



## ▶ BACKING 'EM UP! Canadian WWII explosives expert shares insights

by Drew Tapley

**BOB MERCER STRIKES** you as a man who has enjoyed a full life, with an astonishing ability to recall exact details from it.

“In the peak production years during the war,” says Mercer, “the military explosives plant where I worked in Nobel, Ontario, employed about 4,000 people in the small town.”

The product he once made would end up in the hands of British or American Allied forces thousands of miles away; and their lives would intersect.

Mercer was an explosives expert during the Second World War. He did not serve overseas, yet his expertise played a key role in the war effort.

Arriving in Canada from Northern Ireland at the age of three, Mercer grew up to build a career of more than four decades in the development, regulation and transportation of high explosives for the Canadian explosives industry. The 96-year-old was a representative on air transport regulation at meetings of the UN Committee of Experts on Explosives, and the International Civil Aviation Organization. But the majority of his career was spent developing cordite and other propellants used to drive rounds of ammunition during the war, and for postwar commercial use.

After graduating with a degree in chemistry from the University of Manitoba in 1941, he landed a job as a chemist with the wartime subsidiary of Canadian Industries Ltd.

“There were three large military explosives plants, all built in less than a year and a half,” Mercer said. “In July of 1941, I was in the military explosives department manufacturing cordite and TNT.”

These are very different explosives, explains Mercer.

“Cordite is a propellant. It burns so fast that it almost explodes when it’s burning. TNT is extremely insensitive. You could throw a case of it off a two-story building and nothing would happen. The newspapers used the term TNT like calling every car a Ford. It was

*At 96 years of age, Bob Mercer still vividly remembers the fatal explosion of November 18, 1941 at the plant where he worked in Nobel, Ontario. As an explosives expert during the Second World War, Mercer went on to build a 40-year career in the development, regulation and transportation of high explosives for the Canadian explosives industry.*



usually the main element in the shell, but there were more sensitive components to set it off.”

Cordite was the primary product of the Nobel plant, used to propel ammunition from 16-inch cannons on naval battleships. It was unaffected by extreme climates, giving it a greater quality of preservation and storage.

“When you saw a battlecruiser like the HMS *Hood* operating — that’s where it went. They would load about 400 pounds of cordite to propel a shell 20 miles.”

The Nobel plant had five lines for cordite, with each one serviced by kneader rooms. On the other end of the range, press rooms extruded the cordite into various shapes and sizes that resembled spaghetti. From there it went to a drying room to be blended, packed and cased into magazines.

“The packaging of explosives had to pass rigorous standards. We filled the cases with dummy explosives, and put them through a tumbling and shock test to see how they would stand travelling in a freight car.”

Nitroglycerin is the active ingredient in cordite, with other elements acting to stabilize it and control the speed it burns.

*“Some of this scrap fell out and under the wheels of the cart, and the friction ignited it. The corridor went up, and anyone in there was caught in it. I think there were five people killed. I saw some of them carried out. Just a black mass of a person. It has stayed with me my whole life.”*

“Making nitroglycerin was a batch process in an iron tank, six feet in diameter, with air agitation inside and cooling coils around the outside. Thermometers kept track of the temperature, and at the end of this process you had about 3,300 pounds of nitroglycerin. I used to get these incredible headaches from the fumes.”

In the blending and packing of the dried cordite, pieces broke off that had to be carefully collected and managed. It couldn't be mishandled or thrown away like garbage, and to do so could prove fatal, as Mercer witnessed firsthand.

“Our little group went out to have a smoke and were walking back to the plant when I saw the roofs of the cordite lines exploding, one after the other. What happened was that the scrap cordite, which was reworked into the fresh, was put into bags and left in the corridor to be taken out on carts. Some of this scrap fell out and under the wheels of the cart, and the friction ignited it. The corridor went up, and anyone in there was caught in it. I think there were five people killed. I saw some of them carried out. Just a black mass of a person. It has stayed with me my whole life.”

In those days, the corridor had galvanized tin walls with an emergency fire door every 30 or 40 feet. After the explosion, they took the galvanized coating off and put in a flimsy layer so that if anything happened again, people could jump through the wall and escape the worst of it.

Mercer worked at the Nobel plant until it closed in January of 1944, only to reopen five months later when the U.S. Navy funded the development of a granular form of flashless cordite.



This product was designed to eradicate the muzzle flash when a shell or bullet was fired.

On Thanksgiving weekend 1945, Mercer relocated a few miles outside of Chalk River, Ontario, to concentrate on a national research experiment. He was part of a small team work-



ing on the Zero Energy Experimental Pile (ZEEP), conducting research into the production of atomic energy. ZEEP was the first nuclear reactor in Canada, and the first of its kind outside of the U.S.

It wasn't long before he started to funnel his wartime explosives experience into postwar activities like developing grades of dynamite.

