG: Just a little simple thing like that. You know, the paper I wrote was almost non-technical. I wrote the paper and then I gave it to my boys. All three of my boys went to U. of A. and went into engineering. Somebody asked them, are you going to be a geologist like your dad and they said, hell no, you've got to work too hard for a living. Of course, the boys . . see I was working day and night, weekends, they didn't see that as necessary, they could go and sell cars and make more money than I could.

SB: I'd like to thank you for taking the time to be interviewed today. It's been very interesting.