

Windmills in Manitoba

As was suggested in a previous section focusing on the development of the so-called Indian Settlement at St. Peter's Dynevor, windmills were an essential service ensuring the economic security of the fledgling Red River Settlement. For about 40 years—from about 1825 to the mid 1860s—windmills especially (but also water mills) were the necessary quasi-industrial infrastructure that ensured the cereal crops being harvested by farmers were converted into useful foodstuffs – flour specifically.

It is important that the two windmills at the Indian Settlement (one from 1835 and the other from 1846) be situated in this context – to better understand the whole history of these long-forgotten landmarks, but especially to appreciate the skills that attended the construction and operation of the windmills at St. Peter's.

In his very useful 1981 article in *Manitoba History*, "Flour Milling at Red River: Wind, Water and Steam," Professor Barry Kaye (Department of Geography, University of Manitoba) provides important background context for the exploration of the St. Peter's Dynevor windmills. Professor Kaye's article focuses on both water mills and windmills; it is the section on wind-powered mills that is reprinted here:

Before the transfer of Rupert's Land to the Dominion of Canada in 1869-70, the colony founded on Red River by Lord Selkirk in 1812 was the major centre of population and agriculture in the Canadian Northwest. As such, it was also the preeminent centre for the primary processing of the agricultural products necessary for day-to-day life at Red River and for the operations of the fur trade.

Selkirk's main intention in establishing a colony at Red River was to provide a home on British territory for dispossessed Scottish and Irish peasants, thereby reducing both

social stresses in Britain and the flow of emigrants to the United States. Selkirk's plan for an interior colony became a reality only through the cooperation of the Hudson's Bay Company, on whose chartered lands it was to be planted. For its part the Company judged that an agricultural colony might serve as a reliable and convenient source of agricultural foodstuffs and labour for its growing number of Northwest fur posts. Such a settlement, the Company hoped, would allow significant reductions in the expense of importing the English provisions needed to supplement the local food supplies of its overseas settlements and thus increase its competitiveness in the ongoing struggle with the Northwest Company for commercial supremacy in the fur trade.

Foremost among the secondary industries at the Red River Colony was grist milling, which produced the flour used in Red River households and at the fur posts. From the onset of colonization, plans were made for the installation of a gristmill to meet the needs of the first settlers. In a letter dated 12 June 1813 [Lord] Selkirk advised Miles Macdonell, the first governor of the colony, that "I have no doubt of your finding good mill stones on the east coast of Winipic [Lake Winnipeg] among the granitic rocks." Writing shortly afterwards, Macdonell informed Selkirk that "A wheel-wright and a constructor of windmills would be great acquisitions to us." As a result of these exchanges Samuel Lamont, a millwright about whom Selkirk had heard good reports, accompanied the party of Kildonan Scots settlers that journeyed to Red River in 1814.

The colony's first powered mill was erected in the spring and early summer of the following year. This was a horse-powered treadmill constructed out of local timber and using grindstones transported from the Lake Winnipeg area the previous year by the incoming Scots settlers. Unfortunately this first mill was never able to demonstrate its value to the settlers, as all the colony buildings, including the recently erected mill, were burnt to the ground by the Métis in 1815.

A second horse-mill, able to grind from 12 to 15 bushels of grain per day and employing millstones of four feet in diameter "found pretty near at hand," was

erected at considerable expense during the winter of 1820-1821 for the use of the settlement. The mill worked well enough in the cold season, but during the spring thaw part of the foundations gave way and by May 1822 the mill was not working. Another mill, built by the Hudson's Bay Company and intended primarily for Company needs, but also used by the settlers when the colony mill was out of order, was working by November 1822. Earlier in the same year the lack of flour milling capacity at Red River forced the Company to ship grain as far as the mouth of the Winnipeg River for grinding into flour by the mill at Fort Alexander.