“Making dynamite is like baking a cake,” Mercer shared with a smile. “Some ground-up wood pulp for absorbency, a bit of chalk for stability, ammonium nitrate, sodium nitrate, and cornstarch. The most dangerous thing about handling it is when it's in the point between freezing and melting, where the crystals bump and it becomes unstable.

“Since I retired, dynamite has virtually gone out of existence. What they call slurry explosives have replaced it, which is like a porridge, based on ammonium nitrate and a few other ingredients. It is much safer to handle.”

Mercer's early work was focused on the production and testing end of explosives. One of his regular activities was conducting velocity of detonation tests in a large metal blasting tank inside concrete walls, with exhaust fans and a door like a bank vault.

*TOP RIGHT: Scientist Norman Randall weighs ten ounces of TNT and ten ounces of RDX explosives on a scale prior to ballistics tests to compare the power of the two explosives at the National Research Council explosives laboratory, March 1944. (LIBRARY AND ARCHIVES CANADA, 3197143)*

*LEFT: Bob Mercer and his wife Fran in 1946. Soon after graduating with a chemistry degree from the University of Manitoba, Mercer found himself a job at one of two explosives plants built in Nobel, on the shores of Georgian Bay and about 50 kilometres north of Parry Sound.*

*“When you saw a battlecruiser like the HMS Hood operating — that’s where it went. They would load about 400 pounds of cordite to propel a shell 20 miles.”*



He went on to produce ammonium nitrate fuel oil explosives at small satellite plants in remote regions of Canada. This is now commonly associated with terrorist fertilizer bombs, and an incident that gave rise to its widespread use was the Texas City disaster in 1947.

A docked cargo ship in Galveston Bay, with approximately 2,300 metric tons of ammonium nitrate onboard, detonated and became a chain-reaction of explosions on nearby ships and an adjacent oil storage facility. This snowballed into a giant blaze killing almost 600 people and injuring thousands more, resulting in the first class-action lawsuit against the U.S. government. To this day, it is regarded as the worst industrial accident on U.S. soil.

Mercer explains the key oversight of the disaster, and how this was a key insight for the explosives industry.

“The thing they should have done was to pull the plug and sink the ship. What they did was to close the hatches and try and smother it. Well, you can’t smother it because every 100 grams of ammonium nitrate has 20 grams of oxygen — so it provides its own fuel. The disaster gave people in the explosives business the idea that ammonium nitrate could be used with fuel oil.”

*TOP LEFT: Longshoremen loading cases of TNT explosives into the hold of an unidentified merchant ship, Halifax, Nova Scotia, November 29, 1942. Unlike other volatile components, Bob Mercer asserts that “TNT is extremely insensitive. You could throw a case of it off a two-story building and nothing would happen.” (LIBRARY AND ARCHIVES CANADA, MIKAN 3572366)*

*RIGHT: Only the steel frame of this five-story rubber factory, located next to Texas City’s dockyard, remains after the massive explosion on April 16, 1947. When the SS Grandcamp’s cargo of 2,300 tons of ammonium nitrate exploded, it set off a chain reaction of events, including a 15-foot tidal wave that flooded the surrounding area. Windows were shattered in Houston, 75 kilometres to the north, and people in Louisiana felt the shock 400 kilometres away. (SPECIAL COLLECTIONS, U OF HOUSTON LIBRARIES)*

The commercial application of the postwar explosives he made was destined for mining, road construction, and demolition.

“These were tremendously different to the products I was making for the war effort. The commercial plant was across the street from the military explosives plant in Nobel, and this did little business during the war because they ran mining at half capacity.”

From 1957 to 1978, Mercer was the liaison for the federal chief inspector of explosives. Following this, he became the explosives advisor with the secretariat in charge of dangerous goods; and retired in 1985, a few weeks before his 65<sup>th</sup> birthday.

Although he was never in the usage end of explosives, the destination for the materials he produced during the war was not lost on him. He says that this was something he thought about, but after hearing what Hitler was doing, he wanted to help the Allied forces.

“I was 20 years old when I started my career in explosives. If you’d gone through the pre-war years like I did as a teenager, and listened to the radio barrage of what Hitler was doing — it was quite something. He was a monster.”

Bob Mercer doesn’t make explosives anymore, and the most dangerous thing he handles these days are the batteries in his TV remote control at Woods Park Care Centre in Barrie, Ontario, where he has lived since September 2012. His wife Fran passed away in 2011, and his son has a suite a few doors down from him on the same floor at Woods Park.

Now firmly in his retirement, he is keen to promote the historical importance Nobel played during the war, and donated a large book of photos to the Parry Sound Public Library. It once belonged to the general manager of the facility, and fell into Mercer’s possession many years ago. The book portrays the internal mechanisms and aerial views of the plant from 1940 to 1945, and he has kept it in pristine condition until a time came when he was able to find the right home for it.

“Parry Sound has seen two military plants come and go. The town should have care of something which is such a main part of its history. It belongs with them.” 🍁

