



**PETROLEUM
HISTORY
SOCIETY**

ARCHIVES

Newsletter of the Petroleum History Society

March 2006; Volume XVII, Number 2

P.H.S. Annual General Meeting and Awards Ceremony, March 29, 2006

Speaker: Gerry Maier, *on: The Importance of History*

A long and distinguished career in exploration, production, processing and pipelines has taken Gerry Maier from completion engineering in Alberta, in the post-Leduc years, to Indonesia and the North Sea. When he returned to Canada, he became Chairman and Chief Executive Officer of TransCanada PipeLines and directed the largest gas transportation and marketing expansion in the Company's history. Following his retirement, he took on the chairmanship of the Canadian Petroleum Hall of Fame, among other volunteer commitments. Drawing in his depth and range of experience as a leader in the industry, Gerry Maier will reflect upon the importance of preserving and telling petroleum history.

Gerry Maier was born in Regina, Saskatchewan in 1928. He attended Father Athol Murray's Notre Dame College, the University of Manitoba and the University of Alberta and graduated in 1951 with his B.Sc. in Petroleum Engineering. Gerry began his career with Sun Oil Company in 1951 and in 1953 joined Hudson Bay Oil and Gas Company (HBOG). After international executive postings with HBOG and Conoco, he was appointed chairman and CEO of HBOG in Calgary. Following the Dome purchase of HBOG he became President of Bow Valley Industries in 1982. In 1985 Gerry became President of Trans-Canada Pipelines Limited and eventually became its Chairman, President and CEO in 1992. Following his retirement in 1999 he has continued to be active in the community with a wide range of interests. He has received honorary doctorates from both the University of Alberta and the University of Calgary and is an Officer of the Order of Canada.

TIME: 4:00 p.m. to 6:30 p.m., Wednesday, March 29, 2006.

PLACE: Fairmont Palliser Hotel (133 - 9th Avenue S.W.) – Penthouse (check marquee)

COST: No Charge (everyone most welcome)

**Please R.S.V.P. if you wish to attend to: Clint Tippett, 691-4274 or
clinton.tippett@shell.com by noon Monday, March 27**

Additionally In This Issue ...

The Bull Wheel 2
Sandy Gow on: Rig Safety in
the Oilpatch 1883-1970: A
presentation to the Petroleum
History Society Feb. 21, 2006

4

Archives is published approximately 6 times a year by the Petroleum History Society for Society members. Back issues are archived on our website at:

www.petroleumhistory.ca

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THE PETROLEUM HISTORY SOCIETY
THE BULL WHEEL



Next Board Meeting: The Board will meet next on Wednesday, March 29, 2006 at 3:30 p.m. at the Fairmont Palliser Hotel, Spanish Room, immediately before the Annual General Meeting.

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 always seeking speakers and interesting subjects. If you would like to consider presenting, please contact Clint Tippett, President P.H.S., at 691-4274 or Director Debbie Knall at 780-463-3859 (Edmonton).

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 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.



Passings: We note with regret the passing of two well-known individuals associated with the Canadian oil patch. **Jack Goth** spent 28 years with Shell Canada's Land department and in 1978 began a second professional career with Panarctic Oil where he was Senior Land Manager until his second retirement in 1990. **Ken North** began his oil industry career with Chevron in Calgary before becoming a Professor at Carleton University in Ottawa in the early 1960's. After his retirement he again took up a relationship with Chevron and during this time completed his landmark book "Petroleum Geology", a fitting monument to his encyclopedic memory.

Hidden Gems: The other day your trusty correspondent was passing by the offices of the Alberta Energy and Utilities Board at 604 – 5 Avenue S.W. To his surprise, tucked away in the previous abode of the Energeum, is the excellent technical library of the EUB that contains a wide range of energy-related books and magazines. The Library is open to the public from noon to 4:00 p.m. daily and has a generous lending policy if the need arises. Other comprehensive resources present in the downtown core are the Glenbow Archives, the main branch of the Calgary Public Library and the library of the National Energy Board, at 444 – 7 Avenue S.W.

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.

Membership Dues: Please note: At the September 15, 2005 meeting of the P.H.S. Board a motion was passed to alter the Society's dues structure as follows, effective January 1, 2006:

1. New applications for the lifetime membership category will not be accepted. All existing lifetime memberships will, of course, still be honoured.
2. Individual memberships have increased to \$25.00 per year.
3. Sustaining individual memberships remain unchanged at \$50.00 per year.

