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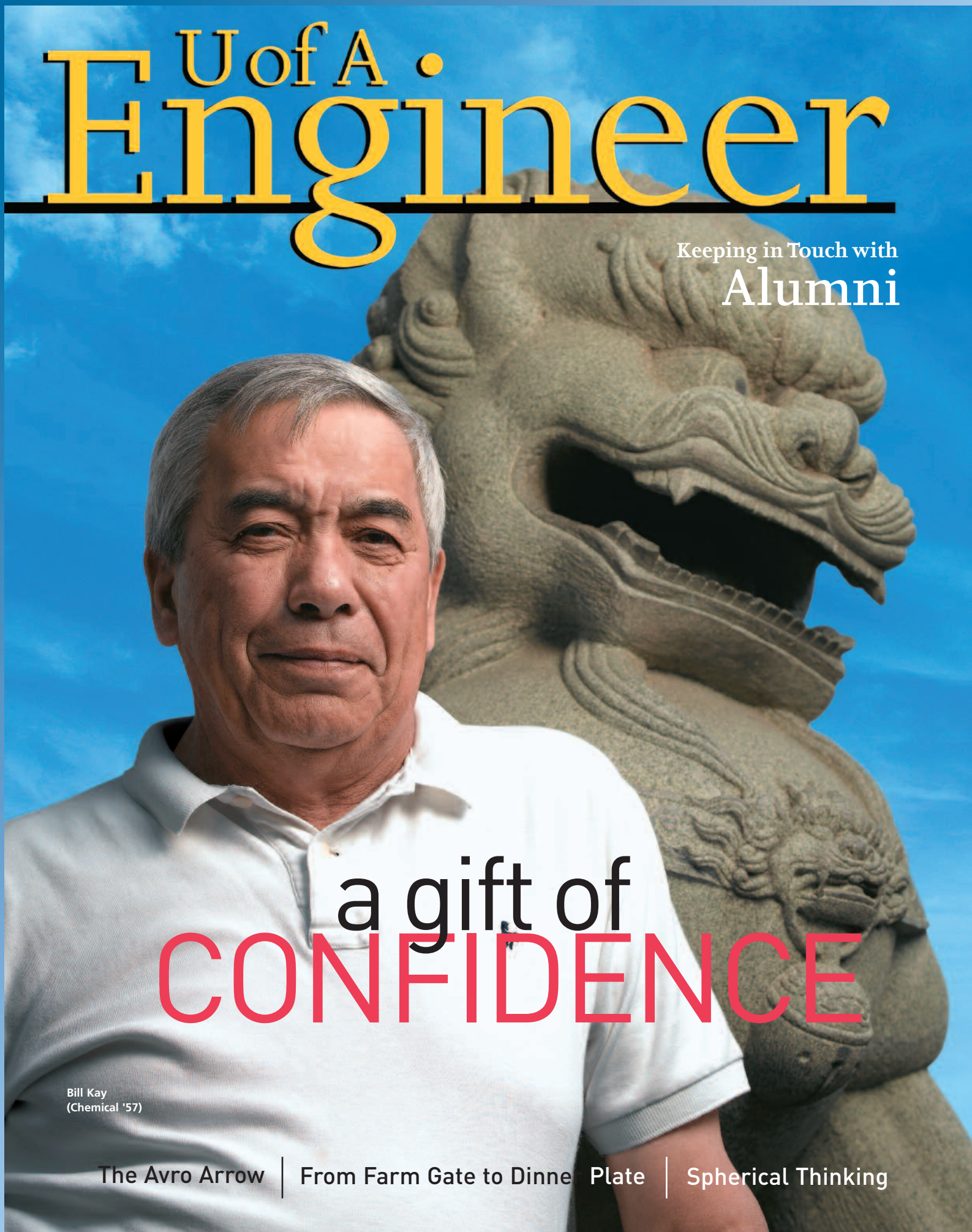
U of A Engineer

Keeping in Touch with Alumni



a gift of CONFIDENCE

Bill Kay
(Chemical '57)

The Avro Arrow | From Farm Gate to Dinner Plate | Spherical Thinking

Message from the Acting Assistant Dean

The Faculty of Engineering, like the field of engineering itself, continues to evolve. Over the past several years, you may have grown used to seeing David Petis, assistant dean of External Relations, addressing you on this page. Last summer, we bid farewell to David as he embarked on a new chapter in his career as vice president of University Advancement for Brock University in St. Catharines, Ontario. We thank David for his seven years of outstanding work in bringing our alumni, donors, and corporate partners together to strengthen their relationships with the Faculty of Engineering here at the U of A.

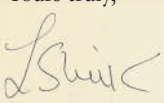
As the manager of external relations for southern Alberta for the Faculty of Engineering for the past six years, I have worked with many of our alumni and partners in the Calgary region. I'm pleased to be stepping into the role of acting assistant dean of external relations as we embark on what promises to be one of the most exciting years in our Faculty's history.

In 2008, we celebrate the 100th anniversary of the Faculty of Engineering, as well as the centenary of the University of Alberta. Many things have changed on campus during this time and the practice of the profession has become more complex and sophisticated. The world is a very different place than it was in 1908, but two things remain the same: the competence and contributions of our graduates and the dedication of our faculty and staff.

Our 100th anniversary provides an opportunity for us to look back and recognize that this outstanding Faculty has been built by the thousands of engineering students who have laid the groundwork for the generations of students that followed. Not to be forgotten are the hundreds of professors who have dedicated their careers to mentoring future engineering professionals. Upcoming issues of this magazine will highlight some of the people and stories that have shaped the culture of our Faculty and set the stage for discoveries and events that have defined our profession in the 20th, and now the 21st century.

I hope you will mark your calendars and plan on attending the special celebrations we are planning to commemorate our 100th anniversary, as well as the 50th anniversary of the Department of Mechanical Engineering. Come home to the U of A campus on September 18–21, 2008, for what promises to be a weekend to remember.

Yours truly,



Laurie Shinkaruk
Acting Assistant Dean, External Relations
Faculty of Engineering

Vision

To be one of the largest and most accomplished engineering teaching and research centres, a leader in North America.

Mission

To prepare top quality engineering professionals, to conduct world-leading research, and to celebrate the first-class reputation and outstanding accomplishments of alumni.

Values

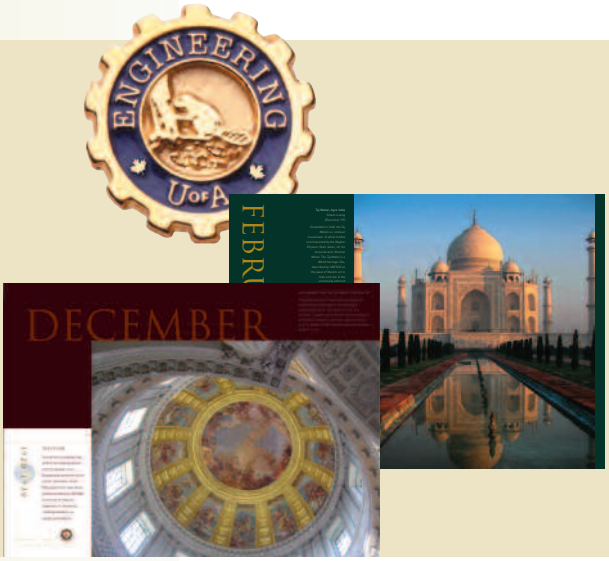
Dedication, integrity, professionalism, and excellence in teaching, research, and service to the global economy and community.

2008 *Celebrating a Century of* ENGINEERING EXCELLENCE

Thanks to those who contributed photographs to the 2008 Engineering Calendar. This specially themed calendar marks 100 years of history of the Faculty of Engineering and includes historical highlights plus messages from Engineering alumni.

Your donations to the calendar will benefit the Engineering Students' Society. Thanks for your contributions to date.

Are you interested in participating in the 2009 calendar? Contact sherrell.steele@ualberta.ca for further information.



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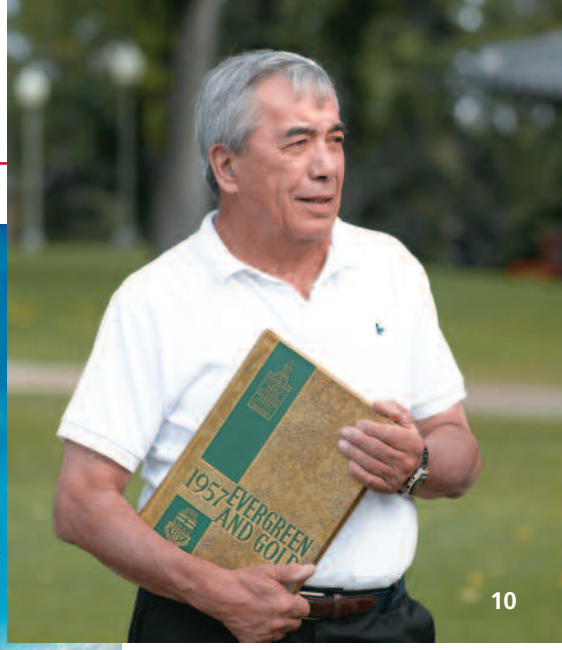

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COVER STORY

FEATURES

DEPARTMENTS

Message from the Editor

Many milestones in Canadian history bear the marks of University of Alberta engineers. This issue features a profile of Jack Neal (Electrical '52), one of 15,000 employees who worked on the Avro Arrow, an advanced airplane that captures the imaginations of Canadians to this day. Although controversy surrounds the politics and cancellation of this project, the fact remains that it was 25 years ahead of its time. It was a glorious, if brief, era in the history of Canadian ingenuity.

The year was 1953, and Canadians were in the midst of the Cold War. As the Soviet Union began to develop a fleet of long-range bomber planes capable of flying nuclear weapons over the pole to North America, the Canadian military searched for a counter-offensive aircraft capable of intercepting and destroying these deadly threats—a supersonic, missile-armed miracle of engineering. Meeting extremely advanced requirements for the time, the Arrow was the first of its kind in the world. It was an incredibly challenging engineering project, and Neal jumped at the chance to be part of it.

The Avro project is just one of a growing list of achievements created and crafted by graduates of the Faculty of Engineering. If you know of other significant milestones in engineering history, please contact me at 780.492.4514 or at sherrell.steele@ualberta.ca.

Yours truly,

Sherrell Steele

Sherrell Steele
Communications Strategist
Faculty of Engineering

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Sidewalk Superintendents

The National Institute for Nanotechnology reflects the challenges and trends in the consulting engineering industry.

From the sixth floor of the University of Alberta's new National Institute for Nanotechnology (NINT) the elevation is such that Phil Haswell can actually see the white tail feathers of a bald eagle as it wheels in its gyre. This might just be one of the best places in the city for the director of facilities for the Faculty of Engineering to bird watch—maybe along side a nanotechnologist, engineer, biologist, chemist, or medical researchers who call the interdisciplinary institute home.

Canada's flagship facility for the development of technology built from individual molecules is unique in purpose and design, the kind of showpiece Alberta's post-secondary institutions are eager to call their own. Universities, colleges, and technical institutes across the province are directing the campus construction boom toward creating highly innovative spaces for learning.

"This facility demanded a high level of environmental conditioning," Haswell says.

"It was a challenge just to meet the specs to accommodate imaging and process tools, for now and the future. What we think we want to do today is going to be different tomorrow. So the building has to roll with the punches."

Alberta's consulting engineers are among those working to provide that kind of agility to structures and their systems. If the number and complexity of upcoming projects is any indication, the boom should keep everyone working for some time. While NINT's design parameters are an extreme example of the kind of creativity post-secondary institutions might require, it has still set an important precedent. Given that tiny molecules react to environmental instability in big ways, every effort had to be made to limit fluctuations in temperature and humidity, building vibrations, and even in natural gravitational fields.

"Scientists are using more sensitive pieces of equipment, and so the environmental controls required for buildings are getting more stringent," explains NINT's structural engineering consultant Dr. Jim Montgomery (Civil '73), who is a partner with the firm Cohos Evamy.

Accommodating equipment as finicky as multi-million dollar electron microscopes was mostly a matter of choosing a sufficiently "quiet" location. Some of the measures taken to assure this were truly innovative. A paper authored by Montgomery, Haswell, and others outlines the results of experiments conducted by the design group to determine the materials and methods for reducing vibratiqn to levels acceptable for nanotechnology—3µm/s in some instances. For the uninitiated, that is a movement of about half as wide as a strand of spider's web in one second.

"You don't get to the moon unless you try things that are new," Montgomery says.

Even for an established national consulting firm, designing a building with these kinds of hair-trigger specifications involved a steep learning curve. Until the NINT project, veteran electrical engineer Glenn Stowkowy (Electrical '76) of Stantec Consulting said he's never come across such strict design parameters. Stowkowy is convinced this is only the beginning.

The National Institute for Nanotechnology.

"I think there are going to be more specialty buildings in the future," Stowkowy says.

"Specifically in Western Canada, we've probably been lacking research facilities. For certain, building technology will change to catch up with other places in the world that have these facilities already."

Projects commissioned by post-secondary institutions may be increasing in sophistication. Control systems are becoming more specialized; projects are demanding a higher degree of management. Innovative designs in Alberta may become just as commonplace off campus as on. However, the shortage of skilled labour hasn't bypassed the discipline. There was a huge gap in enrollment in the 1980s, which means most consulting engineers are either over 50 or under 30.

This means U of A Engineers in a certain demographic have years of professional challenge ahead.

Adapted from an article written by Scott Messenger and published by Alberta Venture. *Reprinted with permission from the Consulting Engineers of Alberta*

Sphe

Harold Kalke
(Civil '62)

rical Thinking

Harold Kalke (Civil '62) began his life on the Saskatchewan prairie, but these days he's an urban dweller in Vancouver with a passion for sustainable growth.

by Caitlin Crawshaw

Kalke, the head of Kalico Developments Ltd., has created some of Canada's most sustainable structures during his career. He believes in "densification from within" (building up, instead of out) in order to protect valuable farmland and ecosystems from urban sprawl and mankind's heavy ecological footprint.

