

Bruce Nodwell Inventor



Bruce Nodwell had an unusual birth certificate: Province of Saskatchewan, Section 22, Township 36, Range 9, West of the 3rd. Born the son of a homesteader on May 12, 1914, he died in Calgary on January 20, 2006. During the intervening 91 years, Nodwell became the world's foremost inventor of industrial tracked vehicles.

His signature offroad machine, the Nodwell 110, sold more than 1,500 units, primarily to the North American oilpatch. Half a century later, its direct successor remains in production, albeit much improved and flanked by a fleet of other models.

Foremost Industries, founded by Nodwell and his son Jack in Calgary, has a market capitalization above \$250 million, and operates in Russia, the United States and elsewhere. Yet success definitely did not come easily. "I've worn out three or four companies along the way, and quite a few customers, too," the self-educated pioneer once remarked.

His father Howard, raised in North Dakota, homesteaded 25 miles west of Saskatoon (population 500 in 1903) near the village of Asquith at age 16. Then as now, farming was unpredictable. When hail destroyed a grain crop just before harvest, Bruce Nodwell said his parents used the ice to make ice cream and to his recollection made no complaint about seeing a year's work wiped out.

His father became a grain buyer, moving frequently from town to town. Formal education, under the circumstances, was erratic. "I never learned a thing in school," Bruce Nodwell stated flatly in a private family memoir. In 1923, the Nodwells migrated from Carmangay in southern Alberta back to Asquith, where Howard bought an interest in a hardware store. Their 1918 Dodge Touring car, towing a buggy converted into a trailer, travelled on prairie trails used earlier by Red River carts. Colored strips painted sporadically on telephone poles marked the route; the only accommodation was a tent.



The hardware store in Asquith sold cars, tractors, machine parts and a new apparatus just arriving on the prairies, radios. Working alongside his dad, the son learned well the knack of making do with what's at hand. Barbed wire fences, for example, made good radio aerials. In 1929, Howard Nodwell took over a Dodge agency in North Battleford, Saskatchewan. A year later, he hired out an ageing sedan to a five-member railroad survey crew with his son as driver, a job rendered difficult by the vehicle's lack of brakes. Whenever Bruce Nodwell (then 16) overshot a tight corner, the head surveyor would remark, "You don't have the

brains of a jack rabbit."

By then, the Dirty Thirties had begun in earnest. The Nodwell Dodge dealership sold 39 cars in 1929 (a restored model from that year is shown at right), only two the following year. As economic depression and drought ravaged the West (the photo below was taken near Pearce, Alberta), Bruce Nodwell shovelled cinders, set up pins in a bowling alley, laboured in a powerhouse and on railroad construction, and more. In his mind, to refuse work of any kind became akin to sin. One contractor took him on as an apprentice, crediting the 21-year-old with extra hours in lieu of wages and enabling him to become Saskatchewan's youngest licensed electrician. In 1936, he and his new bride Phyllis moved to Calgary, where they shared a single house with six other families.



The couple took to ranging the three western provinces in a Dodge half-ton pickup, towing a tiny home-made house trailer (five by twelve feet) with two other workers. The team specialized in quick construction jobs like erecting new service station signs. On one occasion, they were able to eat only because a stranger loaned Nodwell five dollars. Another time, Bruce and Phyllis fixed a leaking flange on a bulk gasoline tank - full at the time - with a hammer and chisel, being careful to avoid sparks. In exchange for risking their lives, they earned five dollars.

In 1938, Bruce Nodwell landed a job constructing a refinery for British American Oil Company, mainly because he had constructed a pipe threading machine out of old car parts and was willing to rent out the machine. BA paid him 30 cents an hour. Two years later, with World War Two destroying Europe but the North American economy finally in recovery, he got a better job as a construction superintendent for Texaco. Between 1941 and 1947, the Nodwells had a daughter and two sons.