It is not known what proportion of the colony's grain was processed by these first mills. What is known is that throughout the colony's early years the settlers ground much of their grain in simple handmills or querns. The quern was a hand-operated rotary mill that was still widely used for grinding in the Highlands of Scotland during the early nineteenth century. Many of the Kildonan settlers brought querns with them and [George] Simpson [Governor of the Hudson's Bay Company during the period of its greatest power, 1820-1860], writing in 1824, claimed that every second or third settler owned one of them. In 1822 the colony also acquired a handmill and two flour sieves from Fort Alexander. For the periods of time when there was no animal-powered mill, most of the colony's wheat must have been ground in handmills. The quern consisted of "two flat stones (the upper and the nether)—the upper having a handle which turned it upon the wheat and brought the grain into some semblance of flour, not over white, but in the best degree a health-producing and dyspepsia—obliterating substance." Small amounts of wheat may also have been ground by similarly hand-operated steel mills.

In 1821 the Hudson's Bay Company sent out to York Factory on Hudson Bay the machinery required for the erection of a wind-powered gristmill. Governor Simpson came across this machinery at York during his 1821 visit to the Northern Department. He reported to Andrew Colvile, [Lord] Selkirk's brother-in-law and one of the principals of the Hudson's Bay Company, that "the Iron Mill now lays here and is likely to remain in our stores. One piece of machinery alone weighs 10 cwts. and

unless boats are constructed purposely and handymen sent from England for the purpose of transporting it, here it must continue." Simpson recommended that the weighty mill machinery be shipped back to England and "returned to the tradesmen who furnished it even at a reduction in price as here it is totally useless."

The machinery remained, however, at York Factory and in August 1822 selected parts of it were forwarded to the colony. The selection was made by James Mitchell, a Scottish millwright who had arrived that year in the Company ship from England to supervise the erection of a gristmill at Red River.

Two years later, in 1824, Mitchell was reported by Simpson to be constructing not a windmill but an animal-powered corn mill at Red River, able to grind 17 to 18 bushels of grain per day. The equipment transported from York Factory in 1822 turned out to be machinery for a sawmill, not a corn mill, and led Simpson to doubt whether Mitchell had the skill and knowledge to set about erecting a windmill.

Despite Simpson's apprehensions, Mitchell, aided by Captain F. Matthey, an officer of the De Meuron mercenaries, completed the erection of a windmill at Red River. It was located on the southern edge of Point Douglas about a mile north of Upper Fort Garry. The windmill began to grind on October 1, 1825 and was said by a Fort Garry journalist to work "well," whilst those best able to judge thought the workmanship "solid and complete." The flour it produced was considered "fine and fully answerable to all demands" by Donald McKenzie, the governor of the colony. Simpson was also favourably impressed by the new mill which seemed to him to answer the needs of both the Company and the settlers at Red River.

The expense of the mill's construction, which amounted to £1,500, was borne by the Estate of Lord Selkirk. When it was finished, the mill, plus one hundred acres of adjoining land which included the site of old Fort Douglas, was sold [almost immediately] for £400 by an agreement of June 11, 1825 to Robert Logan, a retired

trader who had worked for both the Northwest and Hudson's Bay Companies. Payment was fixed at one tenth of the grain ground. The mill fortunately escaped serious damage from the 1826 flood and served as a place of refuge for settlers and livestock during the worst periods of that disaster. Logan's daughter remembered that the mill was a "big round building like a tower—broader at the bottom than at the top, and it had great sails that flapped around and around when there was a good wind and there was grinding to be done."



The first windmill in the Red River Settlement, was built in 1825 for the Hudson's Bay Company by James Mitchell, a Scottish millwright, and Captain F. Matthey, an officer of the De Meuron mercenaries who had accompanied Lord Selkirk on his visit in 1817. In this engraving the mill, which was located on the southern edge of Winnipeg's Point Douglas area, is shown as part of Robert Logan's farm; Logan took over ownership of the mill almost as soon as it was completed. (Image Courtesy Archives of Manitoba)

The mill erected by Mitchell and Matthey on Point Douglas was the first of several to be erected along the banks of the Red, and to a lesser extent the Assiniboine, during the next 40 years. Lack of relief and fairly regular high winds seemed to ensure a successful future for the wind-powered flour mill at Red River.

Logan's windmill was for a few years the only one at the colony and was still in active use when Alexander Ross wrote his history of the Red River settlement in the 1850s. As might be expected, the expansion of the settled area and the growth of wheat production was paralleled by increasing numbers of grist-mills at the colony. By 1830 a second windmill was in operation and three others were under construction. In 1831 the first mill was under construction at the Grand Rapids (later St. Andrew's Parish) to meet the needs of the retired fur company servants who settled in large numbers along that stretch of the Red River.