Kalke's approach is straightforward: use common sense strategies to minimize resource use, and remember that Mother Earth is ultimately in charge.

"If you don't honour [the Earth] and work with it, it'll come back and bite you," says Kalke. "It's a bigger thing than mankind. As a species we don't seem to recognize that. That's a huge problem."

Kalke has been on the environmental bandwagon since long before green living became fashionable.

Born to a farming family in a small town named Success, Saskatchewan, Kalke never had much. For his parents and all six children, life revolved around the whims of the environment.

"You're always subject to the weather and cattle diseases and all kinds of things, so you don't feel like you're in control of the environment; the environment is in control of you."

Kalke's farm upbringing also taught him hard work—and subservience to the planet. This understanding has shaped his life philosophy and life's work. Yet, urbanites who "haven't got any dirt under their fingernails," don't always share his mentality, though they advocate sustainability. "I'm not critical of them, but

The Capers building in Vancouver, a mixed-use building heated and cooled by a geo-exchange system.

they just don't get it at the heart level," says Kalke.

In 1945, after contending with a terrible drought, grasshoppers and rust, Kalke's family headed west. His father went ahead, jumping a freight car and walking from Red Deer to Peace River and back, in the dead of winter, searching for a plot of land to call home.

"He found this place just nine miles outside of Leduc, on highway 2A, and we literally built a farm out of nothing," says Kalke.

At 14, Harold left his family to live with a dairy farmer down the road who'd been in a serious accident and needed the help. For three years he helped the farmer and his wife, before moving in with his eldest sister and her husband on their farm, at which time he finished high school.

But while other kids his age might have had marriage on their minds, Kalke had other plans: he was heading to university. For one year he worked doggedly to save money for the venture, though he didn't know what he'd study and knew few people who'd been to university.

Nevertheless, one day he borrowed his brother's car and drove to Edmonton, parking at the University of Alberta. "I didn't know anything about university, so I just picked the first building," he says.

That building was Civil Engineering. After speaking to the secretary, and briefly with the dean, he filled out an application form and handed over his transcript. Kalke didn't know what the future would bring, but he did know that he loved learning.

By the end of his civil engineering program, nearly two-thirds of students had dropped by the wayside, but Kalke excelled. He had put himself through school by working on pipeline construction projects for the oil industry.

Upon graduation, Kalke worked for Pembina Pipelines in Drayton Valley, designing pipelines. But, after working on a Calgary job for two years, he became acutely aware that he'd need another degree to put him on a more fulfilling career path.

Fortunately, his work had brought him in contact with a coworker who would serve as an example. At the time, the two were involved with a feasibility study to build a pipeline that would stretch from Edmonton to Walla Walla, Washington. Kalke helped crunch the numbers, helping with cash flow forecasts.

"I was fascinated by how he knew the more complicated stuff about finance and all that stuff. So, I asked him how he learned that, and he said he took an MBA." Before long, Kalke headed to University of Western Ontario to complete an MBA.

"Engineering is fairly narrow, but deep, knowledge. And engineering really teaches you how to think deductively and analytically. That's what U of A engineering gave me—it taught me how to think deeply in one discipline. And that really puts your brain in shape," he says.

"What you need to supplement with that after the fact, is relatively shallow but broad knowledge. …When you combine narrow but deep knowledge with shallow and broad knowledge, and you continue to work and think, you begin to think spherically."

For the next two years, Kalke worked for Union Oil doing long-range corporate planning and risk analysis. Although it was intellectually rewarding work, and the people were great, Kalke wanted more. "But I became aware that for me to go up the ladder at the pace I wanted to…I would have to get a line job."

His direction became suddenly very clear during a business trip to Prince George, where Union Oil planned to build a new refinery. His itinerary involved a stopover in Vancouver, a prospect that most would consider unremarkable. But for Kalke, it was a moment of realization.

"It was my first experience seeing an ocean," says Kalke. "I fell in love with [Vancouver] just in that day and I resolved that I would move here."

In 1969, Kalke and his wife and children moved to West Vancouver, where he still lives. He became a consultant, helping a local entrepreneur—who owned four engineering companies and business interests worldwide—rationalize his assets. It was a fun job for Kalke, and it introduced him to a fascinating new field: real estate.

In 1971, Kalke formed a real estate development company and hasn't looked back. "I've been doing this ever since. And I found

my natural niche, if you know what I mean. I really, really love this business," he says.

Kalke went on to create Kalico Developments Ltd, Salt Like Projects Ltd., Dandelion Geothermal Ltd. and other business ventures. Along the way, his underlying environmentalism kicked in.

Kalke is a dedicated member of Smart Growth B.C., an NGO that advocates for densification of cities, preventing urban sprawl and protecting ecosystems. Not only is this a better strategy environmentally, but it's a better way to create connected communities, he says.

Kalke advocates "microneighbourhoods," in which families live more closely together, with recreational facilities and amenities a stone's throw away. This use of space encourages meaningful interactions between people, reducing the isolation that comes from subdivisions far outside of the city core.

Kalke's own projects seamlessly blend environmental and human interests. Presently, his company is involved in two run-of-the-river hydroelectricity projects in the Kootenays.

Unlike other hydroelectricity strategies, run-of-the-river doesn't require flooding the upper part of the river; it thus preserves natural habitats and minimizes environmental harm. The technology, says Kalke, is "the most environmentally friendly power generation, perhaps alongside wind," and is gaining momentum in B.C.

Kalke also developed the Capers Building in Vancouver, on West Fourth Avenue. The block-long, mixed-use building is heated and cooled by a geo-exchange system. Beneath the building, 46 holes, each 90 metres deep, are connected with a pipe loop that circulates water, utilizing the earth's energy.

"No one had ever done it before in Canada. For sure, we did all of the research trying to find out about this thing, but we came at it grassroots, and just did it the common sense way. And it works lickity split," he says.

The building has become internationally known for its sustainable design, and is home to the David Suzuki Foundation.

Currently, Kalke is the chair of the Dockside Green project in Victoria, B.C. The project will develop 15 acres of former industrial land near the upper harbour and downtown, to create 1.3 million square feet of residential, office, retail and industrial space. "It'll be the most sustainable project in Canada," he proudly declares.

Kalke has also given back to the community in other ways. He is a former chair of the University of British Columbia's Board of Governors, and was involved on the search committee that selected Dr. Martha Piper as UBC's first female president, and Dr. Indira Samarasekera as UBC's vice president (research).

Kalke advocates "microneighbourhoods," in which recreational facilities and amenities are a stone's throw away, and families can live closer together.

Kalke is openly frustrated at society's reluctance to make changes to protect the planet. "Man is like a virus on earth, and that's why the earth is now warming—it's getting a fever. Fevers are natural mechanisms in our bodies to kill viruses."

But while cultural change is paramount, it begins with a change in individual attitudes. "They can bring laws in, they can bring policies about Kyoto, they can do all of these things, but unless you and I want to change, it doesn't happen. We need to want to change, we don't want to be forced to change. That's a big difference."

Still, Kalke's excited about today's youth, and their capacity to move society in new directions.

"I have a great faith in them. I think they're much smarter than when I was their age, and I also think they have fewer barriers. They're prepared to explore intellectually a width and breadth of topics that we weren't prepared to think about."

In other words, they're ready to think spherically.

Caitlin Crawshaw is an award-winning Edmonton-based freelance writer.

A rendering of the Dockside Green project in Victoria, British Columbia.

An aerial photo of the Dockside Green project.

a gift of CONFIDEN

BY LINDA GOYETTE

A retired engineer in a beautiful garden in south Edmonton is turning the pages of a university yearbook—1957 Evergreen and Gold. He looks at the self-assured smiles of hundreds of graduates, and reflects on his own journey from uncertainty to confidence.

Bill Kay (Chemical '57) points to the photograph of a student with dark eyes and a hesitant expression.

"That's me," he says.

If only he could reassure his younger self, and soothe the young man's doubts with a glimpse of his future achievements. The Class of '57 at the University of Alberta had little to fear. No previous generation had encountered brighter prospects.

"We are going into a world that desires and needs our skills," the class valedictorian predicted, correctly as it turned out.

The 128 engineering graduates offered everything the emerging province craved in the decade after the Leduc oil strike—energy, fresh ideas, ambition, technical and scientific expertise, optimism—but who could begin to guess the opportunities ahead?

Kay can't speak for his classmates, but he does remember his own uncertainty. On the day he graduated, he encountered a law student at a barber shop.

"I really don't know if I'd want to be an engineer," admitted the upcoming lawyer.

"I don't know if I have the confidence."

The young man wasn't so sure that western Canadian employers would want his new engineering skills, or him. Born in the middle year of the Great Depression, Kay grew up in Edmonton at a time when mixed-race marriages brought unspoken social disap-

CE

Bill Kay (Chemical '57)

proval on all members of the family. His father, Gee Soon Kee, was a Chinese-speaking immigrant from Malaysia who ran the St. Louis Café on Jasper Avenue. His mother, Jessie Natasia Skedaniuk Kay, was the daughter of Ukrainian immigrants. The eldest of six children, Bill spent the early years of his childhood in a three-room apartment above the café. The family later moved to a small home in the downtown neighbourhood of Boyle-McCauley.

As a teenager, Kay admired four university students who lived next door in a house nicknamed "Pete's Shack." One of the students was John Slupsky (Chemical '53, MSc Chemical '58).

"John became a good friend and mentor to me when I was in high school," he remembers.

Kay decided to study chemical engineering, too. His parents supported his dream, but, like most people in their neighbourhood, they could not afford to assist their son with his university expenses.

The younger engineer wondered whether potential employers were avoiding him because of his Chinese ancestry, but he kept his fears to himself.

Kay worked hard at summer jobs and, with financial assistance and encouragement from the Optimists Club and the Alberta Hotelmen's Association, managed to pay his $125 tuition as well as room and board to help his parents.

He loved university, but the difficulty of the courses surprised him at first.

"I thought I was a math whiz, but I discovered I wasn't as smart as I thought I was. I had my first crisis of confidence, but I kept motoring on."

Inspired by young professors like Dr. Bob Ritter (PhD Chemical '61), who taught unit operations, as well as seasoned professionals like Dr. George Govier (MSc Chemical '45) and D.B. Robinson, Kay persevered with his studies.

One summer, Kay worked in research and development for El Dorado in Port Radium, Northwest Territories. As his fourth year approached, he began to daydream about the exciting possibilities of an engineering career.

A fear of inadequacy plagued him during his final exams, and he failed one difficult course under pressure. He took the supplemental, and graduated, but his confidence was badly shaken.

His classmates waltzed into the expanding industry in a buoyant economy.

"Only two of us did not have jobs immediately after graduation, and I was one of them" recalls Kay.

"I did get a job at Sherritt Gordon, but I was the lowest paid graduate in our class. I was also the first one laid off two years later. For six months after that, I looked

Inspired by a Meat Grinder

Who would guess that a meat grinder could inspire a technique for planting trees?

Every inventor depends on a spark of memory and imagination. For Kay, a childhood visit to a butcher's shop with his father provided the answer to an unusual research challenge.

In the late 1960s, the Alberta Forest Service (AFS) was trying to develop a new growing process for reforestation. The conventional seed container—a small block of peat—led to tangled roots. When planters pulled apart the seedlings, they caused root destruction and root shock. The AFS turned to the Alberta Research Council for ideas.

Tackling the problem with his colleagues, Kay recalled watching his family's butcher grinding meat into sausage casings. The research team ordered casings from Canada Packers to experiment, but the standard kind didn't work. Trying again with cellulose casings, the team inserted tree seeds in short lengths filled with peat. The containers looked very much like sausages, and they were manufactured in links like wieners.

"We tested this growing process on bedding plants, and it worked well," Kay recalls.

The forest service was interested, and asked for product trials. Extensive work began at the Oliver Tree Nursery, and continued for three years.

"After three or four years, we had an 85 percent survival rate on some test plots," said Kay.

He and his colleagues took out a patent on the process. Kay later developed a "zipper skin" so that the polyethylene skin covering could be removed without a knife. He alone applied for this patent.

"I believe a million trees a year were planted with this technique," says Kay.

"I just wish I knew where, because I'd like to see them!"

for work with no luck. Employers would tell me I didn't fit the bill, or that they had already filled the position, or they wouldn't reply at all."

The young engineer wondered whether potential employers were avoiding him because of his Chinese ancestry, but he kept his fears to himself. In the late 1950s, racial discrimination was endured but not discussed.

"It was hard to take, and it followed me," he says quietly.

He said nothing about the problem, not even to his parents, as he searched the classified ads in the newspaper. Other Chinese-Canadian graduates of his generation shared his experience.

"The undercurrent was always there, but it did not surface."

At last, Kay made his breakthrough. An astute recruiter at CIL hired him for the research and development team at the Edmonton plant in 1959.

"I was amazed," he remembers.

He threw himself into his experiments, and was soon the assistant supervisor in the compounding unit.

Kay might have worked for CIL for the remainder of a satisfying career, but the company wanted to transfer him to its headquarters in Montreal. With a large extended family in Edmonton, he preferred to stay in Alberta. Leaving CIL to join the Alberta Research Council (ARC) in 1967, he began a series of assignments that sparked a period of intense curiosity and creativity.

His successful career intersected with the rapid expansion of the Alberta economy in interesting ways. He conducted early oil sands research—working with a team that explored in situ extraction using triaxial loaded methods—at a time when other Canadians were first learning about the construction of huge mining projects at Fort McMurray. He tackled new research in forest products for three years in the 1980s, just as the Getty government began to invest heavily in the forestry industry in the hope of diversifying Alberta's economy.

