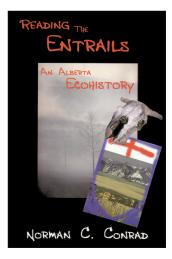


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READING THE ENTRAILS: AN ALBERTA ECOHISTORY

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SODBUSTING

HOMESTEAD DAYS

efore contact there was no agriculture in Alberta. Conditions were too extreme for available technology. Temperatures ranged widely, precipitation was modest; neither were predictable, making agriculture too risky. After contact, agriculture was not en-

couraged. HBC preferred profits to farmers. Agriculture awaited appropriate technology—trains, ploughs and early maturing grains—and with no markets, there was little point. In Alberta's south the Blackfoot Confederacy, herds of bison, capricious but common drought, and nearly impenetrable sod further stood in the way of farming.

Reportedly Peter Pond tended a garden in the lower Athabasca region as early as 1787. By 1810 homegrown barley supplemented trader's diets in Fort Edmonton. A few cows came to Peace River country by 1833 and Reverend McDougall trailed cattle south to Morley (west of Calgary) in 1873. Some 200 years after the HBC grant of Rupert's Land, Alberta's largest agricultural enterprise was 12 hectares (30 acres) of sown barley. From first ranches about 1879, to Billy Cust in 1881 with his green thumb sowing 130 acres (50 ha) to wheat, 36 (15 ha) to barley and 12 (five hectares) to oats, Alberta warmed to agriculture. In the summer of 1883, the railway cut the industrial age's first channel into Alberta: this was the breach and along it would come homesteaders.

Under the Dominion Lands Policy a prospective homesteader paid a \$10 application fee for a quarter section of land (160 acres or 65 ha). If, after three years occupation, sufficient improvements and cultivation were done, the homesteader became owner. Additional Dominion lands could be purchased for \$1 per acre. This early Alberta Advantage undercut the Americans where homestead periods were five years and land prices ranged from \$1.25 to \$2.50 per acre.¹ Few came in response to these first promises of free land. Then Clifford Sifton, Minister of the Interior (1896 to 1905), plenipotentiary of Rupert's Land, spurred the pace from trudge to

trot, then whipped it into a headlong gallop. Alberta's population hyperinflated, from 30,000 in 1895 to nearly half a million in 1914. In 1905 about 2,000 km² were under the plough and even with this influx, tilled acreage merely redoubled by war's outbreak.

During the Great War prices boomed; \$.91 per bushel of wheat in 1914 climbed to \$2.30 in 1920.² Rains came, shooting crop yields and profits higher again. Seeded acreages tripled, net incomes multiplied and then multiplied again. Wheat was king and prosperity settled over rural Alberta. Free land could still be had.

From war's end in 1918 through much of the '20s, drought baked Alberta's southeast. Fierce spring and fall winds or hot dry summer gusts lifted topsoil off, wafting them away toward Saskatchewan. Settlers' dreams dried and blew away with them. In the late '20s, money and rains again wetted settlers' dreams but prosperity was only too brief, turning to a nightmare at decade's end. Commodity prices halved, then rehalved as world recession became the Great Depression (1930-1939). Net revenues plunged into the deep red.³ When that could hurt no more, grasshoppers came. When only stubs remained, drought assailed the land once more.

Prairie sod knew how to resist recurring drought, farmers did not. Ploughing flayed the sod skin from the land, permitting sun and wind to strip the moisture deep within. Winds eroded light soil areas, claiming the fertility of over two million hectares of land, depositing them downwind in sheltered areas as shifting dunes and sandhills, badlands. Alberta's tilled lands may now have lost nearly 50% of their humus content, most by Depression's end.⁴ Despite difficult conditions, the agricultural land base grew. Tilled land jumped to 62,500 km² by 1929, much broken by team and plough.