Nominations for the Executive and Board for 2006-2007: If you have any ideas for nominations or if you would like to run yourself for any of the offices of President, Vice-President, Treasurer, Secretary or Director, please contact President Clint Tippett at 691-4274.

Oil Sands Oral History Project: The Board is entertaining a preliminary proposal that the Society be involved in a non-financial supportive way in the establishment of a new oral history project focusing on the oil sands sector of our industry. Given the high profile of this aspect of today's oil production and its expected dominance in the future, this idea seems like a good one and the Board has expressed its tentative support. If you would like to be involved, know someone who you think ought to be interviewed or are aware of any funds that might be available, please let us know.

Student Visit: An individual from France is studying as an exchange student at the University of Winnipeg and has expressed an interest in speaking to some of the individuals who have been involved in the oil and gas industry in Western Canada. The particular topic of the Ph.D. thesis research is the relationship between Canada's western provinces and the Federal Government. If you think that you could provide some useful historical or current input for this study, please contact us and we will put you in touch with the individual in question.

PayPal: Past-President Micky Gulless has set up a way in which members and others can pay for memberships and merchandise over the internet. You will have noticed the reference to PayPal on your renewal notice. A number of you have taken advantage of this convenient and secure way of handling this sort of financial transaction and we encourage those of you who are in a position to follow suit to do so.

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 hard copy but is yours to enjoy with the on-line version. Why not try it? You don't have to give up your printed version.

Donations: We have been remiss in not routinely acknowledging our receipt of generous donations from our members. Those who have supported us in this way over the last few years are: John Andrichuk, Grey Austin, Dave Barss, Sean Callaghan, John Downing, Anthony Edgington, Oscar Erdman, David Finch, George Fong, Paul Feunning, Rick Green, Jim Hamilton, Roy Lindseth, Gerry Maier, Ron Manz, Brent McLean, Florence Murphy, Alice Payne, George Pemberton, Bev Pfeffer, Christopher Ruud, Uldis Upitis and Tony Vandenbrink. In addition, Neil Leeson and Dick Shaw donated copies of their books as membership incentives and for sales.

**ROUGHNECKS, ROCK BITS AND RIGS:
THE EVOLUTION OF OIL WELL DRILLING TECHNOLOGY IN ALBERTA,
1883 –1970**

by Sandy Gow, Concordia University College, Edmonton

A presentation to the Petroleum History Society at its luncheon of
February 21, 2006

Sandy Gow was kind enough to come down from Edmonton for the day to talk to us about his new book (with the abovementioned title) that has recently been published by the University of Calgary Press. As time did not allow a full review, he decided to focus the address on the evolution of safety as it related to the operation of drilling rigs during the time frame covered by the book. Sandy provided us with the text of his remarks.

“Good morning everyone. Thank you very much for extending an invitation to speak on one aspect from my book, *Roughnecks, Rock Bits, and Rigs: The Evolution of Oil Well Drilling Technology in Alberta, 1883-1970*. The aspect I wish to address is rig safety. I will begin by saying that working on an Alberta rig has, and will continue to be, a dangerous way to make a living. The strides that have been made in protecting and training rig workers from harm since that first well accident at Langevin Siding (now Alderson) east of Medicine Hat have been immense. Accidents resulting in death and dismemberment were so common before the late forties that they were taken for granted as being part of the job. If you worked on a rig then you should have been prepared to experience accident, injury, and perhaps even death.

Before the mid-fifties there were no government safety regulations for drilling rigs, while the very idea of a piece of equipment designed to safeguard workers – almost any kind, even personal – was usually not a high priority. Safety training did not exist either, although the introduction of first aid in the late thirties was a step forward. Proper maintenance schedules or procedures were usually found only on the rigs of conscientious drillers who, in turn, most often worked for the larger oil companies. Some drilling contractors, with only one or two rigs, and operating on a shoestring, could not have afforded safety equipment even if it had existed. Despite all the accidents, safety was not a widespread priority before the late forties. The men, desperate for work and willing to take risks, did not complain, and the companies did not take the issue seriously.