According to Ross, who was himself a mill owner in the early 1830s, the windmills at Red River "were made with the materials of the country, iron only excepted, and finished by the workmen of the settlement, at an average cost, everything included, of £150 sterling." In addition to the iron work, many of the millstones were also imported. Visiting the colony in 1857, Hind was informed that, although millstones had occasionally been obtained from the Lake Winnipeg area, "they could not compete commercially with these imported by the Hudson's Bay Company, which, for a time, were sold for a little above cost, even after their long and expensive journey."

In the 1850s there were two millwrights amongst the few tradesmen at Red River. One of the two was Hugh Polson of Kildonan, who had learnt his trade by helping his fellow Scotsman James Mitchell erect Logan's mill in 1825. Polson built a windmill for himself in the 1830s and later erected "several others at different points in the settlement."

By the time of the 1838 census, the first to record the colony's millers, there were fourteen windmills at Red River. The number of windmills increased only slowly over the next 20 years and no more than 18 were counted in any census year. They were numerous enough, however, to stand out as prominent features in the flat Red River Valley. In the words of an 1848 visitor from the United States: "The grain is ground by windmills, which form picturesque and conspicuous objects in the landscape of the plains surrounding the settlement." For Hind, the windmills were the only visible evidence of any manufacturing activity at Red River.