During the '30s Robert England commented on the imperial strategy for the west:

There have been few more significant movements of capital and men than that from Great Britain to the Dominions, by which, in the generation prior to the war, Great Britain assured herself of her food supply. Railways in Western Canada were therefore as essential a part of the machinery for war purposes as shipbuilding yards or the equipment of heavy industries.⁵

Wars and rains bestowed their double benediction on farmers at the end of the '30s as yet another European engagement spilled over to engulf the world. Tractors and threshers became the swords and spears for Alberta's farmers during this next Great War, World War II.6 Postwar years brought

the rains again, prices steadied and profits rose as the nation managed to dismantle and reintegrate its war machine better than it had after 1918.

AGRICULTURAL TECHNOLOGY PLOUGH

The fibrous, dense and resilient sod-mat of grass covering the North American prairies protected them from wind, rain, fire and ploughs until John Deere's steel mouldboard plough, developed in 1846, penetrated this tough tangle. The shovel's inclined steel blade cut into the lower roots, lifting the mat up and flipping it over. Deep soils turned up while surface grasses and herbs—the cactus, sagebrush, soapwood, bunchgrass, blue grama and buffalo grass—were ploughed under as green manure. With this blade the hard dry soils of America's plains might be ripped deep enough to permit grains to sprout and root down to moisture. Western lands now had value.

First sodbusters talked of an eerie moan coming from the earth when the plough's steel blades sheared open the tight primeval mat. Over millennia, forces of grass, forb and nematode laboured with micro-powers of bacteria, fungus and algae to endow the mineral media with structure and fertility. In each gram of soil a billion microorganisms, diverse and fragile, toil to recompose and sustain soil. With a pass of the plough, the building stops, the process turns and bio-entropy begins. Plough in hand and oxen out front, teamsters might have sensed what a truly deep cut they took of the prairie wool.

Introduced crops relate differently to the soil than native plant communities. Where once the soil was a sustaining element in an interdependent dynamic system, now it becomes a degenerating resource. Turned skyward, unprepared and unprotected, tilled earth faced a hostile environment of whipping winds, beating rain and rapid temperature changes. Each crop extracted more from the land, leaving less for next year. New techniques, like summerfallowing and more recently zero tillage, slowed the decline, but did not stop it.8

WHEAT

Wheat generated from an unusual hybridization of wild grasses. Its seed was so large that it had no means of dispersal. About 8,000 years ago, Hittite agriculturists collected its germ because of the food value of that extraordinarily plump seed, saving it and dispersing it wherever it could be grown. Wheats now are among the planet's most numerous plants. Settlers ploughed up the prairie wool to plant this helpless, fat, tasty imposter.

Alberta's short, dry growing season demanded a special wheat. Red Fife wheat had relatively early maturation, hardness and quality, so settlers packed it west with them. Later in 1909, farmers tried Marquis, a new cultivar developed by the Crown at its Dominion Experimental Farm. This quality hard red spring wheat matured several critical days earlier than Red Fife. The precocious Marquis made those wildlands with shorter growing seasons economical to farm.

WATER

Starting in 1876 local farmers constructed small-scale irrigation structures to combat the always-threatening drought in Palliser's Triangle. Later CPR felt irrigation might help develop and sell some of its 25-million-acre land grant (10,125,000 ha). In 1903 it:

... accepted a three-million-acre (1,215,000 ha), 48-mile-wide (77-km-wide) block of land between Calgary and Medicine Hat, along with 800,000 acres (324,000 ha) in the Northern Reserve, as the final installment of the many millions of acres awarded it for the building of the main line of its railroad.¹⁰

There the CPR dammed and diverted the mighty Bow River to these arid lands, as if "the Bow River were flowing out onto it."