In the 1990s, as the public began to acknowledge its responsibility to find ways deal with industrial wastes, Kay helped manage the Alberta Waste Materials Exchange program. He worked with his colleagues to develop a safe way to use oil and pesticide containers to manufacture strong highway barrier posts, now visible along Alberta's highways.

"As time went on in my engineering career, my confidence grew a bit," he said.

Kay enjoyed his professional collaborations with scientists and skilled technicians. Among other team projects, he built floor-testing frames to test the bending properties of oriented strandboard; developed a new tree-seeding container for tree planting; explored the potential of Stevioside as a natural sweetener; researched the production of micronized sulphur for new uses in the pulp and paper industry, fertilizers, and pesticides; and helped to develop an extraction technique for low-grade iron ore in the Peace River country. He obtained two patents with research colleagues, plus one on his own, before he retired in 2001.

Looking back on his long engineering career, Kay describes his good fortune.

"I came along at a time when the ARC and chemical engineering were both expanding in new directions."

He believes that the graduates in chemical engineering in the 1950s were perhaps the best-rounded engineers of the time, thanks to the diversity of their training and assignments.

"Our unit operations alone touched on many industries, directly or indirectly, while the other engineering disciplines were more narrowly focused," he says.

Chemical engineering graduates had a solid grounding in chemistry, electrical processes, mechanical process as well as unit operations in a wide range of industries from mineral refining, oil sands recovery and refining, to petroleum and chemical processing.

What makes a successful engineer? Kay suggests a preliminary list of essential qualities.

"Perseverance. An active, curious mind. A willingness to deviate from the straight and narrow when solving problems. A love of science."

As for the gift of confidence, Kay has learned that it develops slowly, through a lifetime of challenging work and fair opportunities. Once found, it becomes the essence of creativity.

Caitlin Crawshaw is an award-winning Edmonton-based freelance writer.

Sulphur Pellets

In the early 1990s, Kay began to work with colleagues Dr. Edward Bertram and Jim Laidler in new research on the micronization of sulphur for the pulp and paper industry.

Alberta's petroleum industry produces huge volumes of sulphur, which is sold for many industrial uses. The team's research challenge was to produce sulphur fine enough to allow a new production process that would be safer than grinding solid sulphur, which can cause explosions.

The research team melted the sulphur, shot it into water, and returned it to a pellet form.

"We created a process that would allow the forest products industry to use sulphur to bleach pulp for paper," says Kay.

Sulphur micronization was also useful in the creation of pesticides and fertilizer.

With a unique and important discovery in hand, the team knew it needed to file for patent. Six months later, it was granted.

the MIGH Might-Have-Be

by Lisa Ricciotti

Some little boys grow up to live their dreams—and Jack Neal (Electrical '52) was one of those lucky ones.

From the time he could walk, Neal dreamed of flying. Early family photos show him as a small boy, happily waving toy planes in the air. A faded newspaper clipping from about 12 years later is brightened by a beaming Neal, pictured with his fellow prize-winners of the Edmonton Model Aeroneers Club aircraft-building competition.

"Dad got his private pilot license the moment he was legally old enough to do so," recalls Neal's son Steve, "thanks to a scholarship for flying lessons that he won as an air cadet."

And by the tender age of 20, fresh from the electrical engineering class of 1952, Neal had signed on with A.V. Roe Canada to work on the aviation project of a lifetime: the building of the CF-105, better known as the Avro Arrow.

Much has been written about the Avro Arrow project, which was also mythologized in a CBC-TV miniseries "The Arrow." Unfortunately, the focus often centres on the politics behind its sudden cancellation, or conspiracy theories about why all plans and parts from the Arrow were so rapidly and thoroughly destroyed. The Avro legacy is often summed up as "one of the greatest might-have-beens of the aviation industry"—an analysis that fails to recognize the project's achievements.

In reality, those who worked on the ill-fated project were well on the way to creating an airplane that would have been 25 years ahead of its time. It was a glorious, if brief, era in the history of Canadian ingenuity. Neal, one of the 15,000 employees involved in the ambitious undertaking, offers a fresh insight into those heady days.

The year was 1953, and the climate of fear surrounding the Cold War was dipping into the deep-freeze zone. As the Soviet Union began to develop a fleet of long-range bomber planes capable of flying nuclear weapons over the pole to North America, the Canadian military searched for a counter-offensive aircraft capable of intercepting and destroying these deadly threats. The CF-100 Canuck, Canada's first jet fighter, was already in production, but the RCAF realized it would be outmoded before it was launched. Something more was needed—a supersonic, missile-armed step up from the Canuck.

The ideal aircraft for the task carried a formidable wish list of specifications. It would be a twin-engine two-seater fighter jet, with a radius of action of 1,000 km, a ferry range of no less than 6,000 nautical miles (11,000 km), and a top speed of more than Mach 1.5. It would carry advanced missile and fire control systems, which would require a large internal engine bay. And, it should be manoeuvrable enough to pull two Gs at 15,000 metres, without any loss in speed or altitude.

These were extremely advanced requirements for the time. In fact, no such aircraft existed: the creation of the Arrow would

Courtesy Jack Neal's family

Original painting by Michael Swanson © 1990 (www.swansonart.com) Published by Mill Pond Press.

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make it the first of its kind in the world. It was an incredibly challenging engineering project, and Neal jumped at the chance to be part of it.

Recently, Steve Neal found a transcript of a speech his father gave to a local home-built aircraft club. In it, Neal describes his time at Avro Aircraft—nearly seven years in total. At first Neal was involved in "a kind of practical training program, spending a few weeks in each of the fabrication and assembly areas to learn the practical aspects of building military aircraft." Soon he progressed to the assembly line for the CF-100 Canucks, then went on to production flight testing.

"The cancellation of the Arrow was a tragic waste of a Canadian-developed aircraft that could have out-performed any fighter aircraft purchased since 1959," wrote Neal.

After that, things became very interesting indeed for Neal, as he moved into a new position that combined his love for electrical engineering with his passion for aviation.

"My next stop was Experimental Flight Test, and for the first time I began some real engineering on special instrumentation for the development of flight testing. Of particular interest were experiments for an airborne radio telemetry system, which could collect aircraft data in-flight, and radio it to the ground. Plans were also being developed for a mobile ground receiving station where engineers could monitor the data received while a test flight was in progress."

This was an early phase of a concept now known as "fly-by-wire"—a radical innovation at that time.

Neal's speech goes on to clarify "some scenes in the TV movie that never happened in real life." As his son Steve remembers, Jack Neal "was incensed about a couple of incidents in the TV movie, like how they added in a couple of women engineers."

The Kate O'Hara character "was a fictitious person," who actually represented the work done by close to 35 staff. And as Neal wrote his speech: "These people were almost exclusively male. Women with engineering degrees are scarce today, and they were even rarer in the '50s."

Neal also complained that the test pilots were portrayed in a "flamboyant, daredevil Hollywood image. Jan Zurakowski, Spud Potocki, and Peter Cope were actually technically informed, professional pilots who understood the risks and pushed the limits very carefully." Often, after Zurakowski had finished a session in the simulator, "we would find a St. Christopher medal hanging on the instrument panel."

Straightening out the errors of the TV movie takes up about five pages of Neal's speech. The design of the Arrow didn't come "as a flash of inspiration, but [was] the culmination of several design studies for delta wing fighters." Security was far more intense than shown in the miniseries: "When drawings or performance specs were written on paper, they immediately became classified as 'Secret' and were kept in a locked cabinet." It appears that Neal broke that security code himself, however, in a minor way; his scrapbook contains photos of test flights of one-eighth-sized models, stamped as property of A.V. Roe Canada, which he sneaked out of the plant on the day of the layoffs.

For a man with Neal's interests, the time spent on the Avro projects was undoubtedly the best job ever. Like others on staff, Neal received no warning that his dream position was about to end. On February 27, 1959, a terse announcement came over the company public address system. Son Steve remembers his dad describing the day now known as "Black Friday": "It was like pack up your things and go now."

Neal's speech ends with a blunt statement: "The cancellation of the Arrow was a tragic waste of a Canadian-developed aircraft that could have out-performed any fighter aircraft purchased since 1959."

Unlike many engineers, Neal chose not to join the so-called brain drain of talent to the U.S., as former Avro employees were scooped up by NASA. Instead, he returned to Edmonton, along with the wife he'd met while in Ontario.

Courtesy Jack Neal's family

Neal, bottom right, was a member of the Edmonton Model Aeroneers Club.

Courtesy Jack Neal's family

Scale model Arrow test flights.

"Dad collected every book on the Arrow, and every model of it that came out," recalls Steve. Giving his father's eulogy, he noted,"It must have been a sad day indeed for my dad, when that project was cancelled. I imagine by now there has been a tense exchange of words in heaven between Dad and the Right Honourable John Diefenbaker, who cancelled the Arrow—assuming, that is, that the Honourable Member for Prince Albert made it to heaven."

Despite his disappointment, Neal made a new and full life for himself after his return to Edmonton. He took a position at AGT (Alberta Government Telephones, the predecessor of Telus), working in network standards until his retirement in 1987.

"There's an interesting symmetry to his AGT career," says Steve.

"When Dad started, AGT had just gotten to the point where everyone had a phone, although most were party lines. When he retired, the last party line had just shut down."

Jack continued his passion for flying as a pilot at both the Edmonton Flying Club and the Edmonton Gliding Club.

One senses, however, that Neal's favourite role was the one he played so early in his life: telemetry engineer on the Avro Arrow. That was a hard one to top. To quote another speech, one given in 1958 by Jim Floyd, Avro Aircraft's vice president of engineering, a year before the project was cancelled: "The RCAF naturally wanted the best and latest integrated electronic system in the aircraft. From an engineering point of view, attempting to meet what was probably the most advanced contemporary interceptor requirements was an enormous pressure. However, we have survived so far, and there is every reason to believe that Canada's biggest military venture will emerge from a state of national discussion to become a source of national pride and security."

Floyd's hope never came to fruition, but Neal would probably have agreed with the Avro VP's final words: "For those of us in Canada who have been actively engaged in this project, this is sufficient."

Lisa Ricciotti is an Edmonton-based freelance writer.

Mighty '50s Technology

The headline of an *Edmonton Journal* article, dated September 28, 1954, excitedly reports, "Former City Man Works On New Electronic Device—one that allows an engineer on the ground to 'see' and 'hear' an aircraft engine 100 miles away." The story features Neal and his telemetry engineer work with A.V. Roe Canada. The article started with the definition of radio telemetry as "the process which is allowing engineers to study Canadian-made Orenda engines in actual flight, while the engineers sit in a ground station and receive data from complicated instruments."

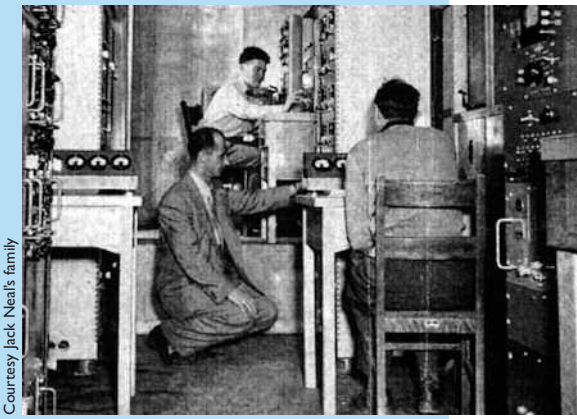
Prior to the addition of telemetry, flight testing could only be done by engineers who accompanied pilots on actual flights. This was undesirable for the Arrow for two very good reasons. First, the amount of data points per flight to be measured on such a complicated aircraft could easily run into several million, making manual handling of the data impractical. An automated system was also needed for easy retrieval of data for research and analysis. Secondly, the Arrow was built in a highly unconventional manner, to fast-track its production. Instead of a series of prototypes, the actual plane was under construction, with ongoing alterations made to the original plans whenever testing indicated the need for changes. This put both the plane—and the lives of its pilots—at high risk, which could only be minimized through extensive structural and systems testing.

In addition, the CF-105 Avro Arrow relied on electronic systems for controls to a much higher degree than any previous aircraft, although it was not a true fly-by-wire design. Its control system was computerized, a then groundbreaking innovation, using an Automatic Flight Control System (AFCS) that worked in three modes: normal (the system assisted the pilot by stabilizing the aircraft without controlling it); automatic (the AFCS controlled the aircraft completely, acting as autopilot and blind-landing aid; and emergency (used in case of a serious failure, such as an engine failure, and also to prevent the Arrow from entering a stall).

As Neal described it: "The Arrow was one of the first aircraft with fly-by-wire controls. It had two sets of servos: one set moved the control surfaces in response to pilot control inputs. The second set operated from the in-flight computer, and would eventually have allowed the Arrow to be guided from the ground to intercept a hostile aircraft."

Initially, monitors from flight simulators were tied in with a coaxial cable to an analogue computer room, some distance away from the simulators. Later, aircraft monitors relayed information during actual test flights back to an electronic telemetry unit housed in a large truck trailer.

A 1955 article from an unnamed magazine in Neal's scrapbook describes the procedure: "From the aircraft, the variables to be measured are converted into electrical signals by a special transducer. These signals are transmitted to the ground unit. Among the data sent are air and liquid pressures, accelerations, rotary and linear motions, temperatures, and various applied forces. These signals are received in the trailer by an elaborate FM unit and recorded on high-speed recorders. The receiver is actually a pretuned 67-channel set. Each channel is fed independently to one of 67 discriminator circuits which will handle only its predetermined signal. The output of each discriminator varies with the frequency of the particular signal fed into it, similar to the action in a home FM radio set."



Courtesy Jack Neal's family

Neal, at top, with other techinicans, kept track of flight tests with visual indicators, continous trace recorders, and electrical signals inside the ground station.