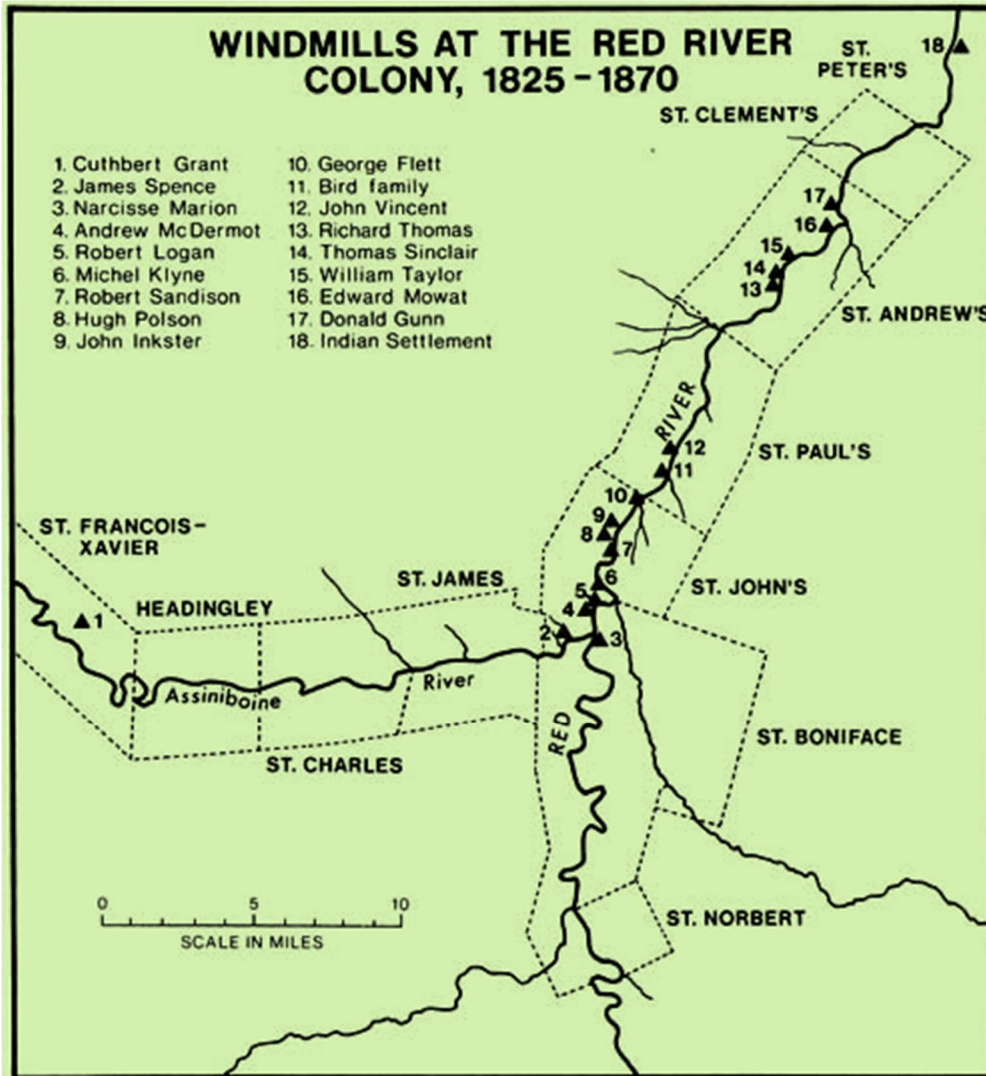


In this early photograph, ca. 1870, of the landscape around Middlechurch, the site of St. Paul's Anglican Church, and today a northern suburb of Winnipeg, one can easily discern the two landmark forms of windmills on the right-hand horizon line. ((Image Courtesy Archives of Manitoba)

North of the Forks along the west bank of the Red River, in what was generally called the Lower Settlement, windmills occurred at fairly regular intervals along the river front (see map next page). The Lower Settlement included the predominantly English-speaking Protestant parishes of St. John, St. Paul and St. Andrew. In 1856, 13 of the colony's 18 windmills were located in these three parishes. The reasons for the concentration of mills in that quarter of the colony are fairly obvious. It was the longest settled and most densely peopled part of the colony and also the part where agriculture was most important and most advanced in the years prior to 1870. The relative dominance of agriculture along the lower Red was not the result of any environmental advantages but of the cultural prejudice of the Scottish Highlanders, who formed a significant portion of the parochial population only in St. John's and St. Paul's. It was the Scots at Red River, and to a lesser degree the Orkneymen and English-speaking mixed-bloods [now more commonly identified as Métis], who were most completely dependent upon agriculture as the main source of their livelihood. The distribution of mills at Red River mirrored this fact.

Even at the centre of the colony windmills were far fewer on the east bank of the Red River. Until the 1850s only one mill sufficed to grind the wheat grown by the Canadian and Métis farmers of St. Boniface. This was the windmill built south of the St. Boniface mission church, sometime between 1840 and 1843, by the Canadian Narcisse Marion.

Outside the agricultural core of the colony the commitment of settlers to farming was weak or nonexistent and mills were consequently fewer. This was particularly the case in the peripheral parishes of St. Francois-Xavier and St. Norbert where the population comprised a mixture of Métis and Canadians, and that of St. Peter which was wholly Aboriginal. Almost all the residents of these parishes lacked any significant agricultural background, and although a few adopted the life of the farmer with some enthusiasm and energy once they settled at Red River, this was not general. Grain production was, therefore, small and the needs of the population could be met by a small number of mills.



This map created for Professor Kaye's article shows the concentration of windmills along the Red River, especially in the area above (north) of the forks of the Red and Assiniboine rivers and then along the stretch near St. Andrew's. The windmills at the Indian Settlement are shown as number 18, top right.

For many years one windmill, erected sometime during the early 1830s by the settlement's founder, Cuthbert Grant, ground flour for the Métis settlement of Grantown (St. Francois-Xavier). Grant's mill remained the most westerly one in the Red River country until the early 1850s. At that time English-speaking mixed-bloods from St. Andrew's and St. Paul's began to migrate westwards along the Assiniboine and settle at Portage la Prairie, where a windmill was erected by John Hudson soon after the commencement of farm settlement. Hudson's mill continued to grind until 1873, when it was pulled down and its timber used in the construction of a blacksmith's shop.