Irrigation's thirst is quenched by Alberta's wild rivers. It consumes 80 to 90% of their diverted waters, distorting riverine and hydrological systems and cycles. Spring flows are captured in reservoirs to store water for mid-summer, when irrigators need the water. On-stream reservoirs disconnect upstream aquatic life from downstream with miles of deep stagnant waters. The cottonwoods, guardians of riverbank and floodplain, require flooding to set their seed. Dams stop the flood. Without over-the-bank spring freshets, cottonwoods below the dams and reservoirs do not regenerate. These groves are foundation, column and dome to riverine ecology. Whether for water and food, shelter and wintering grounds or hibernaculum, nesting and cover, prairie river valleys host and nourish nearly all plain's life in critical ways. Wild native fish populations, in poor condition in the province as it is, suffer and decline with their river. Terrestrial wildlife, upstream separated from downstream by miles of exposed reservoir mudbank, inevitably disconnects and declines.

Irrigated farming uses energy, chemicals, fertilizers, pesticides and of course, water very intensively. This water appears nearly free but is not.¹³ Irrigation products, mostly grains and hay, feed Alberta's heavily subsidized,

sacred cow. Irrigation systems are wasteful and sloppy; about 50% of the diverted river's flow reaches the crop zone and 25% returns to the river. The remainder, with loads of agricultural fertilizers and chemicals, seeps elsewhere percolating through the ground to new drainages or evaporating back into the hydrological cycle, leaving its distillates behind. Irrigation adds to groundwater, raising water tables and sometimes inundating surface lowlands with dissolved salts, minerals and chemicals, choking them by soil salinization.

About 6,000 km² of Alberta's lands are irrigated, 5,000 km² in irrigation districts. Gathering and distribution systems take up more land, degradation consumes still more. Irrigation dammed the south's major river systems. Government argues that dams prevent downstream flooding in populated areas, a greater concern now that government has authorized the clearcutting of headwaters forests. Some speculate Alberta's rivers will be the water source not just for irrigation but for Alberta's next natural resource industry, water export.

MECHANICAL

Internal combustion power and new mechanical devices overran the farm between the wars. Mechanical monsters—tractors, swathers, thrashers, then combines, each able to do the work of hundreds of animals and tens of men—drove dray animals and teamsters from the field. Farm size grew and farmer numbers shrank. Horse populations fell from 800,000 to 100,000. Earlier technological innovations lured people to the land and drove nature off, now technology's efficiencies, product of military and industrial processes, drove people from the land. Many homesteaders, scarcely one generation on the land, left for the city. Pioneer days were over in Alberta.

FERTILIZERS

Fertility diminishes when nature's recycling systems are ousted and replaced by unidirectional flows of nutrients and the energy required for ploughing, harrowing, seeding, weeding and reaping—from the ground, to the bin, to the rail, to international markets, to the gut, to the sewer. Each ploughing turns the field up to sun and wind. Tractors and heavy equipment excrete fumes and smoke, not cow pies or horse apples, they do not fertilize the land but acidify and compact it, squeezing and burning the soil. Under the drawbar of industrial-age agriculture, soil structures deteriorate.

By the 1950s, much of the land's natural fertility was lost. Alberta's natural gas reserves provided a ready feedstock to fill this nutrient void. This natural capital from millions of years past could be converted to fertilizers, providing additional years of productivity from slumping soils.

But the resultant crop yields came at a cost. By themselves and in combination with other chemicals and uses, fertilizers have altered the soil's chemistry, condition and content.

CHEMICAL

Agriculture is a war with the wild kingdom. Untamed nature is the enemy. Concerned that the "beast of the field multiply against thee," farmers must purge other life. ¹⁵ In the early days this meant killing the blond-pelted prairie wolves, massive plains grizzly bear, herds of bison and wapiti. That progressed on to smaller life—Richardson's ground squirrels, chestnut-collared longspurs and Melissa blues. Today it includes the microscopic.