Another man might have settled down but not Bruce. In 1943, he and his brother Jack (his older son's namesake) formed Nodwell Brothers Ltd. They worked with concrete and steel, erecting bridges, schools and tunnels. To house their workers at remote sites, Nodwell Brothers developed the first portable camps. These pioneering units would soon evolve into the wheeled and skid-mounted camps used later by oil exploration crews. To boost sales, the camps were later built by United Trailer, owned by Calgary Ted Riback. After ATCO Ltd. began to manufacture similar products, Bruce Nodwell and Riback decided that demand was pretty much satisfied in this particular sector and looked for other ventures (a market assessment that in retrospect was remarkably incorrect).

In 1947, Imperial Oil Limited struck oil at Leduc, and construction of pipeline gathering systems went into high gear. In just four months, Nodwell developed a mobile wrapping machine that would clean steel pipe, prime it, apply a coat of hot tar and wrap it in treated fabric, all in one operation. Made mostly from war surplus parts, the machine worked well. Nodwell partnered with Banister Construction in 1949 to wrap flow lines at Leduc and Redwater, and then sold two machines along with the patent rights to Banister.

Imperial Oil approached Nodwell and Riback in 1951 to see if they would build a prototype vehicle capable of transporting a five-ton payload across muskeg. This boggy stuff, very common in the Canadian bush, was severely hindering exploration initiatives in northern Alberta. Nodwell created two vehicles following an Imperial design, but neither functioned properly. Although the oil company then abandoned the effort, Nodwell decided to devote himself full-time to developing a tracked offroad vehicle.



He operated as North King Equipment (Canada) Ltd., a name that implied it was the subsidiary of an American company because American products were generally deemed more acceptable at that time. Nodwell heavily converted a Ford tractor into his first prototype, which could operate in wheeled or tracked mode. A rear trailer-like section was also developed. Hydraulic articulated power steering between front and rear sections proved a winner (right), and that feature is still in use today. Overall, however, an Imperial Oil crew found that the first North King prototype could not handle the required loads.

The company came up with a second prototype, and sold 16 machines. Again, Imperial purchased, as did geophysical companies. But the vehicles still lacked sufficient mobility and were mechanically weak. The army and air force each bought one machine. After their initial tests went badly, an airman and soldier tossed a coin, with the "winning" service forced to take both unwanted units.

Nodwell came up with yet another prototype, using a two-engine concept that provided the mobility required in muskeg, as well as snow, water, mud and rough terrain. In fact, the machine could traverse muskeg that would scarcely hold the weight of a man. Even so, it was ungainly, oversized, costly to maintain and unsaleable. At that point, Riback backed out of the project. But he provided a loan which enabled his still-determined partner to launch Bruce Nodwell Ltd.



The new firm created three small tracked vehicles called Scout cars, and Imperial gave a grant of \$2,000 to develop a powered tracked trailer. In this project, Nodwell came up with a substitute for a simple loop track. Instead he used conveyor belting with an overlap splice. He also invented a double sprocket which made it possible to drive this wide track and also keep it in place while using a single row of wheels. The combination of splice and sprocket could accommodate tracks 40 inches wide. The Scout car provided navigation, while the trailer could haul the required five tons. Imperial bought 30 of each.

The Scout car was still too underpowered to be fully practical. Instead, Nodwell set about providing his powered trailer with a cab and differential steering device, turning it into a self-operating vehicle. This prototype evolved into the Nodwell 110, indicating its payload in 100-pound units. California-based Western Geophysical gambled on the new equipment, outfitting an Alaska crew with five drill carriers, two seismic recorder vehicles, a mechanics shop, kitchen unit and sleeping quarters. The tracked flotilla proved capable of negotiating severe muskeg conditions.

Although the developer called his breakthrough creation a "tracked truck," the industry dubbed it the "Nodwell." (The stripped version at right is typical.) The designer immediately started work on the Nodwell 200, essentially a Model 110 coupled to a powered trailer with a long single deck above both units and equipped with 48-inch tracks. The new vehicle had a 10-ton capacity, enabling it to haul drilling rigs across muskeg.