The most northerly windmill in the colony, that in the Church Missionary Society's station at St. Peter's, differed from the others at Red River in that it was built as a result of encouragement by missionaries. The Church of England missionary, the Reverend William Cockran, encouraged the building of a mill at the mission he had established in the early 1830s amongst the Saulteaux and Swampy Cree living in the vicinity of Netley Creek and the Red River delta. Cockran actively urged the Aboriginals to settle down and become agriculturalists as a step in their conversion to "civilization" and Christianity. He saw mill building as a part of this process. In his journal for 11 February 1835 Cockran wrote that "the Indians began to complain of the inconvenience they were subjected to from not having a gristmill. The poor fellows are obliged to live principally upon parched corn, when they are unsuccessful in taking fish. This is not agreeable when the settlers above are enjoying their wheaten bread. I reminded them of their former state, and likewise the present state of the Catholic population, that had not one mill amongst them, but at the same time assured them if I saw them enlarge their farms and raise as much grain as was worth incurring the expence [sic] of building a mill, I would certainly set about as soon as possible. A mill to us here would be of great service."

Six months later Cockran reported his intention to go ahead with the erection of a mill at the Indian Settlement so that he "might be able to give the children a larger quantity of flour, and likewise to grind the grain of the parents upon the spot, to see if

they will not be more attached to the habits of civilized life." The mill was completed later that year or early in 1836, several months before the mission church was finished. Cockran referred to it as "the most conspicuous mark of civilization that we have planted in this rude waste."

The windmill built at the Indian Settlement in 1835 is the only one at Red River whose precise dimensions are known. The pillar of the mill was 21 and a half feet in diameter at its base, while its height from the foundations to the top of the dome was 37 feet. The mill stones were three feet six and a half inches in diameter and the sails, each of which contained 76 yards of canvas, were 17 feet six inches long and six feet wide.

The Indian Settlement mill gradually fell into disrepair and in 1845 had been out of operation for three years. It was rebuilt in that year under the supervision of the Reverend John Smithurst, at a cost of one hundred pounds. Once the mill was back in working order the Aborigines "made considerable efforts towards enlarging their farms." In 1852 the mill at St. Peter's was sold on twelve months' credit to an Aboriginal settler, Thomas Cameron. In the same year a second mill was built at the Indian Settlement. Cockran informed his superiors that this second mill "may be said to be entirely Indian property — It does a great deal of good. & we get a regular supply of flour, & the two mills give a certain portion of employment to needy individuals and sell flour to others who have anything to represent it. This gives an additional spur to industry and will no doubt induce the Indians to enlarge their farms & look more to the soil for the supply of their wants."

Throughout its long history as a source of mechanical power the major shortcoming of the windmill has been its failure to provide power during periods of calm weather. One settler at Red River remembered that "The north and northwest winds were the best for the mills. The south and east winds were not so strong and steady." There were also occasions when "there would be a breeze strong enough to give them power to grind, but not to bolt." At such times the settlers had to do the bolting themselves. for which was used "a sieve of brass wire which we would hang from a

beam and spread a white cloth under it on a table, then by pouring in the ground but unbolted grist we had brought from the mill and shaking the sieve we would get flour." Prolonged calms sometimes caused or accentuated flour shortages at Red River. The windmills did "fair work," according to Macbeth, "but when a long calm prevailed there was always danger of a flour famine, unless by borrowing from one another the supply could be eked out until the wind arose." The Reverend John Black wrote from Kildonan in February 1856 that "The people have almost been out of flour the whole winter on account of the very calm weather." Against such contingencies as this many households continued to keep a handmill even after windmills were erected at the colony. Such calms occasionally posed problems for the Hudson's Bay Company in making up its requisitions of flour from the colony. In 1828, when Logan's windmill was still the only flour mill at Red River, Donald Mckenzie informed Simpson that "With the settlers the harvest has been pretty liberal; in consequence your requisition of flour bids fair to be put up unless the calms present a hinderance [sic] as last year at the mill."

In his discussion of the Red River Settlement, John Palliser included a section on the "Trade and Occupation of Inhabitants." According to Palliser, "There can be said to be no distinct trades practised at Red River, every man being his own carpenter, smith, mason, etc., and the women taking the clothing department." Henry Youle Hind was similarly informed by Mr. W. R. Smith, the clerk of the Council of Assiniboia, and the Superintendent of the Red River census, that "no kind of industry or a distinct trade or occupation existed in the settlements. Almost every man was his own wheelwright, carpenter or mason; carpenters, blacksmiths, masons, etc. could be found, but they were also engaged in other occupations, either as small farmers or hunters. Mr. Smith did not think that one man could be found in Assiniboia who pursued any particular trade, or limited his industry to one special branch. Both Palliser and Hind probably suggest a greater degree of self-sufficiency among Red River households than was the case, for to the extent that colonists with a particular craft skill supplemented their incomes by doing odd jobs for their neighbours, there was some specialized activity at the settlement.