The technology of the '50s was crude by today's standard, but was totally new territory to Avro engineers at that time. The reliability of the telemetry transmission was generally higher than 95 percent. Jim Floyd, Avro's vice president of engineering, liked to describe how "on one occasion a model fired over Lake Ontario hit the water after the test, then skipped out again over the surface—and continued to send back information to greatly surprised technicians at 'point zero!'"

Engineering Scrimma

by Bruce White

Like many successful engineers and oilmen of his generation, Grayson ("Mickey") Hajash (Mining '47) was a farm boy. Born in Hungary in 1924, he was five when his father moved the family to Estevan, Saskatchewan, just in time for the Great Depression.

His father worked in coal mines and a pottery factory—and once fell into trouble with the law for running an informal beer parlour selling home brew in the family's living room. They later moved to the irrigated land around Brooks, Alberta, where Mickey's father worked his way from hired farm-hand to share-cropper to landowner—with the prodigious help of Mickey, his two brothers, and two sisters.

Many of today's prosperous Albertans might be shocked to read Hajash's account of what it took for a poor farm family to survive in the 1930s and 1940s. Their diet was what could be grown and preserved—sausages, sauerkraut, potatoes. A flour sack was recycled into bedding and foot wraps; socks were too expensive for everyday wear.

In high school, Mickey emerged as a natural track and field athlete. He once entered eight events in a provincial track meet in Calgary—including the 120-yard hurdle, even though he'd never hurdled before. He learned by trial and error. After evening farm chores, he set up lanterns and obstacles on the road by the house. The first time he competed as a hurdler, he won first place, plus two other events.

Track and field started Hajash along his path in life. A crew working for an affiliate of the Standard Oil Company was exploring for oil in the Brooks area at the time and young Hajash decided the life of an oilman was for him. Impressed with Hajash's athletic ability, the oilmen got together with some townsfolk to try to find him a track scholarship. They managed instead to secure Hajash a football scholarship to the University of Oklahoma. Even though he'd never played the game, his speed, strength, and enormous hands made him an excellent prospect.

Hajash was thrilled by the chance to attend Oklahoma, which had an excellent petroleum engineering program. He even plotted the three-day journey on Greyhound buses to Tulsa, but Hajash never made the trip. Wartime rules and regulations tripped him up. Uncle Sam considered Hajash not a Canadian but a national of Hungary, which was an ally of Nazi Germany at the time. Stymied by immigration paperwork, Hajash applied to study at the University of Alberta instead. He chose mining engineering because it included the only geology and geophysics courses taught by the U of A at the time.

Hajash remembers he was an average student—although he did bag a perfect 100 in the fire-assaying course taught by E.O. Lilge (Mining '33)—and an excellent athlete. He played football for the Golden Bears, was president of the engineering track and field club, played hockey for the engineers' team, a little basketball, and he wrestled.

Hajash graduated in 1947, only months after Imperial Oil's discovery at Leduc, and Imperial snapped him up.

The Eternal Fires at Kirkuk, Iraq, 1959.

All photographs courtesy Mickey Hajash

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"Mickey" Hajash (Mining '47)

By 1949, Hajash found himself in Imperial's Calgary office working in a bullpen with 14 other geophysicists to interpret seismic data from Alberta's growing list of oil discoveries at Leduc, Redwater, and Golden Spike. That summer, Hajash tried out for the Calgary Stampeders and won a spot on the roster; team practices on weekend evenings made it just possible for a player to hold down a full-time job.

The Stamps, reigning Grey Cup champions, won the western conference in a two-game total-point playoff against Saskatchewan. Hajash was on the field for half the Grey Cup game against the Montreal Alouettes, playing flanker and left cornerback. However, the Als came better prepared for the snow and ice at Toronto's Varsity Stadium. Montreal wore tennis shoes, while Calgary stuck with their regular cleats. Montreal relied on short, soft passes and gentle, looping running patterns on the ice. The Stampeders stuck with running sharp-angle plays and slipped all over the place. Montreal won the game 28-15.

Hajash pocketed a cheque for $500 for the entire season, which he used to buy a good, solid sofa that he still has to this day. It turned out to be his only year in the CFL.

"I realized that for me the best thing to do was concentrate on my job," he says.

Through the 1950s he was transferred to Peace River, Regina, and Edmonton, before deciding during a downturn to apply for a job with the Iraq Petroleum Company, a consortium of western oil companies that included Imperial's parent company Standard Oil. Other than for vacations, Hajash wouldn't return to Canada for more than 26 years.

Baghdad of 1960 was a lot like the city that we read about in the newspapers today. Two years before Hajash arrived, a revolution overthrew the monarchy. There was chaos until 1963 when the Ba'ath party, whose leaders included Saddam Hussein, took charge.

"After the revolution, things were very unsettled," Hajash remembers.

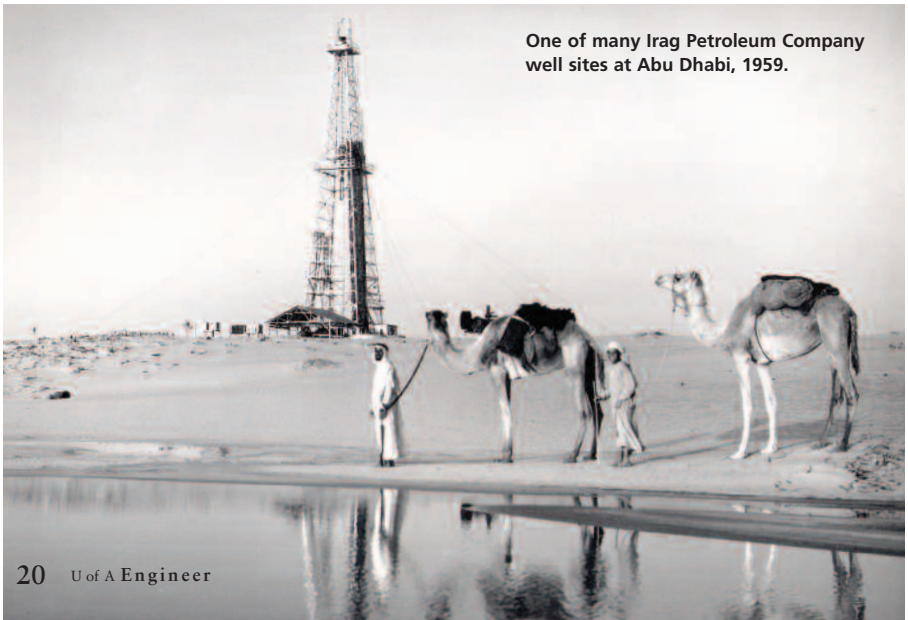
In 1959, Cuban-style revolutionaries tried to take control of Standard Oil seismic crews. One Iraqi ruler was killed when his own air force bombed the presidential palace. Hajash saw bodies which were strung up on light poles on the main thoroughfare and left there for a week as a message to others. Even the Baghdad golf club was an intimidating place; natural gas seeping from the ground nearby burned permanently in a biblical vision of hell.

"It was scary, but for a year and a half, we were able to do some effective work," Hajash says.

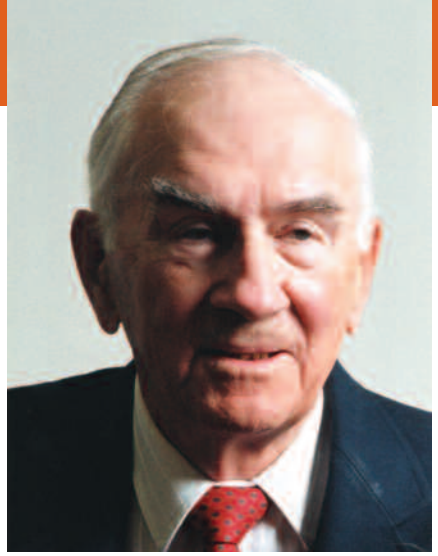
Then the government ended exploration by the Iraq Petroleum Co., a first step towards nationalization. Hajash first moved to Bahrain and then to London as Standard's head geophysicist for the Persian Gulf, spending many weeks a year on field visits to the Middle East.

In 1967, he moved his family to New York for three and a half years as a geophysical advisor at Standard Oil's headquarters in Rockefeller Center—reading through piles of seismic reports during long commutes by train between Grand Central Station and his house in Connecticut. Next stop was Houston, where he ended up in a research job and became involved with offshore projects in the North Sea and South China Sea.

In 1974, after Standard changed its name to



One of many Irag Petroleum Company well sites at Abu Dhabi, 1959.



Exxon, Hajash was sent to Kuala Lumpur to help develop properties in Malaysia's Borneo states of Sarawak and Sabah and off the Malaysian mainland in the South China Sea. After that, oil exploration in the North Sea took him back to London, where he was based until retirement in 1986, which took him to a sprawling ranch house in Victoria's Oak Bay neighbourhood.

Although technically retired for 21 years, Hajash has been anything but idle. He and his wife Donna have a foundation that funds three scholarships at the U of A supporting high-performing students, engineering students, and student athletes.

A few years ago, Gwen McLaws, widow of close friend and U of A classmate Gordie, talked Hajash into putting his stories down on paper.

"She kept saying, 'What an interesting life you've had. Why don't you write a book?' I finally succumbed," he says.

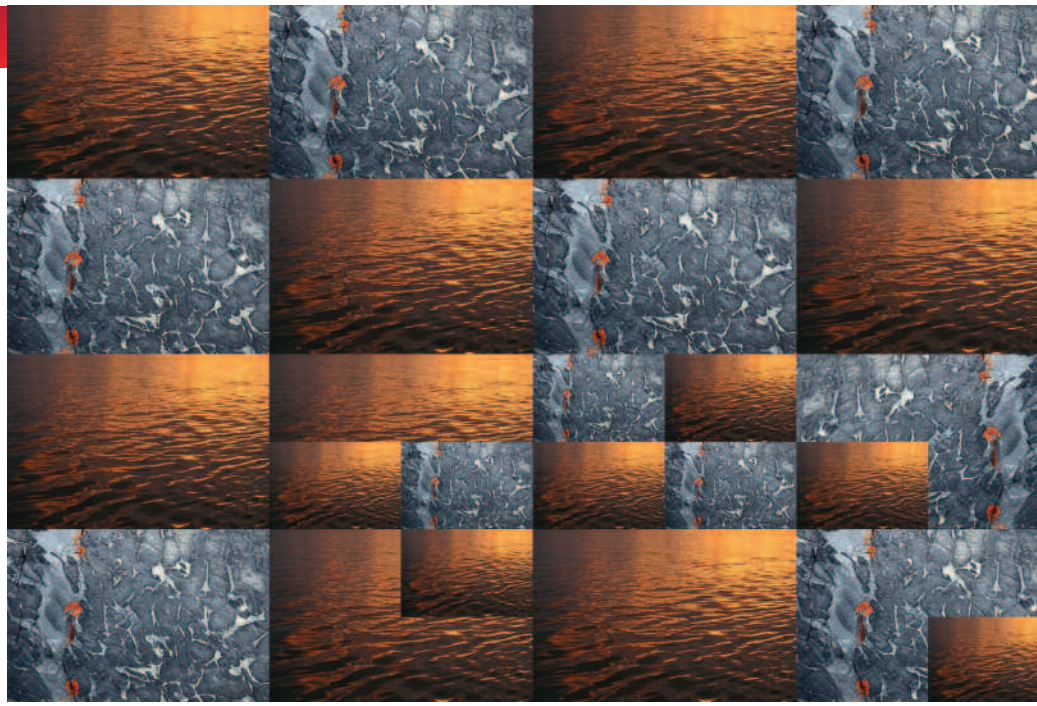
Written with McLaws in a remarkably short five months, the result is an entertaining memoir of life in western Canada. It is a unique oral history of the oil business, not by the guy on top but from the point of view of a hard-working Alberta farm boy who began with mud on his shoes and worked his way up through the ranks.

The books title sums up Hajash's life beautifully: *It's Been Fun*.

Copies of *It's Been Fun* by Mickey Hajash can be obtained by sending a cheque for $15 to G.M. Hajash, 3160 Ripon Rd., Victoria, B.C., V8R 6G5. Proceeds are donated to charity.

Bruce White is an Edmonton-based business writer and editor.

engineer.alum @ualberta.ca



Civil Engineering

Hunter, Carl (Civil '61, MSc Civil '67)

I was delighted to read the article "2016 A Nuclear Odyssey" in the spring 2007 issue of *U of A Engineer* about Jerry Sovka's achievement as the ITER project's construction manager. ITER represents an enormous international technical, political, and economic effort.

I am pleased to hear of his success because in 1980, as a principal of The Dalcor Group consulting management engineers, I completed an industrial benefits and economic assessment study of INTOR, ITER's earlier vision.

INTOR, as I recall, got its name from International Tokomak Reactor, which was a multinational effort led by U.S.A. and Russia. As the startup electric energy required for this type of facility is enormous, it was decided that British Columbia, Canada, with massive hydro power generation, would be the proposed site supported by the U.S.. Russia proposed Finland, which is equally well endowed with hydro power. The project was to cost billions of dollars even in 1980, but the technology benefits of hosting the facility were also significant—so B.C. and Canada were keen to see INTOR succeed.

Unfortunately, costs, politics, and technical uncertainties prevailed, and the INTOR facility was never started. As the above article mentioned, Canada lost interest and withdrew participation from fusion energy development in 2003. So far as I know, there is now only one technical person with Natural Resources Canada in Ottawa who monitors global fusion activity on a part-time basis. This country is very lucky to have the sort of talent that Jerry Sovka has so that we can contribute to, and gain knowledge about, the ultimate energy source.

Please send my regards to Jerry Sovka if you have contact with him.

P.S. The Dalcor Group also included John McDougall (Civil '65), now CEO of Alberta Research Council.