The battle begins with ploughing, by preparation of the field for cropping, by elimination of all other life forms. This provides a suitable host medium for the chosen life form, wheat and such. After seeding and sprouting a defensive battle begins. Nature counterattacks with battalions of weeds and pests. "The cutworm cutteth, the rust rusteth an' the 'hopper hoppeth!" Monocropping fields provide a blanket banquet of some creature's favourite food. Its predators having been eliminated by the farmer's earlier purgings, an orgy of reproduction follows. Horizon to horizon ravenous insects set upon the homesteader's crops. World War II armed the farmer for this. In finding new ways to kill people, scientists devised tempting means to mass-manufacture selective poisons to eliminate other pests. Rachel Carson's 1962 classic critique Silent Spring traces the chemical industry's parentage:

This industry is a child of the Second World War. In the course of developing agents for chemical warfare, some of the chemicals created in the laboratory were found to be lethal to insects. The discovery did not come by chance: insects were widely used to test chemicals as agents of death for man.¹⁸

Warriors themselves, and quite liking the biocidal effects of these new chemicals, prairie farmers took to them like sawflies to a wheat stem.¹⁹ Nearly any vexation that might be chemically disposed of, was.

What do these chemical cocktails do to the soil's micro-organic community, the land, the Biosphere? Today, in this arms race, humans seek virtual elimination of local nature. Chemical engineers now construct poisons of such broad spectrum that they kill everything on the land—systemic biocides. Genetic engineers fabricate crops, genetically engineered plants, that are resistant to these biocides. Finally a true monoculture is possible—everything dead but one. And that one species—the crop—is not natural

but genetically engineered. Not that the intent is any different from technology of old; it is just the awesome mastery over the death of life. A few wonder, and fewer question, this civilizing of the land.

DOMESTIC ANIMALS

Horses, cows, pigs, sheep, goats, chickens, turkeys, ducks, geese, dogs, cats and others unloaded from off the ark or out of the European "envelope" along with the homesteaders. Others disembarked with this familiar menagerie—the plant, animal and human pathogens, and the weeds and pests, both big and small. All came to homestead the land. Each brought its community of effects along.

Climate, fertility or topographical features forbid some lands to the plough. Domestic animals were the intermediate machine, the tool, to exploit the non-arable or wildlands. The cow's ruminant stomach is the indefatigable factory that turns wild grass to meat or milk or leather. Continuously we seek new methods to make these factories more effective. Genetics increase the meat or milk productivity of these biological machines. Horticulture changes the land's productivity and carrying capacity. Some land might be broken and seeded to exotic grasses. Others are left unploughed but cleared, scarified or altered through introduction of exotic high-yielding species of plants, and chemical suppression of others. Fire, herbicides or other management technology provide more auspicious circumstances for grazing cattle. As a result native flora is eliminated.

Native fauna is also eliminated, displaced by domestic animals. Cows became surrogates for bison, not synergistically but degeneratively. Unlike the bison, they are a keystone species only, perhaps, for starlings, sparrows, clover and White people. Cows displace the wapiti, antelope, mule deer, moose and mouse. Formerly ubiquitous, the ground squirrel provided plains predators their main course; killing it eliminates those trophic levels above it. When done-in by strychnine, their predators—the hawk, fox and ferret—die fast. When erased by other means, predators die more slowly. Today some talk of ground squirrels as Alberta's next export commodity—pets, apparently, for the Japanese.²⁰

The cow's top predator, humans, displaced all others. Cougar, wolf and bear were resolutely eliminated to keep the cow safe, happy, productive and available exclusively for market appetites. While bison's grazing habits maintained diversity in native vegetation on the plains and parklands, the cow's preferences and practices collapse diversity. They graze favourite or nutritious native grasses to elimination. When overgrazed, pastures degrade to thickets of sage, shrubby cinquefoil and weeds.

Never the adventurers, cows overgraze near their favourite watering places, trampling their banks, eroding them. They foul streambeds, silting them up, suffocating aquatic life and water quality. Populations and diversity among avian and fish species plunge. Waterways occupy only a small portion of grazing lands but they are the most critical to other life. Effects of the destruction of them ripple widely.