"Young's Mill," by noted painter Paul Kane, shows a windmill outside the walls of Lower Fort Garry, ca. 1860. ((Image Courtesy Archives of Manitoba)

In general, the millers were settlers of energy and some entrepreneurial ability who were trying to escape the stifling economic restraints imposed upon the colony by the all-pervasive fur trade and the Hudson's Bay Company monopoly. The milling business was one avenue of economic advancement. Included amongst the settlement's millers were some of the most eminent citizens at Red River, men who were involved in a variety of vocations other than agriculture. The Orkneyman John Inkster, for example, was a store owner, merchant, free trader and member of the Council of Assiniboia, as well as a miller. Andrew McDermot, the colony's most prominent miller, was also a leading free trader, a shopkeeper, a freighter and a dealer in cattle. Narcisse Marion of St. Boniface owned "a shop of merchandise" and a blacksmith's shop as well as a windmill. Robert Sandison and Thomas Sinclair combined carpentry with milling. John Tait was a carpenter and boat builder as well

as the owner of a water mill. In addition to Inkster, McDermot and Marion, several other millers owned both a mill and a store. These included Donald Gunn, Thomas Logan, Edward Mowat and John Vincent. Several of the colony's millers also earned part of their livelihood by private freighting. The boats of John Inkster, Andrew McDermot, Edward Mowat and Thomas Sinclair voyaged twice during the summer months to and from York Factory, carrying goods ordered from England by both the Company and the settlers.

It is also worth noting that the majority of the Red River mills were owned and operated by Protestant settlers as might be expected from their interest in agriculture. These included Scots, Orcadians, Englishmen and English-speaking Métis and after 1852-53, an Aboriginal [at St. Peter's]. Of the more than 20 millers identified in the Red River censuses before 1856 only four—Andrew McDermot, Michel Klyne, Narcisse Marion and Cuthbert Grant—were of the Catholic faith.

No account of the early flour milling industry at Red River would be complete without a discussion of the role of the Hudson's Bay Company in that industry. The Company was by far the largest customer of the Red River gristmills and following 1865 was itself directly in the milling industry. The Company started to buy Red River wheat in 1825, the first year in which there was a surplus. In February 1826 Company carts carried its wheat purchases to Logan's newly erected windmill for the first time, "to be ground for exportation in the spring, to Norway House and York Factory, for the ensuing summer's consumption." After the mid-1820s wheat was the most important item in the Company's purchases of colonial farm produce. It was also the only item that had to be processed before it could be shipped out of the colony to provision the fur trade.

There thus began in the 1820s the system, which was to continue until 1870, whereby flour produced by Red River millers was annually boated north to the stores at Norway House. Norway House, in turn, supplied the boat brigades of the various districts that composed the Northern Department as they passed on their journey to

and from York Factory during the weeks of open water on the Nelson River system. In this way Red River flour and other colonial farm products were distributed to fur posts scattered throughout the vast distances of the Northern Department.

With the increase of gristmills after 1830, the Company patronized a variety of private millers in the colony. Indeed, the prospect of the Company's business may have been the prime factor in convincing a few settlers that flour milling would provide them with valuable additional income.

After 1850 the Company appears to have reduced the number of mills at which its wheat was ground. McDermot constructed his water-powered gristmill on Sturgeon Creek on the understanding that he would have the right to grind the Company's wheat for the next ten years. From entries in the Fort Garry post journal, it is evident that a large part of the Company's wheat purchases during the 1850s was in fact ground at McDermot's mill on Sturgeon Creek. The flour was boated down the Assiniboine or sent by cart to the flour stores at Upper Fort Garry. McDermot did not, however, have a monopoly of this side of the Company's business. In 1854, the Company loaned Louis Riel Pere one hundred pounds "in the security of his water mill across the Riviere la Seine" and in the late 1850s Riel was grinding Company wheat at his water mill on the Seine to the east of the Red. After 1857 the Company also made use of the St. John's steam mill, and in the autumn of 1858 was sending wheat to "Larjemonier's" mill.