Mechanical Engineering

Labossière, Dr. Pierre (PhD Mechanical '87)

Dear colleagues and friends from Canada and abroad,

Many of you who have worked with me, attended the same conferences, or travelled in my company know that photography has long been a passion of mine. However, few of you have ever seen my work. Therefore, with great pleasure, I wish to inform you that the Art Gallery of the Université de Sherbrooke (Galerie d'art du Centre culturel de l'Université de Sherbrooke) invited me to exhibit my photographs from the Arctic to complement an exhibition of Inuit art. The major exhibition of Inuit art, on loan from the Québec National Museum of Fine Arts (Musée national des beaux-arts du Québec), was shown last year in the Louvre in Paris and then spent some time in Reykjavik, Iceland. It stopped in Sherbrooke on its way back to Québec City. I was extremely honoured to be invited to display my work in such an exceptional setting; this is why I hope that you will forgive me for this message that may be viewed as somewhat self-promotional.

Top: Pierre Labossière, 70° Nord – Panorama reconstruit, (Détail). 2007. Impression numérique, 490 x 97 cm.

Below: Pierre Labossière, Bloc de glace à la dérive# 2 - Détroit de Franklin, Nunavut, Canada, 2006, Impression numérique, 30,5 x 20,3 cm.

May I suggest, if you are ever in Quebec, that you consider a one-day side trip to Sherbrooke, a lovely drive from Québec City through Beauce and the Eastern Townships, to visit our university laboratories and, on the same occasion, that you visit the Inuit and photo exhibitions, almost next door to the engineering building on the campus. It would be a great pleasure to meet you.

Soo Ping Lim
(Mechanical '74)

Parliamentary MATTERS

by Hanna Nash

In 1970, without a particular university or even a country in mind, an eager **Soo Ping Lim** (Mechanical '74) decided to try his luck at getting a scholarship to study engineering outside of his home in Singapore.

That year, Lim, along with 10 other Singaporean students, was offered the Colombo Plan Scholarship (a scholarship set up among the Commonwealth countries) to study in Canada and pursue a degree at the U of A.

"Because of cost and so on, a scholarship was one way of getting a university education without my parents having to take on the burden of paying for my education," Lim explains.

"It was like hitting the jackpot. There weren't that many scholarships given out. A scholarship to study abroad was even better because it gave me the chance to be exposed to other cultures and to other people."

Since his time at the U of A, Lim's interests and career have taken him to paths both within and beyond mechanical engineering. He has used his background to lay a foundation for more schooling and policy work with the government. He was also recently appointed as Singapore's auditor general, only the republic's third since its independence in 1965.

Mechanical engineering seemed like a favourable career choice when Lim first developed an interest in the field in junior high. In secondary school, he combined his interest in physics and math with a delight for playing with mechanical toys, making the opportunity to study engineering abroad the perfect way to start his career.

During his four years at the U of A, Lim stayed at some of the usual residences—Henday Hall, Newton Place, and Concord Tower.

"There was no better way for me to get to know Canadians than to be living among them," he says.

Lim also spent much of his time with a Canadian host family, the Schurmans, from Sherwood Park. He took part in their Christmas celebrations and continues to stay

"I was glad to be part of the national effort to enhance the physical infrastructure of Singapore, which became a sovereign nation only five years before I left for studies in Canada," Lim says.

in contact with them. In 1992, while visiting the U of A with his family, Lim was able to see his host family again. They returned the favour, visiting him in Singapore in 2001.

Lim also maintains strong relationships with many of his former classmates. One such friend is Tsun-yan Hsieh (Mechanical '74). Also from Singapore, Hsieh studied at the U of A under a Canadian International Development Agency scholarship. Hsieh now works in Singapore as the chair for Mckinsey and Company, a managing consulting firm for businesses and institutions around the world. He remembers Lim fondly.

"We shared an apartment together in the final year of engineering," Hsieh recalls in an e-mail interview.

"He is a dear friend—always there when someone needs a sympathetic ear. Oh, and he never loses his cool even when things get tense."

After Lim finished his mechanical engineering degree with distinction, he stayed at the U of A for a few months to complete a fluid mechanics project. He then went on a short vacation to Europe before returning to Singapore. When he arrived home, Lim was immediately enlisted in the Singapore Armed Forces (mandatory for all adult males in the republic). While in the military, Lim was trained as a combat engineer and served as a platoon commander in an infantry battalion in the reserves.

In 1975, after completing his military service, Lim began work at the government's Public Works Department as a mechanical engineer in infrastructural development projects. As Singapore was still a very young republic, Lim's engineering degree came in handy. He helped his country create important buildings including the Long Range Radar System Building for the Changi Airport. As a mechanical engineering, Lim specialized in the design of air-conditioning and ventilation systems in buildings. He also supervised the installation of the systems he designed.

"I am glad to have been part of the national effort to enhance the physical infrastructure of Singapore, which became a sovereign nation only five years before I left for studies in Canada," Lim says.

"I am pleased to have put in good use my engineering knowledge and instincts acquired at the U of A. I made use of most of the engineering subjects I took. Except heating! No such need in equatorial Singapore!"

Mechanical engineering was not Lim's only interest. He decided to pursue further education in engineering and business. In 1979, he completed a Master of Science degree in industrial engineering from the University of Singapore. He went on to achieve a diploma in business administration in 1981 from the National University of Singapore.

Despite his success in his field, Lim was not content to work with the same subject matter for the rest of his career. He continued to work for the Public Works Department until 1988, when he decided that he wanted a change in career. His broadened education and hard work paid off when he applied for a position with the Administrative Service to work at the policy level in government.

"I switched to policy only because I felt the need for greater challenges in my career in government," Lim explains.

"I therefore decided to take quite a big leap by applying to go into policy, which means that I get to work in the headquarters of different ministries and serve the political leadership."

Between 1989 and 1996, Lim worked for the Ministry of Home Affairs, where his first appointment was as director of planning.

His work in policy also shaped new paths for him. He was appointed director of operations and then deputy secretary. In all, he has handled diverse areas such as Security, Emergency Planning, Immigration, Rehabilitation, Primary Production, Building and Construction, Information, and Arts and Culture.

Then, in August 2006, Lim found out that he was being considered for the position of auditor general. His position as a senior

Lim (second from left) poses with his Canadian host family, the Schurmans.

member of the Administrative Service made him eligible for the nomination. The possibility represented another huge career leap.

Singapore's auditor general must be a responsible person who understands how the government works, Lim says. The auditor general reports to Parliament about any inefficient government spending. For that reason, the candidate must be approved by the the president of the republic who is advised by the council of presidential advisors.

In December 2006, Lim received a letter confirming that he would become auditor general. To ensure his independence, Lim retired from his Administrative Service career. He was officially appointed as Singapore's new auditor general on February 8, 2007.

"I felt very honoured to be given this job," Lim says.

"In the whole of the 42 years of Singapore there were only two previous auditor generals. So I am the third one, you see. It is really an honour to be appointed to carry out this responsibility."

The new job has been a challenge, Lim admits, but he feels ready to handle it. He has an excellent team working with him, and is equipped with a clear, simple objective: to gain the respect of government departments, parliamentarians, and, most importantly, the public.

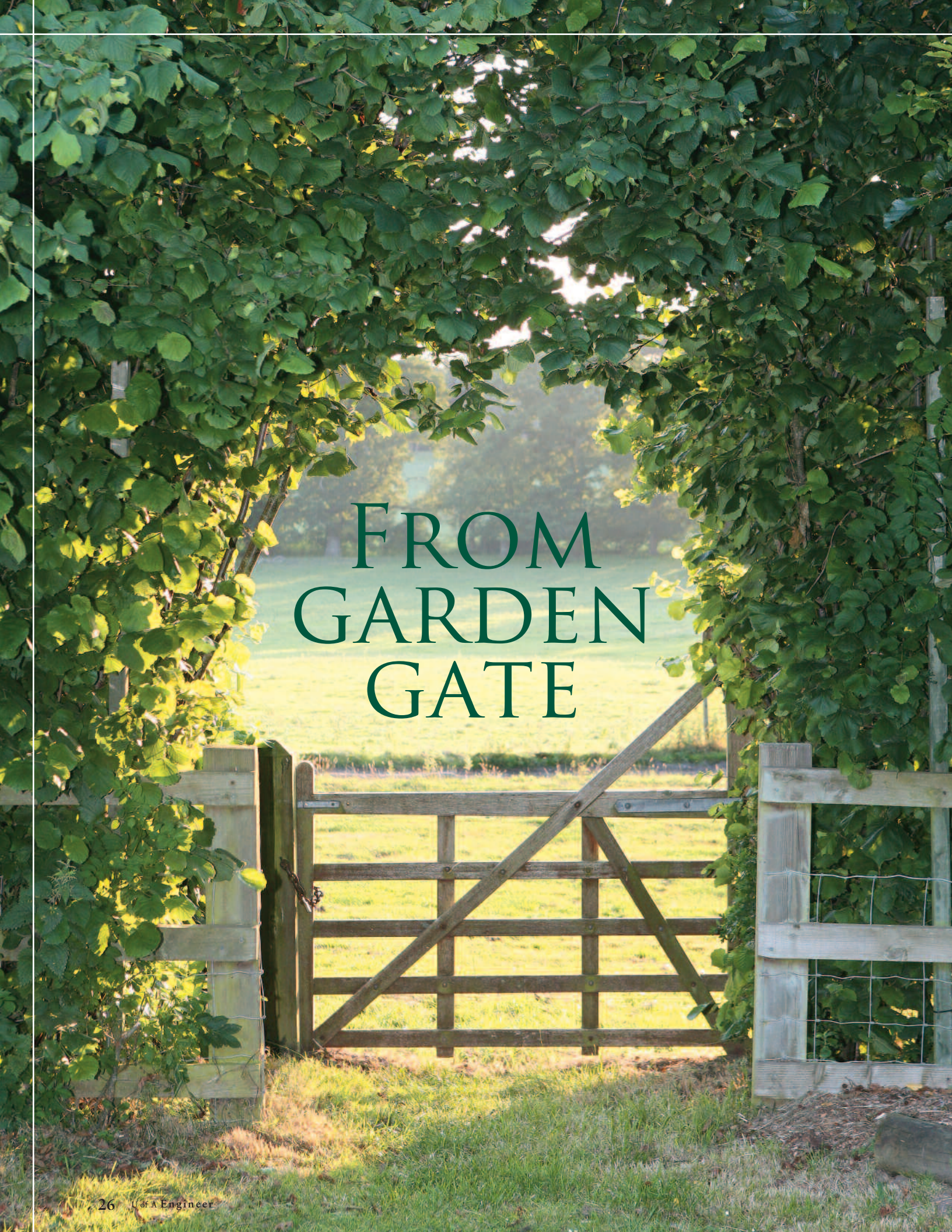
Although he no longer supervises contractors directly, Lim still draws on his first career as an engineer. His engineering background has shaped his thinking, and has allowed him to understand the challenges government departments face at their operational level.

He performs operational audits (he also refers to them as value-for-money audits) with officers with an engineering or management background. They work together to prevent public funds from being wasted "due to poor project evaluations and management, and lack of rigour in capital expenditure scrutiny, especially in times of economic prosperity."

Lim's new role has kept him busy learning about the technicalities of government audit work, and working with staff to plan organizational improvements and future directions.

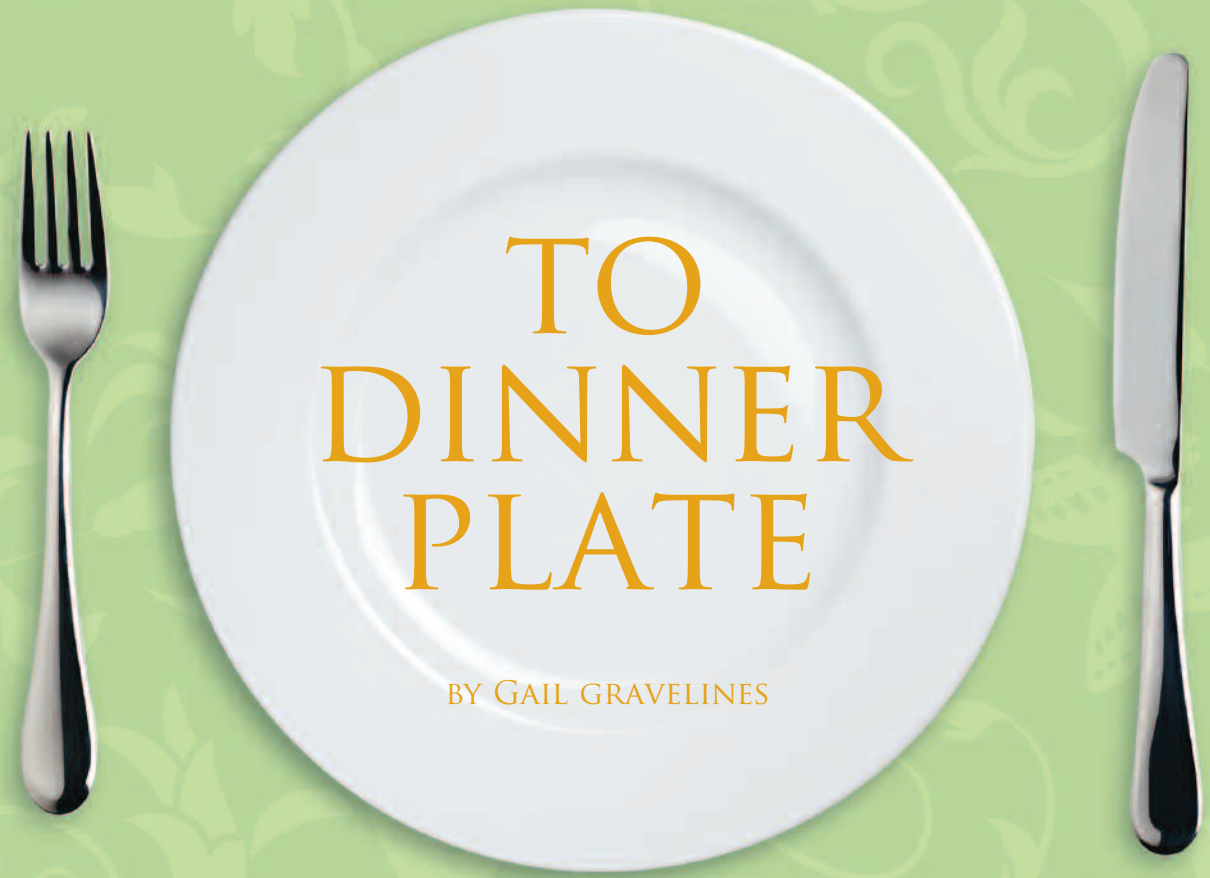
After leaving Singapore as a young student, Lim has devoted decades to making his country a better place.