The cow provides an efficient dispersal mechanism for exotic species. Weed seed came on their hides, in their feed and deep in their complex gut. These clever passengers of the ruminant stomach sprouted, rooted and grew in cow pies. Wherever cows wander so do venturesome clovers, thistles and other Eurasian plants. Weeds adore a disturbance so they love the plough. Wild mustards, wild oats, thistles and dandelions and hundreds of others, came west. Wherever the settler set foot—plantain is aptly called "Englishmen's foot"—weeds sprouted. Today's traveller sees little native vegetation in settled areas. Most is Eurasian. Even on Alberta's highest mountains or most deserted valleys, rarely is one beyond sight of exotic plants. In mountain meadows, up to 40% of the grasses may be exotic. For every exotic, there is one less native plant and, perhaps, one less native insect, fungi or other dependant.

Invertebrates changed too, although less is known of this. Common earthworms were introduced. Today concern increases over their ecological effects. ²² Like the weeds, any number of insect pests came overseas with their favourite food source. Houseflies followed man out of Africa through Europe to the New World. Cabbage moths and lice chummed along with their respective hosts. Native insects were eliminated, some by design, others unintentionally. The Rocky Mountain locust loved agriculture; it was extinct by 1902. ²³ Where now is the giant carrion beetle? In the war on pests, many helpful creatures, from birds and bats to spiders and nematodes, died in friendly chemical crossfire. Postwar pesticide exuberance did incalculable damage, but crops looked good.

Vertebrate wildlife leapt out of the European ship—starlings, English sparrows, pigeons, rats and the house mouse. Some native American species developed exotic-like affinities for human habits and habitations. The white-tailed deer was an eastern species that liked White people and moved west with them—Manitoba by the 1820s and Alberta by the turn of the century. Wherever there was cover and farmers, the white-tailed deer presented itself, displacing the mule deer. Introduced eastern greys may displace some indigenous red squirrels.

More obscure are diseases introduced by exotic species, usually domestic animals, to wild native species and, possibly, inter-species with humans:

The domestication of animals, which involved close contacts between humans and animals (with animals often living in the same buildings as humans), exposed people to a range of diseases which already affected animals. Some of these were able to adapt to humans as new hosts and flourish in their new environment, others slightly changed their characteristics and became specifically human diseases. Many of the common human diseases are close relatives of animal diseases. Smallpox, for example, is very similar to cowpox and measles is related to rinderpest (another cattle disease) and canine distemper. Tuberculosis also originated in cattle as did diphtheria. Influenza is common to humans and hogs and the common cold certainly came from the horse. Leprosy came from water buffalo. After living for some 10,000 years in close proximity to animals, humans now share 65 diseases with dogs, 50 with cattle, 46 with sheep and goats and 42 with pigs.24

As surely as smallpox devastated Native people, introduced diseases ravaged wildlife. What effects had canine and feline distemper on the wolf and mountain lion?²⁵ What effects might whirling disease have on native trout? What did blue-tongue and lungworm do to the bighorn sheep? And what of anthrax, bangs and rabies?

The politics of interspecies disease transmission play out today in Wood Buffalo National Park bison. Its plains bison herd descended from survivors of last century's bison campaign. In the '20s domestic cattle infected this bison herd with brucellosis and tuberculosis. When these diseases were eliminated from the Canadian cattle herd (1984 and 1992 respectively), government agriculturists and the cattle industry determined to eliminate the Wood Buffalo herd ("depopulate" is the brave new word) and thereby eliminate these diseases. Their plan was to later reintroduce disease-free and pure wood bison. A federal Environmental Assessment Review Panel recommended depopulation, but it has yet to be acted on. 26