Insofar as the history of drilling went in this province, it really did begin with a bang! when the Canadian Pacific Railway, having contracted out its water well at Langevin Siding, had the rig hit gas on January 8, 1883. The rig caught fire and there were injuries. In the years following this fire there would be many more injuries and deaths on Alberta rigs. Some accidents would make it into the local newspapers but many more went unnoticed. Deaths and spectacular injuries made news whereas lost fingers, crushed toes, burns, lacerations, and other forms of injury did not. Some men were left maimed for life and in some cases unable to work again. How many lives could have been saved had someone on the rig known first aid? The usual routine for helping injured men was to get the person into a wagon, vehicle, or, in the winter, on to a stone boat, and try to get him to the nearest doctor or hospital. By then it could be too late; if the injuries did not kill him then the rough and sometimes lengthy ride across the prairie, or through the foothills or bush, or along poorly maintained country roads could do it. The lack of hard hats and steel toed boots – of which I will say more later – meant that head injuries were often fatal and toes were routinely severed when pipe or some other heavy item was dropped on them. In the early years,

those injured while drilling in the Turner Valley Field had the best access to medical care when they were injured because of the presence of a hospital and doctors. Credit must go to General Petroleum – no longer in existence – for being the first company to promote first aid in the oilfields and to underwrite the cost of training through St. John Ambulance.

In the years from just before World War I to about 1950 there was almost no personal safety equipment for a rig hand. His clothing was what he was wearing that day. His headgear would be a woolen cap with pullout ear-flaps for cold weather. His boots were leather and ankle high, or perhaps rubber boots, lined with felt in the winter. Calf-length leather boots appeared in the 1930s but the rubber boots did not disappear completely. Heavy cotton coveralls appeared in the early 1930s, only to be replaced by khaki shirts and trousers in the 1940s. Around that time the cloth cap was gradually replaced with the felt fedora, which persisted into the early 1950s when it was replaced by a cotton cap. One of the most important developments in personal safety that appeared around 1938 was the wearing of the aluminum hard hat. Not everyone felt they were necessary despite the long history of head injuries on rigs, and it was a full ten years before they were accepted. They went through a series of changes in shapes and materials until by the late sixties they took on the cap style made from durable plastic material. Clearly, they reduced the number of head injuries. Steel toed boots were often a hard sell on rigs because in winter they were colder than the regular leather boots. One crew member characterized the safety boot as: “Freeze ‘em off or cut ‘em off”. When the manufacturers began to insulate them they also gained acceptance and reduced the number of foot injuries.



Photo of drilling operations in the 1950's (Shell Canada Collection)

The hazard of slipping on rig floors was dealt with through typical roughneck ingenuity. When the floors were made of wood they screwed small logger's spikes into the leather soles to improve the grip. When steel floors came in, they glued ribbed rubber soles to the leather, or wound strips of old belting used on cable tool rigs around their boots to prevent slipping. With the steel toed boot also came the thick, ribbed sole which improved footing, and helped reduce, but not eliminate, the number of falls. Death on the rigs came in a variety of forms. The list was long. Here are some examples.

Death by scalding, especially on the steam-driven rigs, could be caused by exploding steam lines or unsafe boilers which failed to meet, or were not being maintained to, government standards under the Pressure Vessels Act. Belts broke and scythed through the air, cutting men down. Chain link drives under stress simply exploded, sending chunks of metal hurtling in every direction. The absence of any safety guards around moving parts caused horrible injuries to any rig hand standing nearby. The cathead was a spool-shaped hub on a winch shaft around which a rope is wound and used for pulling and hoisting. It was one of the most dangerous pieces of machinery on the entire rig and when men got caught up in the line as it snaked around the floor, the whole body was usually thrown around the cathead and crushed up against the machinery. Some roughnecks referred to it as “the widow maker”.

After the cathead, the next most dangerous position on the early rotaries was working up the derrick and later the mast, as derrickman, on the monkeyboard. On the earliest rotaries men tied themselves to the derrick with manilla line. By the mid-thirties a safety belt had been designed to go around the derrickman’s waist and a rope ran from it to the girders of the derrick. It provided a measure of safety for many, but on Major #7 drilling in Turner Valley in the 1930s, a derrickman was leaning out to rack pipe when the blocks caught and snapped the rope. He fell eight-five feet to his death.