Hanna Nash is an Edmonton-based freelance writer.



From Garden Gate

It's noon at the Sunterra Market, Trans Canada Tower location, and the Calgary corporate lunch crowd is descending in droves from the adjacent office towers.



TO DINNER PLATE

BY GAIL GRAVELINES

Just two minutes later, a throng of people clusters around the Sunterra salad bar. A line has formed at the hot food advertising a Rancher's Beef steak sandwich luncheon special. A well-dressed young man clips past it, nudging his colleague, saying, "Hey, Thursday is butter chicken day. Let's go!"

From office clerks to CEOs, a seemingly endless stream of customers peruses the offerings at Sunterra's French-market-style eatery. The bustling crowd reflects the ongoing success of the enterprising Price family of Acme, Alberta. It's also a testament to innovative thinking—a strength Art Price (Mechanical '73) comes by naturally.

"Sunterra is the product of a visionary family, father, mother, and siblings," observes Price, chair of both The Sunterra Group of Companies and Rancher's Beef Ltd., a consortium of 50 ranchers, farmers, and feedlot owners from across Alberta and British Columbia, of which Sunterra is a major shareholder.

"It's about a fundamental value proposition of providing quality, convenience, and freshness to customers."

For three generations, the Price family,

Art Price (Mechanical '73)

owners and managers of Sunterra, have built a thriving "farm gate to dinner plate" business. At the time the Prices started, most producers saw beef as strictly a commodity-based business that ended at the feedlot.

The Sunterra Group started as single, central Alberta mixed farm and has grown to an integrated family-run business that produces grain, forage, and livestock through to processing and on to retail. From a single section of land in Acme, Alberta in the early 50s, Stan and Flo Price and their children, partners, and staff have grown the operation to include 600 employees, 45,000 acres of cropland and pasture, and six Sunterra Market retail outlets in Calgary and Edmonton.

Price, the second-born of Stan and Flo's eight children, says Sunterra is not a mainstream bet, not something business consultants would readily recommend. And that suits him just fine.

In fact, Price has made a career of betting outside the mainstream. In his thirties, he served as president and CEO of Husky Oil Ltd. and Husky Oil Operation Limited. During his decade-long tenure (from the mid '80s to the mid '90s) he led Husky's building

Price has made a career of betting outside the mainstream.

of Alberta's first oil upgrader in Lloydminister, with current capacity to produce 54,000 barrels of synthetic crude oil a day.

He then spent a few years as special advisor on international investments to the chair of the board of Hutchison Whampoa Limited, one of the largest companies listed on the main board of the Hong Kong Stock Exchange. Here, Price added to his knowledge of the workings of a leading international corporation and its diverse array of holdings—from port operators to retailers to technologically advanced and marketing-savvy telecommunications operators.

In 1995, Price joined Calgary-based Axia NetMedia Corporation with the vision of creating a company that, as his corporate biography says, "would meet the full spectrum of Internet protocol-based communications needs for businesses and consumers."

Consider that, in 1995, most companies were still getting accustomed to e-mail. Two computer science majors at Stanford University had just met and were about to begin developing the computer search technology that would become the foundation of Google Inc. And the vast majority of rural Albertans were chained to traditional telecom-provided dial-up Internet.

"When I'm in a business, I am giving it 100 percent. And I'm spending the other 40 percent of my time thinking about my next business," Price says of his years before Axia.

While he wouldn't trade his experience at Husky, he had always wanted to create a company.

His leap from oil to Axia NetMedia may have surprised many (a 1999 *Canadian Business* article on Price, dubbed Axia "a holding company that few people can figure out") but Price says Axia is a continuation of a connective theme in his varied business life: quality service, a theme steeped in the successes of Sunterra.

Today, Axia provides network access services to the Alberta Government's Supernet, providing high-speed connectivity to Albertans in 429 communities and to 4,400 government, learning, health, library, and municipal locations. The company has successfully leveraged its Alberta experience to now provide its Real Broadband services to the Government of France.

Axia reported a ten percent increase in revenues from its Real Broadband sales and value-added services in its second quarter of 2007—up to $12 million from $10.9 reported for the first quarter of its fiscal 2007. Net income also rose to $4.7 million from $3.1 million from the same fiscal period in 2006, partially as a result of revenue from the France operation.

"Alberta is unusual in that our rural economy is the big player in all of our businesses. All the important businesses that drive this,"

Price says, pointing to the Calgary skyline from Axia's 33rd-floor offices, "are rural based. Oil and gas is rural, pulp and paper, mining, agriculture. It's the world we live in. And, if you're doing important things in Alberta, you're doing things that leverage the rural economy. I'm trying to make a positive impact from an Alberta base to the world.

"Successful businesses start with thinking about the ultimate value proposition to the customer. Once you understand that evolution, and line up with it, you have something. Look at Sunterra Markets. This is not a fad thing. It is a fundamental value proposition of providing customers quality, convenience, and freshness. This is how you create a brand."

Price says he would call his approach to business aggressive, perhaps rebellious. He has made his way by going against current market wisdom, leading organizations that go against the stream. He offers some examples.

"Why can't we accomplish a petrochemical industry in Alberta? Or an oil upgrader? Why can't we create downstream value-add to a farming business instead of simply selling grain off the farm? Why can't we move the beef industry from a big, commodity-based business to a specialty value-added niche business?"

That same questioning led Price to Axia.

"Why can't we accomplish uncompromised world connectivity? Why was there a digital divide between Edmonton and Calgary and the rest of Alberta? Why can't a group of Alberta-based people accomplish all of these things? Why would we? Will it make a difference? Will it make a good, profitable business?"

Unfettered by the legacy systems and traditional operating models of the monopoly telecom providers, Axia was able to provide a fresh look at how to provide effective connectivity to Alberta.

"We started with a blank sheet of paper and asked, what's the right answer?" says Price.

The answer was to create an open Real Broadband network that any Internet service provider can connect with, to give rural dwellers rates comparable to those paid by urban customers.

"Real Broadband access is now a critical piece of all national economies, a necessary national infrastructure in this age, just as transportation was in the last century. Axia is now where we want it to be in terms of a track record and having a meaningful impact in a lot of places."

Key to his company's continued growth is creating high performance teams with the vision to see what will happen next and position the company in that spot.

And of course it's also about delivering value to the customer. Delivering value from farm gate to dinner plate . . . or to desktop!

Gail Gravelines is an Edmonton-based freelance writer.

Pioneer of Electrical Safety

by Lisa Ricciotti

Ralph H. Lee (Electrical '34)

You could tell a lot about Ralph H. Lee (Electrical '34) by the way he walked.

"He was a tall man, who moved fast," says Don Zipse, a forensic electrical engineer from Pennsylvania, describing his former mentor and friend.

"I remember walking with him to an Industrial Application Society (IAS) conference in Chicago, where he was presenting a paper. I had to take two steps for every one of his."

In more ways than one, Lee was always a step ahead. Now recognized as a pioneer of electrical safety, Lee was the first to draw attention to a significant but previously ignored hazard: electric arc flashes. In his seminal paper "The Other Electrical Hazard: Electric Arc Burns," presented in 1982 at a Philadelphia IAS annual meeting, he argued that they posed as great a risk for burns as electric shocks.

"There is another hazard which few appreciate, which we do not even need to touch to incur injury," wrote Lee. He went on to describe and quantify the skin tissue damage that arc blasts can cause.

Lee was the first to scientifically study the problem of electrical arc burns. Although his formulae clearly estimated the amount of arc energy (incident energy/heat) produced by electrical arcs, and defined the degree of burns involved, the electrical industry was slow to respond. A full decade passed before companies began to recognize that the hazards of arc flashes were significantly different from those of electric shock. Over time, though, their understanding grew.

The petrochemical industry was among the first to establish practices to protect employees from arc flashes. Gradually, more and more companies and safety personnel fell in step with Lee's ideas and lobbied for change. By 2002, enough momentum had been gained to result in widespread changes in federal regulations, building codes, design of electrical equipment, and safer work and training practices. Advances had also been made in personal protective equipment, such as flame-resistant NOMEX clothing.

Although Lee didn't live to see the changes his 1982 paper set in motion, he undoubtedly would have been thrilled. He never stopped learning, and loved nothing more than having his ideas challenged along the way to new solutions.

Gene Fagan, who worked with Lee at DuPont from 1950 until Lee retired in the late 1970s, recalls, "Ralph never minded if you disagreed with him. If you found a mistake in his work or his theories, he was happy you did. He wasn't afraid to discuss and share his ideas with everyone, and was very happy to include other people's ideas if they were better. He was never possessive about his knowledge—a wonderful characteristic to have."

Zipse has a favourite anecdote to illustrate Lee's helpfulness. After Lee retired and started his own consulting company, Zipse developed a habit of inviting him to lunch, taking advantage of the time together to pick his mentor's brain.

"Over lunch, Ralph would freely consult with me, and guide me toward the solution to my problem. One morning when I called to invite him, Ralph said, 'Don, I am very busy today and don't have time for lunch. So tell me, what's the problem?' Then he proceeded to give me the solution over the phone."

Both Zipse and Fagan remember Lee's amazing capacity for original research and writing.

"He was a great author, and wrote many, many papers," says Fagan, who co-wrote several important papers with Lee.

"It was very appropriate that the Institute of Electrical and Electronics Engineers (IEEE) IAS Ralph Lee Prize Paper Award was set up

A Flash of Inspiration

How One Paper Changed Electrical Safety

There's no warning before an electrical arc flash explosion, no time to flee, not even time for fear. It strikes faster than the speed of light, in a violent explosion of radiant energy. First, there is a retina-searing flash of light. In less than a tenth of a second, temperatures spike to 22,000° C, four times as hot as the surface of the sun. Almost simultaneously, a blast of sound assaults the eardrums. Fast-moving pressure waves, strong enough to crush a chest, rush outward, hurling debris from the explosion and other objects at speeds higher than 1,300 km/h. In less than a tenth of a second, even without direct contact, it can melt flesh and ignite clothing, causing fatal burns at distances up to 1.5 metres, and major burns at up to three metres. It's an electrical worker's worst nightmare.

The impact of electrical arcing on humans is well documented. Those who escape with their lives can still suffer hearing loss, blindness, burns severe enough to require skin grafts, damage to lungs or other internal organs, neurological damage, or injuries from being knocked off a rooftop or ladder. CapSchell Inc., a Chicago-based workplace safety organization, reports that flash explosions send workers to special burn centres five to ten times every day. And that tally doesn't include less severe incidents and near-misses, says Dr. Mary Capelli-Schellpfeffer, the firm's principal investigator.

Not surprisingly, electric arc flashes are a major safety concern in the electrical industry. New regulations to specifically address arc flash safety were introduced in 2002, along with guidelines for the use of personal protective equipment such as flame-resistant NOMEX clothing. The Institute of Electrical and Electronics Engineers (IEEE) developed nine key steps to analyze arc flash risks, and some companies now take it one step further by conducting hazard analysis with software programs designed to calculate flash protection boundaries. New research into the many variables of arc flashes continues to provide a lively topic for debate.

With the emphasis they receive today, it's interesting to note that electric arc flashes weren't such a hot topic just 25 years ago. Although workers and the public had a healthy respect for the power of electricity, their focus was on avoiding shock and electrocution. Today, statistics show that electric shock is not the main cause of electrical injuries and fatalities; instead 80 percent are due to arc flashes. But back then, arc flashes received little attention.

The emphasis began to change in 1982, with the publication of an IEEE paper that has since become a landmark in the field of electrical safety. Titled, appropriately enough, "The Other Electrical Hazard: Electric Arc Blast Burns," it was authored by Lee, a former senior design consultant with DuPont.

During his long career at DuPont, Lee worked on the design and start-up of nuclear reactor control systems, military explosive and commercial chemical and textile manufacturing, improved performance of motor installations, industrial distribution system coordination, and switchgear and grounding systems.

Today, however, Lee is largely remembered for his work with electric arc flashes and blasts, mostly done after he retired from DuPont. His theories on how to prevent arc flashes and how to protect workers from them, considered radical at the time, have gone on to become mainstream practices. Over the past 25 years, occupational safety figures show a 50 percent reduction in electrical fatalities. Thousands of NOMEX-clad workers, in safer environments, have Lee's 1982 electric arc blast burn paper to thank for that.

in 1986 after his death, as an annual award to honour his memory."

"I aimed my life after Ralph's," says Zipse.

"I wanted to follow in his footsteps, and I was very proud when I was made an IEEE Fellow in 1994. Ralph was one of the first industrial electrical engineers to make Fellow. They weren't thought of highly back then, and it took three nominations before he was elevated. I made it the first time, which says a lot about how things had changed. I think Ralph was greatly responsible for the increased respect industrial engineers now receive. He was a gentleman and a scholar, a very good man."

Lisa Ricciotti is an Edmonton-based freelance writer.