With Frankensteinian zeal, science and technology work hard and long to create new monsters. Genetic engineering and manipulations increasingly strip nature from these sorry creatures, replacing it with attributes having economic advantage. The milk cow becomes less a cow, more a biological support system for the udder. With bovine somatotropin (BST) these udders become prodigious drug-charged milk machines for humanity. Modern habitat for these inert creatures is intense factory environments, more crowded and brutal than the factories of Dickens' day. Specialized breeds come to slaughter with production line efficiencies and mass kill

techniques. Force-fed, narrowly constrained, drug-driven, hormone-stimulated creatures, like veal calves and broiler chickens, never see day's light before slaughter's darkness. Relentless pressure accelerates the speed and efficiency of this. Designer geneticists toil to manufacture the perfectly replicable genotypes to produce the homogenous phenotypes industry demands to efficiently feed or clothe the consumer. With cloning technology these too will become perfect monocultures.

Today agriculture searches the wild kingdom for new species it can turn into consumer goods. Most bison are now cattle. Wapiti were noble animals. They too, are becoming an aggregation of products. The wapiti's efficient stomach turns herbs too wild for cows into wapiti meat—taking up those wildlands that cows will not touch. Agribusinessmen cut and grind proud wapiti antlers to dust to export to the Orient as aphrodisiacs while universities research ways to use these same horns to bulk up athletes, just about the same activity—phony hardness. Bear's bladders do the same. Today people farm ostrich, llamas, deer, trout and anything that somebody may crave. Most claim love of nature as their motive.

ALBERTA'S LAND BASE

The federal Crown holds about 10% of Alberta's lands: national parks (9%), First Nations lands (less than 1%), and other federal works and responsibilities. Provincial authority divided the remaining lands into two areas. The Green Area is approximately 350,000 km² or 53% of the province and contains those stretches considered appropriate for forestry and other resource or extractive industries, but not "settlement." The remainder, the White Area, is approximately 245,000 km² or 37% of Alberta. It hosts agricultural and other intensive humans uses, much under the regimen of private property ownership. Farming and ranching claims over 32% of Alberta's lands, that is some 208,110 km² of the 638,235 km² total.²⁷ Lands under cultivation or "improved lands," crops or summerfallow, occupy over 110,000 km²; unimproved pasture or other less intensive agricultural uses occupy just less than 100,000 km².

Agricultural lands were among the most productive wildlands. They supported the greatest populations and species diversity of fauna and flora. Formerly the range of the bison and the great bears, now they are host to wheat, oilcrops, feedcrops, cows and pickup trucks. Neoteric Alberta contains some 5.6 million head of cattle, 1.85 million pigs, 255,000 sheep, 100,000 horses, nine million chickens, 815,000 turkeys, countless dogs, cats and other domestic animals in addition to its three million people. By weight approximately 99% of Alberta non-human mega-faunal mammalian

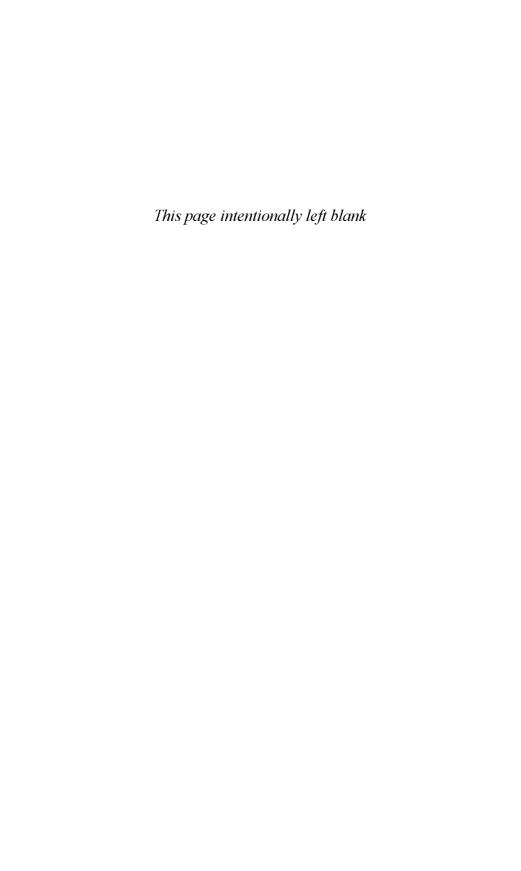
life is domestic animals, while 1% or so is wildlife. That 1% is radically altered through a century of abuse. In 1729, Native people had 100% of the land, now they have less than 1%. They were 100% of the people, now they are 2%. In 1729, wildlife was 100% of the mega-faunal biomass, now it has plunged to 1%. The displacement is nearly perfect.