The derrickman led an isolated and vulnerable existence. He could be in harm’s way if the driller tried to pull out too much pipe at once, or to pull out stuck pipe, placing the rig under stress. What occurred was a “pull in”; the rig’s upper structure collapsed and came down on to the rig floor. Sometimes the falling equipment and structural members brought the derrickman down with it.

If a high pressure gas blowout occurred, or a gusher of oil shot out of the hole, or a fire broke out, he was trapped on his perch. By the late forties the first escape buggy was introduced and if he was fast enough the derrickman could jump into it, pull the release, and go shooting down the gradually sloping line to the ground at a point distant from the rig. If he were not fast enough then he was overcome by the deadly hydrogen sulphide gas or fumes from the fire, or burnt to death by the flames as they shot up into the air.

The “pull in” was caused by the driller at the brake on the hoisting mechanism allowing the drilling tools to shoot upward, at high speed, and not stopping them before they hit the crown block attached to the derrick or mast. This tore the crown block loose, sending the drilling line, the traveling blocks, the hook, and angle steel from the top of the rig down on to the floor where men were working. This phenomenon normally occurred after repeated incidents of the drilling tools smashing into the crown block and weakening it until, finally, it tore loose and fell. This reckless behaviour by some drillers occurred right into the 1960s until the “Crown-O-Matic” was introduced by an American working in Canada, Charlie Thornton. A simple device, it consisted of a sensing finger which cut the power to the traveling blocks at the drum when they got too close to the crown block.

Blowouts at Alberta’s wells and the rig fires which often followed were a given until blowout preventers were made mandatory and their presence on the rig confirmed by inspectors. Because cable tool technology had no drilling fluid or mud to control the build-up of gas pressure, blowouts were more common on cable tool rigs. About all the cable tool driller had to help him after his nose and before he shouted the command to “clear out”— was a bleed-off line in the cellar. This did little to relieve a big build-up of gas pressure so the cable tool rigs experienced what can only be described as some pretty spectacular blowouts.

Here is just one example. Flying debris from a cable tool blowout injured some and killed at least two men at Royalite #14 on 21st March, 1929. Murray McRae and Alfred Yeo were hit by flying tools and casing. A hundred and sixty feet of casing and drilling tools went through the top of the 80-foot derrick and probably 200 feet into the air. The casing and tools struck three men as they ran from the site, killing Yeo and McRae. You was either quick or you was dead.

There is a photograph in the book – Figure 11.6 - showing a bailer exiting Home Brazeau #1 at Chungo Creek, west of Nordegg, in October 1939. This 50-foot bailer weighed more than two tons and it was estimated to have gone to a height of about 100 feet.

The introduction of rotary rigs with their drilling mud helped to prevent many potential disasters. Hydrostatic pressure in the form of a column of heavy mud could often hold down the gas trying to make it to the surface, allowing the driller to bleed it off into the open air.

Often a blowout was accompanied by a fire that usually completely destroyed the wooden derrick and ruined much of the equipment at the site. Fire was, as already indicated, a terrifying experience for the derrickman on the early steel derricks and later on the masts. The escape buggies, if properly maintained and properly used, saved lives. If not they could take a man's life, sometimes by not releasing as required or by dumping him in mid-air, before he reached the safety of the end of the wire.



Tripping in the 1950's (Shell Canada Collection)

But rig fires had their origins in more than just blowouts. The gas fumes that collected around the rigs were the source of many fires. The cellars under both cable tool and rotary rigs were natural collection points for gas, and explosions there were not uncommon. One of the earliest culprits to be detected in these fires was the electrical wiring on the rig. Until the early 1920s, both wooden and steel derricks used copper cable sheathed in lead to carry electricity from their generators to the lights strung around the floor, down in the cellar, and out to the occasional building. This sheath would crack with frequent handling and over time it would cease to be watertight. When moisture got inside the cables they were prone to shorting out. When the power was turned on, the copper cables would arc and any natural gas in the area would explode. A step forward in rig safety occurred when copper wiring was placed inside rigid conduit pipe, and vapour-proof lights were installed. These early safety measures had a dramatic impact

upon the number of Alberta cellar fires. By the early 1960s Westinghouse and General Electric of Canada were meeting the technical needs of the rigs by manufacturing flexible, neoprene-coated, five wire, .00 cable. This wire, with its accompanying explosion-proof fittings, helped to all but eliminate fires caused by electrical wiring faults.