Notable Achievements

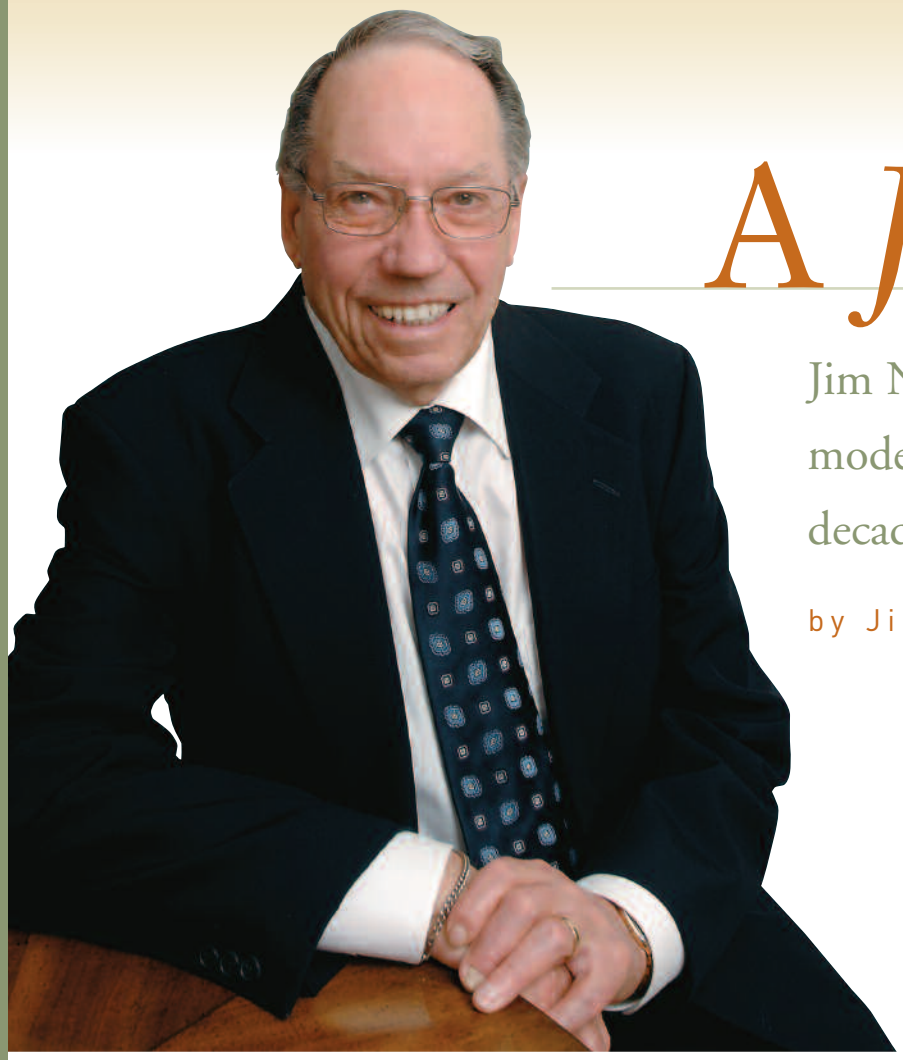
- Three landmark papers on electrical safety that stand up to scrutiny today, after 25 additional years of research and technological advances in the field:

  "Electrical Safety in Industrial Plants" (1971)

  "The Other Electrical Hazard: Electric Arc Blast Burns"(1982)

  "Pressures Developed by Arcs"(1987)

- Promoted the use of rebars in structural footings as a building's grounding electrode. First developed the idea of "grounding to rebar" in a prize-winning IEEE paper co-written with Gene Fagan, published in 1970.
- His work on high-voltage cabling splicing helped bring in a new standard of testing at 100% at the factory level, resulting in less downtime and a lower failure rate.
- One of the developers of IEEE Standard 902, "Guide for Maintenance, Operation, and Safety of Industrial and Commercial Power Systems."
- Recognized with an IEEE IAS Outstanding Achievement Award in 1976.



A *Jim* of all

Jim Newby turned a talent for model-building into a four decade legacy.

by Jim Veenbass

Even when Jim Newby (Civil '52) was a little kid he was attracted to changing the landscape. Whether his materials were wooden blocks or Meccano sets he was able to conceive of different kinds of structures and make them face the elements—gravity, weight, or wind—right there on the living room floor.

"I have always been intrigued by building structures, the desire to design them is in my blood," he says.

When Newby and his partner Gord Duthie (Civil '55) opened Duthie, Newby, and Associates in 1963, he had no way of knowing his manual dexterity and tenacity would help carve out some of Edmonton's landmark buildings. Some of his handiwork can be seen St. Basil's Church, the University of Alberta Cancer Centre, the University of Alberta Hospital, and the MacEwan College

One of the first projects he worked on was Edmonton's Groat Bridge, which spans the North Saskatchewan River just west of downtown. When Newby drives across the bridge, he can't help but reminisce. When he began working on it in 1952, he was fresh out of the University of Alberta's civil engineering program. At the time, it was one of the city's biggest construction projects. With Dr. Ralph McManus (Civil '42, MSc Civil '46) and others from Structural Engineering Services Ltd., Newby spent the summer analyzing and designing the bridge's superstructure.

"It was a big project for a young guy to start with," says Newby.

"I had a few projects under my belt by that time, but it was important for the city and it was exciting. I designed bridges that were much more challenging later in my career, but I enjoyed this one; lived close by and could watch it being built. It was a bridge to be proud of."

Completed in 1955, the 305-metre concrete bridge was a good test of his skills. The loading and designs were calculated with a slide rule and using the old logarithms tables. It took him and his associates at least three months to complete an analysis of the bridge, something that can now be done in under three hours.

Within a few decades of the bridge's construction, computers began to revolutionize the industry. Newby was one of the first to adopt new engineering practices; he developed a lifelong fascination with computers. He started creating engineering programs in the 1970s, and didn't stop until his retirement in 1993. He was determined to keep his company on the cutting edge, even if it meant

The Groat bridge in Edmonton, Alberta.

countless hours tinkering with code. When no one was around, he would slip back to the office at night and rewrite programs.

His programs are still being used by his former colleagues, and he occasionally gets requests to develop and refine others. When Orlan Weber joined the firm in 1973, Weber was amazed by Newby's ability to keep pace with the latest developments in the industry.

"Jim really adapted to the changes and was always aware of the latest codes. You never got the impression that he was just putting in time. He really enjoyed what he was doing and that rubbed off on the people around him."

His expertise was in the design of concrete, whether it be structural or architectural, cast in place or precast, reinforced or prestressed, or preferably a combination of all. He did, however, keep up with the latest technology concerning all other construction materials, including metals and timber. Later in his career he became interested in the study of very light structures such as air-support domes and tents.

Newby has always been eager to acknowledge that he owed his success to his partners and the technicians in their firm, and also to the many great engineers he worked with along the way. Dr. Ralph McManus, Dr. Leroy Thorssen (Civil '39), Dean Robert Hardy (Electrical '66, PhD Electrical '71), and Sir Edmond Happold to name a few.

"I loved my work, I loved my life, I couldn't have been happier," he says.

More than four decades after hanging a tile on the streets of Edmonton, Newby is still the same little kid who could build anything.

Originally published by Alberta Venture, *this article has ben reprinted with permission from the Consulting Engineers of Alberta.*

A Trophy Bridge

How a once hungry farm boy became the lead engineer of the Dunvegan Bridge.

by Scott Messenger

In the den of his quiet Riverbend duplex, Ralph McManus (Civil '42, MSc Civil '46), 87, takes a tiny silver trophy from a bookcase.

"I'll tell you a cute story about this," he says.

"I was teaching at the University until 1956, when they had the men's faculty club golf tournament. I won the cup, which is this little thing here. I've never posted any information about myself on the Internet, but I looked myself up and it said I won that tournament.

"That's my history!" he says, replacing his memento.

McManus finds it funny that, at least on the Internet, a golf tournament should eclipse the defining accomplishments of his 50-year career.

Over his desk hangs a painting of the Dunvegan Bridge, which has spanned the Peace River along a northern stretch of Highway 2 since 1960.

"That would probably be the highlight of my career," McManus says.

Artwork by Keith Walker www.peakexperienceimagery.com

The only highway suspension bridge between British Columbia and Ontario, the Dunvegan Bridge stands out as one of the most challenging projects of McManus' five decades in engineering. The bridge is showy, with towers that are 70 metres high and enough lengths of arching cables to run from Edmonton to Vancouver and back.

Suited to an autumnal colour scheme, the bridge's towers are brown, its sides cream, and its cables orange.

"That was our attempt to be something more than just engineers on that job," says McManus.

"Up until that time you could have any colour of black you wanted."

McManus moved to Edmonton in 1936 from a desiccated southern Alberta family farm, seeking a university degree. In the depression-era job market, engineering seemed a good bet.

"Today you probably have a hundred options to consider," he says.

"I chose civil engineering, and that was it. And it so happened I liked it."

McManus earned his degree in 1942 without ever having to write final exams—a concession granted by the University in exchange for agreeing to put his new skills to work building the Alaska Highway.

Since the wartime government felt he could serve his country better in the classroom than in the army, McManus also taught civil engineering at the University of Alberta. He picked up a Master's degree along the way, and began a two-year sabbatical in doctoral studies at the University of Illinois in 1949.

"When I went back to teach at the University of Alberta," says McManus, "I intended to stay there forever. I didn't. We got into the consulting engineering business when the big trucks started tending the oil wells."

Smaller bridges across the province were buckling under the weight of trucks laden with oil and heavy equipment. The department head of Civil Engineering at the university, Dr. "Chick" Thorssen (Civil '39), proposed to the provincial government a series of precast concrete bridges. McManus was hired to design girders, pilings, and caps strong enough to support Alberta's industrial revolution. In 1952 the two men formed Structural Engineering Services Ltd., and recruited Tom Lamb as a partner in Calgary.

McManus' double career as professor and consultant didn't last. Oil and gas pipeline crossings over B.C. rivers made classroom obligations hard to meet. The Groat Road Bridge, completed in 1955 for the City of Edmonton, would be one of the few projects located close to home. Upon accepting the Dunvegan Bridge contract from the Alberta Department of Highways in 1956, McManus left his post at the university. A year later, he was a full-time consultant.

The Dunvegan Bridge remains an anomaly on the prairies, where slower, shallow rivers allow for conventional crossings. The Peace's flow rate and bed instability meant supporting piers would have to extend far below the shifting sediment.

"You don't decide it's going to be a suspension bridge immediately," says McManus, who led design from the deck up.

"Suspension reigned in costs. We got the whole thing for about five million. It was a real bargain."

Now, similar bridges cost more than $50 million.

In 1960, thanks to the work of two dozen engineers and a building crew of up to 60, the bridge was complete. The bridge deck stood 30 metres tall on just two 320-tonne steel towers. At half a kilometre long, it was Canada's fourth longest suspension bridge. Depending on the temperature, the bridge is designed to rise or fall a metre. Any structure has a certain amount of give; on a hot summer day the Dunvegan will expands and drops. On a cold winter day, the materials contract and the bridge rises.

"It was a real challenge," says McManus.

"We did not have personal computers. The slide rule was the weapon of design. We did have some computer assistance, but it was in Los Angeles. We had to hook up by telephone, and because of the long distance they would come back (with answers) 45 minutes later, and sometimes the whole thing would be lost."

Bob Morison (Civil '54), who was McManus' student before becoming an engineer with the firm, says his former professor was a determined worker.

"McManus had a passion for engineering," says Morison, "and wasn't afraid of looking at new ways of building."

As resident engineer in the summer of 1960, Morison provided then-Premier Ernest Manning with the wrench for the ceremonial fastening of the last gold-plated bolt, officially opening the bridge. The ferry that had linked the towns of Peace River and Grande Prairie became history. So did the annual freeze-up of the region's economic development. About 15 years later, McManus traded managing the consulting firm for overseeing construction projects for the Alberta government. He retired in 1989, and now says he enjoys doing as little as possible.

"I really have had a happy career. I've been lucky. If I were offered an opportunity to relive my life, I wouldn't take it, for fear that I might mess it up this time."

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BADRY, MICHAEL

(Civil '05) EIT

won a 2007 Showcase award of excellence in project management from the Consulting Engineers of Alberta for his work on the National Institute for Nanotechnology. This multi-disciplinary, multi-owner facility houses laboratories for nano-scale research. The $65 million building is one of the quietest in Canada, designed to provide ultra-low vibration and minimal acoustic noise and electromagnetic interference. Badry is with Stantec Consulting Limited.

BARR, ANDREW

(Civil '88, MSc Civil '92) PEng

received an award of merit in sustainable design from the Consulting Engineers of Alberta at their annual Showcase Awards. This was for his work on the Bearspaw Water Treatment Plant—Residual Treatment Facility. The Facility treats wastewater and recycles the treated water back to the plant. Residual solid waste is sent to a landfill. This process saves approximately six percent of the water taken from the Bow River and removes discharges that were historically sent to the river, thus preserving water resources and protecting the environment. The judges commented that it was a sophisticated application of technology toward a sustainable future. Barr is with Associated Engineering Alberta Limited.

BASHIR, NASEEM

(Electrical '92) PEng

won two awards from the Consulting Engineers of Alberta for a long-term power generation planning study: an award of excellence in the natural resources, mining, and industrial category and an award of merit in the studies, software, and special services category. Bashir is with A.D. Williams Engineering Inc. His firm was retained by Faconbridge Ltd. to recommend a power generation solution appropriate for the mine development plan at the Raglan Nickel Mine in Nunavik, Quebec. The plan defines the mine development sequence, resource requirements, expansion timing, and minimized operating costs and impact. Ten generation and load scenario combinations were identified and evaluated based on proposed generation criteria. Recommendations were made for future installations. This process provided significant value to Falconbridge, allowing future installations to be rationalized and planned to minimize construction costs and disruptions to mining operations.

CARTER, JAMES E.

(DSc [Hon] '04) PEng

has been appointed to the EPCOR board of directors. Carter is the former president and chief executive officer of Syncrude Canada. He recently retired from the company after 27 years—20 of them at the executive level. Carter played a prominent role in the growth of Syncrude, and the evolution of Alberta's oil sands and the community of Fort McMurray.