OTHER AGRICULTURAL EFFECTS

The bison debacle ended large scale "market hunting" in Alberta. There was little else to kill and Alberta was far from markets. Migratory fowl "market hunting" had its largest effect at the southern end of migratory routes in America. On wintering grounds, that market bludgeoned and blasted birds in the millions. Local demand for waterfowl eggs and swan skins may have contributed to the stoop in prairie populations of trumpeter swans and whooping crane.²⁸ Habitat destruction certainly did as well.

Some wildlife—caribou, sheep, bears and whooping cranes—do not tolerate humans well. They survive only by retreat to wilderness. But wilderness itself retreated and shrank, so that by 1941 whoopers had a wild population of 15.29 Their recovery, if such it is, testifies to their attractiveness as a symbol and to massive interventions, but has nothing to do with a more hospitable wild world. Even in Wood Buffalo National Park, their last refuge and part of the last refuge of the wood bison, *Bison athabascae*, giant dams threaten their summer home.³⁰ The plains grizzly and the plains wolf survived the bison's passing, only to die with the wolfers and first settlers. Pinnated grouse or prairie chicken were ploughed and "pot shot" to death. The land suffered a succession of purges, strips.

These days agrarians claim to be true environmentalists. They care for the field and nurture the range, but their purpose is to take not to save, to exploit not nurture. A few species eke out fleeting existences on agriculture's margins, in the ditches and rock piles aside from the vast monocultures; but they do not live in nature, they exist in refugia awaiting this ice age's end and a better day. The future will bring more of the same—more technology, more production. Every slough, pothole, border and borrow pit must produce. The throbbing drumbeat "more production," the ubiquitous mantra "more technology" and the numbing ululation for "more trade" turns residents into automatons, vacantly following orders for more and more, received from farther and farther away. The Promised Land is nearly deserted now. Birds fly through on migration. They fly over amorphous furrowed seas populated by occasional giant machines, a furtive worker or two on a monoculture checkerboard, but otherwise the land is funereal.



RECOLLECTIONS OF GROWING UP IN LODGEPOLE, ALBERTA IN THE PEMBINA OIL FIELD



eteran "rig pig" Harry says he remembers the early '60s like yesterday. "I was young and perfect. Everybody remembers their perfect years.

We were all in a hurry. Those oilfields took a zillion years to fill but everybody wanted them drained now, or sooner.

"We lived on Pan Am F Lease, drove lease roads out, lease roads back, company truck of course, lived in a company skid shack, 'Mobile home parks,' some were called.

"It wasn't bad money if you could hold it. Trouble is, there was nothing to do but rough-neck, play cards, and drink—drink at the Frontier, drink in tin trailers, steal a nip in the cab of a pickup.

"Myself, I was always saving for a Parisienne, but roads in them days, rrrgh. Built 'em fast, with tons of heavy rock cuz everything kept sinking, eh, boggy and all. No place for a car.

"But those Parisiennes, I tell you, low? Wide? Long? They was it!

"Wanted a red car cuz everything else was black.

"I stayed 10 years, if I'm counting right. Longer than most. But nobody goes in there with a one-way ticket.

Excerpt from *Today is the Frontier* by Lorne Daniels Calgary Herald, December 30, 1995, D 11.