Smoking on or near the rig floor was sometimes found to be the source of fires, but a more common cause was the sparks made when tools, in the presence of gas, went in and out of the hole. Explosions and fires from gas seepages came to be accepted as a normal part of working on a rig, just like any other accident. The forges used on cable tool rigs and rotary rigs using the early fishtail bits were a source of open flame and when quantities of seeping gas reached them the result was what you would expect. The bits were heavy and had to be wrestled back and forth to and from the rig floor by hand so the drillers wanted to keep the forges close by.

Natural gas seepages and the ever-present problem of the blowout and the fire had to be prevented. They were costly in terms of lost oil; if there was no fire, the expense of cleanup; the cost of putting out the fire, replacing ruined equipment, and the problem of lost drilling time; and the human factor – death and injury. Many rotary drillers became highly skilled at holding down a gas blowout with hydrostatic pressure in the form of that long column of mud going down the hole. Sniffing the mud for gas and, if it was detected, pouring in more heavy mud worked well in many situations. But they were not always quick enough. If they were unlucky the gas would blow the mud out of the hole and spread around the rig floor. Many things could then provide the spark that would set off the explosion.

Prior to the early 1940s there were not many BOPs on Alberta rigs. The Hosmer Button had been around since about 1920 but it was of very limited value. It was situated down in the cellar, mounted on the casing lining the hole, and despite the manufacturer's claims, it was not easy to work. At the first sign of trouble a roughneck had to scramble down into the cellar and wrestle with a locking device that had to be centred on the rotary table up on the rig floor, something that was almost impossible to do. The button then had to be latched before oil and gas began pouring out of the hole. General Petroleum began using the Hosmer Button, as had some other drilling contractors in the Leduc-Woodbend Field, in 1947-1948. It had already failed to prevent a blowout for General Petroleum at Marwayne, and it was a Hosmer Button that was on Atlantic #3 when it blew out in June, 1948 and caught fire, creating what would today be referred to as an environmental disaster. Because the Hosmer Button was so ineffective, starting in the twenties some drilling companies began substituting a Christmas tree with its array of control valves, pressure gauges, and chokes, hoping that it would hold down the gas. When a blowout was imminent, the driller would have a roughneck rush down to close it off. Sometimes it worked and sometimes it did not.

Around the mid-1920s the Hinterline Company introduced a manually-operated, ram-type blowout preventer with large control wheels to activate it. By the time they arrived in Canada in 1948 the improved models had ram preventers which closed the annular space outside the string of drill pipe, holding it firmly in place. Once again, the roughneck had to race to the cellar to turn the often rusty, mud- and ice-encrusted wheels to make it work. By the early 1940s Decker, Cameron Iron Works, Hydril, Shaffer, and Hinterline had blowout preventers on the market and were trying to sell them in Canada. However, only the most forward-looking drillers showed an interest in trying them out. Most would rely on mud. However, until a government regulatory body had the legislative authority to make BOPs compulsory on rigs, they were not going to appear on many operating in Alberta. The Atlantic #3 blowout in the Leduc Field – so well documented by Mr. Aubrey Kerr – prompted the Alberta Government to bear down on the rig owners and to make

them install BOPS, as imperfect as the first ones were. Then inspectors had to be appointed, and they had to chase the rigs around the province to see if they were compliant. As the model design improved, most drillers came to trust them more and to pay more attention to their shelter, cleaning, heating, and inspection. By the time high pressure fields like Pembina were being developed, almost all of the medium sized rigs had installed blowout preventers.

Death by H₂S, hydrogen sulphide, was not uncommon. By the 1950's an unknown number of roughnecks had been gassed, some fatally, and gas masks were finally present on every rig. They came in various makes and models but they were all constructed in much the same way to neutralise the effects of H₂S. However, they were only as good as any other piece of safety equipment, and if you didn't take safety seriously and wear them then you faced death or injury to your lungs. Drill stem tests, well completions, acidizing, cementing, slippery rig floors, coring, running casing and tubing, swabbing operations, perforating with acid and guns, and so on and so on. All tasks held a measure of danger, some more than others. And yet, some men worked their entire lives on the rigs without ever suffering any serious injuries. These men were safety-conscious and practiced safety on the job. Others were untrained or careless and many paid the price.