CHANG, HELEN

(Petroleum '88, MSc Petroleum '90) PEng

has been elected to the position of director, Rocky Mountain North American Region for the Society of Petroleum Engineers (SPE). The 27-member SPE board of directors is the policy-making body for the SPE and reflects its diversity, both geographically and technically. As a member of the board of directors, she will advise the council on SPE matters, brief the SPE board on the status of council activities in the region, and bring matters of interest to the attention of the regional council and the SPE board. Chang begins a three-year term commencing in November 2007.

Chang is a senior development engineer with Talisman Energy Inc. in Calgary. She has more than 17 years' experience in reservoir engineering, production optimization, and reserves determination in gas and both conventional and heavy oil.

CLAYTON, CARL

(Civil '77) PEng

won a Showcase 2007 award of merit from the Consulting Engineers of Alberta for project management of the southwest Anthony Henday Drive. This is a joint project completed by Stantec Consulting Ltd. and UMA Engineering Ltd. for Alberta Infrastructure and Transportation. The project includes a 360-metre-long river crossing, three creek crossings, five major interchanges, and 11 kilometres of divided highway. Judges noted the wide range of innovative approaches and technological advances in this complex project.

DIBATTISTA, DR. JEFF

(MSc Structural '95, PhD Structural '00) PEng

was recognized by the Consulting Engineers of Alberta at the 2007 Showcase Awards. He received an award of merit in building engineering for the $13 million PCL Centennial Learning Centre in the Edmonton PCL Business Park. As PCL's learning hub, the 2,430-square-metre building is a model of sustainable design, gold-certified under the USGBC Leadership in Energy and Environmental design (LEED™) Green Building rating system. The structural, mechanical, and electrical systems are exposed and incorporated into the architecture. The facility houses state-of-the-art training rooms, boardrooms, meeting rooms, offices, and a grand hall. DiBattista is a partner with Cohos Evamy in Edmonton.

FAULKNER, DR. M. GARY

(Mechanical '63, MSc Mechanical '66) PEng

was the recipient of the L.C. Charlesworth Professional Service Award from the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA). This award was presented for his service to the profession and for his substantial contributions to the operation of the Association and the advancement of its professional status.

Faulkner has experienced a highly distinguished career in mechanical engineering since graduating from the University of California, Berkeley, in 1969 with a PhD in applied mechanics. He has made outstanding contributions to the engineering community as a whole and to the education of undergraduate and graduate mechanical engineering students in particular.

Kudos

KATOPODIS, CHRIS
(MSc Civil '82) PEng

received the Camille A. Dagenais Award from The Canadian Society for Civil Engineering. His engineering experience and research centres on interdisciplinary work that bridges hydraulics and ecology.

His engineering career began with Manitoba Water Resources Branch in 1974. Katopodis is spearheading interdisciplinary efforts in hydraulics, hydrology, river mechanics, ecology, biology, ecosystems, fish physiology, migrations, and habitat.

KLOSTER, JOHN
(Civil '89) PEng

received an award of excellence in water resources and energy production for his work on the Petro-Canada recycled wastewater pipeline project. This honour was awarded by the Consulting Engineers of Alberta. The project is environmentally sound, sustainable and the first of its kind in Canada. Rather than drawing additional water from the North Saskatchewan River to produce hydrogen and steam, Petro-Canada can now draw on recycled municipal water for its industrial operations. Kloster is with Bel-MK Engineering Limited.

KOSTIUK, DR. LARRY
(MSc Mechanical '85) PEng

was the recipient of the 2007 Environmental Excellence Award from the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA). This award recognizes Kostiuk's application of engineering methods towards preservation of the environment and the practice of sustainable development.

After graduating with his PhD from Cambridge University in 1991, Kostiuk joined the Department of Mechanical Engineering at the University of Alberta. He is currently chair of the department as well as an accomplished researcher. Since 1996, Kostiuk's research has focused on mitigating the environmental impact of flaring by the upstream energy industry, in particular, the flaring of solution gas.

KRYWIAK, DAVE
(Civil '77) PEng

accepted an award of merit in water resources and energy production from the Consulting Engineers of Alberta for phase one of the City of St. Albert's sanitary trunk sewer. Krywiak is with Stantec. The City retained Stantec Consulting Ltd. to provide interim in-line storage and conveyance to relieve existing surcharging conditions in the city's wastewater collection system and to provide for the long-term servicing of future development in the northwest area of the City. The project exceeded the expectations set in the previous feasibility study by identifying an alternate alignment and construction method, which resulted in lower construction costs and significantly less impact on the community.

KUEHNE, HERB
(Civil '76) PEng

was congratulated by the Consulting Engineers of Alberta for his role on the Mill Creek Roper Pond. He received an award of excellence in sustainable design and an award of merit in community development. Kuehne and his team applied creative environmental design practices to address the technical challenge and restored the drainage course to its natural state. This stormwater management facility provides a naturalized wetland area for wildlife, birds, and waterfowl nesting. It serves as a multi-use recreational facility, improves the quality of stormwater, and reduces the risk of flooding.

LEE, MICHAEL
(Mechanical '82) PEng

has been appointed president of Alberta Oil Sands Incorporated. He was formerly chief operating officer and co-founder of Platform Resources Incorporated. Over his 25-year career in the oil and gas sector, Lee held several senior-level engineering positions with EnCana Corporation, Burlington Resources Canada Ltd., Stampeder Exploration Ltd., and Amoco Canada Petroleum Limited. His expertise encompasses planning and budgeting, execution, and management of large capital projects, and exploitation engineering.

LONG, DR. DEJIANG
(PhD Civil '91) PEng

won an international award of excellence from the Consulting Engineers of Alberta for his report on the developmental impact of Canadian Technologies: Yellow River water resources and flood management. This international cooperative project involved the transfer and adaptation of leading-edge Canadian technologies (RADARSAT Remote Sensing and Water Resources Management Model) to China. These technologies were used to improve operational decision making, improved flood monitoring and assessment, and optimized water resources management of the Yellow River watershed. This project will generate social benefits to a population of 235 million, environmental benefits in protecting the ecological health of the river, and economic benefits of billions of dollars a year. Dr. Long is with Golder Associates Limited.

MELTON, STEVE
(MEng Transportation Engineering '94)

was the recipient of a 2007 Showcase Award for Alberta's new Highway Guide and Information Sign Manual. The manual provides information on human factors and best practices in sign design and construction. The manual assists designers in creating signs that are easily read so drivers have time to recognize, read, and react to them. Melton is with ISL Engineering & Land Services Limited.

in memoriam

The Faculty of Engineering sincerely regrets the passing of the following alumni and friends.

Adair, Barney
(Petroleum '50)

Bennett, Susan
(Chemical '00)

Blamire, Norman
(Electrical '54)

Braybrook, Robert
(Chemical '69)

Brent, A. Lawrence
(Mining '52)

Cherniwchan, William
(Mechanical '64)

Chornopsky, Michael
(Petroleum '51)

Daviduck, Lloyd
(Civil '62)

Dubas, Jesuit Father M. Stephen
(Civil '53, MSc Civil '55)

Eckenfelder, George
(Civil '33)

Edie, Dr. Ralph
(Mining '45, MSc Mining '49)

Hymas, Donald
(Electrical '49)

Jackson, William
(Civil '45)

Jakob, Russel
(Chemical '59)

Madsen, Edward
(Electrical '49)

Marjanovich, Berislav
(Chemical '69)

Mcdonald, John
(Electrical '50)

McNichol, Major General Don
(Civil '50)

Melik, Michele
(Civil '90)

Mutch, James
(Petroleum '53)

Patching, Professor Thomas
(Mining '36)

Philip, The Honourable Justice
(Civil '62)

Popek, Henry
(Electrical '66)

Reynolds, Robert
(Chemical '48)

Robson, William
(Electrical '49)

Sacharuk, Edward
(Electrical '70)

Simons, Cory
(Chemical '96)

Stollery, Robert
(Civil '49, LLD [Hon] '85)

Tipman, Rudolph
(Chemical '58)

Tomilson, Robert
(Mechanical '73)

Tyrkalo, M. Tod
(Civil '74)

Usher, W. David
(Civil '49)

Wacowich, Anthony
(Electrical '49)

Webb, Kenneth
(Civil '59)

The Faculty of Engineering was recently made aware of the following alumni who passed away more than a year ago.

Cumming, James
(Electrical '47)

Golightly, Robert
(Chemical '61)

Holmberg, Hjalmar
(Chemical '43)

Kutney, Peter
(Chemical '54)

Livingstone, Donald
(Chemical '44)

Pascoe, John
(Chemical '50)

Shook, Dr. Clifton
(Chemical '56)

In memory of Thomas Patching
Professor Emeritus (Mining '36)

Patching was born on October 2nd, 1915 on the family farm near Etzikon in southern Alberta. His early education was in a local country school. He finished high school in Lethbridge Collegiate Institute. He completed the four-year program in Mining and Metallurgy in 1936. He worked with the International Nickel Company and the Hudson's Bay Mining and Smelting Company in Flin Flon. In 1945, he returned to the U of A to teach in the Department of Mining and Metallurgy under the leadership of the famous Dr. Karl Clark. He taught for 35 years and earned a reputation as one of Canada's leading experts in mining engineering. He became a full professor in 1958. He followed the careers of his students with interest. Starting with the existing departmental records from 1916, he added names of each year's new graduates commencing in 1947 and continued this until his retirement.

In memory of Edward Madsen (Electrical '49)

Edward Madsen passed away peacefully on March 24, 2007 at age 84. An only child, he was born in Odense, Denmark on January 13th, 1923, and emigrated with his parents at age nine months to Canada, settling on a farm homestead in Alberta. After attending a small country school, he completed high school by correspondence. He built his first radio receiver on the farm as a young teenager, with many improved versions to follow over the coming years.

He joined the Royal Canadian Air Force during WW II and received his pilot's wings with the rank of pilot officer. He did not fly after the war, but continued his lifelong love of airplanes through reading, movies, and television. Working first in Hamilton, Ontario, he then joined B.C. Electric Co. in 1955, retiring from B.C. Hydro in 1985.

Kudos

MONTGOMERY, DR. COLIN JAMES (JIM)
(Civil '73) PEng

was the recipient of the 2007 Centennial Leadership Award from the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA). This award is presented to a member of APEGGA who has attained the highest distinction relating to the science of engineering, geology or geophysics as an executive or director of an outstanding project or continuing enterprise in which the member has conducted, guided or directed or was responsible for the practice of the specific profession. The recipient may have also attained the highest distinction because of invention, research or original work, or an outstanding or exemplary career in teaching the professions.

Montgomery has had an exemplary career that spans almost 30 years. In 1973, he graduated at the top of his class at the University of Alberta, receiving an APEGGA Gold Medal in civil engineering. After obtaining his post-graduate degrees at the University of Illinois, Urbana-Champaign, Dr. Montgomery joined the Department of Civil Engineering at the University of Alberta where he held positions as Assistant and Associate Professor from 1977 until 1981.

NEVEU, KEVIN
(Mechanical '82)

has been appointed chief executive officer and a director of Precision Drilling Trust, Canada's largest oil field services company.

Neveu has over 25 years' experience in the oil field services sector and most recently was president of the Rig Solutions Group of Houston-based National Oilwell Varco, where he oversaw design and manufacturing of land and offshore drilling equipment.

PROCTOR, MARTY
(Petroleum '84, MSc Petroleum '85) PEng

has been appointed to the executive management team for North American Oil Sands Corporation. He joined the company in 2006 and is working as senior vice president, upstream. Proctor has more than 22 years of diverse experience in the oil and gas field. He has worked on projects in Canada, the United States, Kazakstan, and China.

SADOWNYK, KEN
(Civil '81) PEng

(Photo sent Sept 12)

accepted an award of excellence in community development for stages one to four of the engineering and landscape architecture at the Village at Griesbach. This award was presented by the Consulting Engineers of Alberta. Sadownyk is with UMA Engineering Ltd. UMA provided the engineering and landscape architecture services that revitalized one of the largest urban developments in the country. Greisbach represents a sustainable and innovative use of urban land and infrastructure that will ultimately provide a pedestrian-friendly community for more than 120,000 people.

SMITH, STUART
(Civil '74, MEng Civil '79) PEng

received an award of excellence in transportation engineering from the Consulting Engineers of Alberta for the Yellowhead Trail and 156th Street interchange. Smith is with BPTEC-DNW Engineering & Land Services Limited. Smith's company provided structural design for this complex and challenging project involving the construction of roadways and bridges.

STAMBAUGH, WES
(Civil '79) PEng

received an award of merit in transportation infrastructure for work on the Bow Trail widening and intersection upgrades. The award was presented by the Consulting Engineers of Alberta. The $14-million Bow Trail capital project is the first phase of the commitment to widen the Bow Trail corridor to a six-lane expressway and will delay the need for grade separation at key intersections in Calgary's transportation network until at least 2023. The project relied on context-sensitive design principles to meet the challenges of severe topography, major utility conflicts, stormwater drainage, and substandard pre-existing geometry. Stambaugh is with ISL Engineering & Land Services Limited.

SUNDARAJ, DR. UTTANDARAMAN
(Chemical '89) PEng

was the recipient of the 2007 Excellence in Education Award from the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA). This was for his exemplary contributions to teaching and learning at a recognized post-secondary teaching establishment in Alberta.

Upon graduation in 1989, Sundararaj received an APEGGA Gold Medal for top marks in his class. After obtaining his PhD from the University of Minnesota in 1994, he returned to the University of Alberta, where he is now a professor in the Department of Chemical and Materials Engineering.

Editor's note: The descriptions of the CEA Awards were excerpted from *Alberta Innovators*, the annual magazine of the Consulting Engineers of Alberta.

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