Nodwell's business setbacks were far from over. Shell Oil Canada, which commissioned the first Model 200, aborted the project due to broken springs and steering cables, leaking hydraulic lines and other operational problems. About that time, Riback decided to shift into real estate development and called his loan. Robinson Machine and Supply Ltd. bought control of the offroad vehicle business, forming Robin-Nodwell Manufacturing Ltd.

As luck would have it, big sales occurred shortly after the takeover, including a \$250,000 delivery for South America and a 45-unit order from the U.S. Army. American officers told Bruce Nodwell that they'd never before purchased a civilian vehicle without requesting a single modification for military use. Success, it appeared, was in hand at last.

But the inventor's creative impulses mixed badly with the new management's style at Robin-Nodwell and he felt increasingly sidelined within the operation. In 1965, Nodwell left the firm to join his son Jack in establishing a competitor in the same market, Foremost Developments Ltd. This partnership proved a better match.



Born in 1942, Jack Nodwell had been working as an electrician on the portable camps since age 14. He learned sheet metal work two years later and at 17 shot a company marketing film in Alaska which Foremost still uses as historical footage. (The photo above shows Jack, 16, at the far left, his father on the far right.) During a summer break from university in 1962, the student designed and manufactured a tracked farm tractor, registering Foremost as a company one year later. His next machine was even more ambitious; it could plough and condition unbroken virgin land in one pass. The prototype did work but proved too expensive to operate.

When Bruce Nodwell joined his son at Foremost, their initial offroad oilpatch hauler was the six-ton 6T. Early customers complained about difficult steering and gearing, and the fledgling company found itself in severe financial distress. On a trip to the emerging Rainbow Lake oil play in northern Alberta, Bruce Nodwell had a chance encounter with two Peace River contractors, John McMillan and Vern Estabrook, whose \$40,000 investment saved Foremost.

Robin-Nodwell launched a lawsuit against Foremost, alleging that Bruce Nodwell had poached trade secrets and customers. Bitter emotions were aroused, with a number of oil and gas firms supporting Foremost in the form of vehicle purchases. Jack Nodwell and his bride Leila spent their honeymoon in court, where father and son eventually won on all counts.

In 1966, a nine-person trade delegation from the Soviet Union led by a federal energy minister named Sashin came to Alberta, and realized that the novel "snow-swamp" vehicles was tailor-made for Siberia. When the Russians visited Foremost, Bruce Nodwell calmly asked the minister if he'd like to drive a 6T. His son was horrified, aware of the troubles experienced by other novice drivers. But Sashin maneuvered the tracked truck like a pro, thoroughly enjoying himself - he'd been a driver in the Red Army.

Later, after a marathon two-week negotiation, sometimes running to 14 hours a day, the Soviets placed a \$1.2 million order for 32 Foremost units. The breakthrough came a critical time when Canadian oilfield activity had hit a low point. Foremost's bank, concerned that the Russian order would strain the weakened company, cut its line of credit in half. Bruce Nodwell observed that "a banker gives you an umbrella when the sun is shining but wants it back when it starts to rain." The Soviet order was filled by recruiting support from suppliers and later new investors.



Big Russian sales came through again in 1969 and 1970, and Foremost went public the following year. New models found customers as far afield as Southeast Asia and Iran. In 1976, the firm recovered the trade name "Nodwell" when its rival folded. Over future decades, Foremost diversified into heavy oil pumps, pipe manufacturing, drilling systems, tanks and coil tubing rigs. In 2001, the company converted to an income trust.

Bruce Nodwell became an officer of the Order of Canada. Also, this westerner who did not complete junior high school was made an honorary lifetime member of Alberta's professional engineering association. He retired in 1977, and became adept at restoring old cars. His wife Phyllis died in 2004.

Oddly enough for such an energetic man, the inventor himself was not a healthy person. At 42, he was diagnosed with multiple sclerosis, which failed to advance for unknown reasons. At his funeral memorial, his son Jack said, "He had lots of strange illnesses, many of which one would have expected to finish him off. But he would bounce back." Resilience, it seems, came as naturally to Bruce Nodwell as mechanical ingenuity.

<http://www.northerntracks.com/history/bruce-nodwell-an-inventor-with-drive.html>