As the number of working rigs increased after 1947 so did the number of deaths and injuries. Government initiative was part of the key to reducing these numbers. The Government of Alberta acted in 1953 when the Department of Industry and Labour's new safety code was introduced. It was an amendment to the Factories Act by means of an Order-in-Council. This first legislation, which would be expanded in following years, consisted of ten pages of regulations and became a model for other provinces and countries such as Australia and Norway. The new regulations identified and put an end to dangerous practices that took place on the rigs, such as allowing the derrickman to ride up to his monkeyboard on the pipe elevators. Rig owners also had to comply with a long list of safety requirements governing equipment, right down to and including the type of piping, valves, and fittings. The government meant business.

In 1957 the Conservation Board set down its own new Safety Regulations Governing Drilling. Once again a series of hazardous practices were identified and prohibited. Demands were made on the owners to supply various safety devices on their rig engines and other equipment. The presence of working blowout preventers was required on every rig; and there was a host of provisions for the personal safety of the workers, including a scale for the length of the escape line based on the height of the mast. To ensure enforcement of the new regulations, the Board's representatives in the field – the inspectors - had open-ended authority to shut down a well if they deemed it unsafe. As new safety technology was developed, put on the market, and installed on Alberta rigs, the Board's inspectors evaluated it and made recommendations regarding its use. In this way the regulations were updated from time to time to reflect the introduction of new equipment. New technology could also bring new types of accidents; changes were made to deal with these emerging problems when they presented a unique hazard to rig workers. In spite of the regulations, inexperienced and careless drillers, and green hands that were never taught the basics of safety, especially in relation to the new regulations, still had accidents. The boom of the fifties and sixties meant that men came and went on the rigs. The key to an accident-free rig proved to be the driller and his attitude toward safety. He could provide positive leadership, and his attitude toward safety could rub off on his crew. The major oil companies like Shell, Imperial and Chevron, for example, had drilling departments and drillers who worked to reduce death and injuries on the rigs. Among the drilling contractors of the forties, fifties, and in some cases the sixties, there was sometimes less concern for safety, partly

because of the pressure to “make hole” and move on to the next well site. Drilling at a set fee for each vertical foot in the hole meant drilling under pressure and the temptation to take shortcuts and risks. Crews often worked more than their eight-hour tour or shift; the first eight hours were regular time and the next four were time and a half. These were often tired men, and they were more prone to carelessness and accidents. As well, the equipment on many of the contractors’ rigs was not well maintained; when a rig was checking and repairing equipment it was not making money.



Testing a well at Turner Valley (Glenbow Archives)

Safe drilling practices finally received formal recognition after the opening of the first Banff Safety School in 1952. Today’s Canadian Association of Oilwell Drilling Contractors began safety schools in western Canada and gave drillers and crews strong support. They also gave awards to crews for accident-free days, as did various drilling contractors and the drilling departments of the oil companies. Gradually, a culture of working safely was promoted and rewarded in Alberta.

Doug Gibbs spent 34 years as a safety inspector and for him the lack of proper training was the main culprit in most accidents. Many of the safest drillers and toolpushers proved to be men who regularly upgraded their knowledge at the Banff schools or schools put on by the equipment manufacturers, and then passed on what they had learned to their crews. The second culprit, he says, was poor maintenance. In short, people did not take proper care of the equipment that could kill or maim them. Finally, for Gibbs, there was the improper use of masks and carelessness around H₂S. Good drillers could neutralize this threat through leadership in teaching, he maintains. Rig safety came a long way between 1883 and 1970. Fortunately the bad old days of the fifties, when two years running there were 19 deaths a year and two to three thousand accidents, are gone. Since the sixties the number of deaths and injuries has continued to decline gradually. Today’s roughneck is better trained, more responsible, and more careful than his predecessors. Under the guidance of safety-conscious drillers and toolpushers accidents are being minimized.

*Our thanks to Sandy for his comprehensive presentation! Contact www.uofcpress.com or your local bookseller for a copy of the book. For a recent review see: *The Edmonton Journal*, March 6, 2006 at the website www.Canada.com*