Windmills and water mills were the only sources of mechanical power at the colony until 1856, when the Red River Valley's first steam mill was erected. Amidst an atmosphere of what one colonist described as a "mania" for steam, during the winter of 1855-1856 a number of prominent Red River citizens organized the formation of a joint stock company, "The Red River Steam Mill Co.," that would raise sufficient funds for the purchase of a steam gristmill and saw mill. The desire for a new source of power appears to have been instilled by the shortages of flour resulting from the calm weather that halted the windmills for long periods that winter.

The machinery and boiler for the mill were purchased in St. Paul, Minnesota, and transported north to the colony along the Red River in a scow, a type of flat-bottomed boat. The mill, driven by a 20-horse power engine fueled by wood and designed to saw timber as well as produce flour, was assembled in St. John's parish. It had a two run of stones and began to grind in December 1856. The cost of the machinery and its assembly was £1,600, raised in £50 shares. The major shareholder and president of the steam mill company was John Inkster, an Orkneyman, of St. John's.

The steam mill posed mechanical problems and never turned a profit for the proprietors, but nevertheless it gave valuable service to the colony for several years, particularly during the winter season. The new mill was reported to produce "an excellent article." This venture unfortunately ended in 1860, when the mill was totally destroyed by fire.

At the time of this disaster the ever-enterprising Andrew McDermot was starting to assemble the colony's second steam mill. The mill machinery was purchased by McDermot from the United States government at Fort Abercrombie, Minnesota, in the summer of 1859. The mill was located a few yards back from the Red a mile or so north of Upper Fort Garry, close by McDermot's home of Emerald Grove. It was in operation by November of 1860. The charge for users was eight pence per bushel or one eighth of the grain ground, which rose to one shilling per bushel or the fifth bushel by October 1863. The settlers were heavily dependent on McDermot's steam mill during the dry summers of 1863 and 1864 when the water mills failed to grind and the windmills were unable to meet the extra demand. This mill suffered the same fate as its predecessor, however, and it was destroyed by fire in December 1872.

Later in the 1860s steam mills were constructed in other parts of the colony. In 1863 the first steam mill in St. Andrew's was built at the Rapids on the corner of the parish church lot and was expected to begin grinding early the following year. This appears to be the same mill built by E.H.G.G. Hay, a Yorkshireman who settled at Red River in the early 1860s after a number of years in the United States.

In the mid-1860s the *Nor'Wester* [newspaper] carried advertisements for Hay's "American Steam Mill" and "new store" at the rapids of St. Andrew's, grinding at the eighth bushel in wheat. By 1867 Hay's mill contained a smutting machine and was able to "produce a good article of wholesome flour." Hay's mill served the residents of St. Andrew's until 1877, when it too was destroyed by fire.

In 1868 J. B. Holmes of St. Boniface built a steam grist and saw mill at High Bluff to the east of Portage la Prairie, an area of rapid settlement in the 1860s. Other steam flour mills were erected at Portage la Prairie itself during the early 1870s, the first by William M. Smith, a former resident of Winnipeg who had been that town's "pioneer flat-boatman." Lower down the Assiniboine in the Silver Heights district of St. James, a steam mill was built at Sturgeon Creek by Robert Tait in 1869. Tait's mill was said to produce a "beautiful fine flour." Based on information from 1872, the St. Norbert parish survey map of 1875 locates Joseph Lemay's steam mill, the first in a predominantly French-speaking parish, on the west side of the Red a short distance north of the parish church. The year of its erection is not known.

During the 1860s the Hudson's Bay Company also involved itself in the steam flour milling business at Red River. This involvement stemmed largely from the Company's growing dissatisfaction with its heavy reliance on the inconstant wind and water mills of the colony's private millers. Furthermore, getting the wheat purchased from the settlers to the mills for grinding involved "the Company in a great deal of expensive and time-consuming transportation."

The outcome was that in 1865 the Hudson's Bay Company decided to enter the milling business for itself. In that year a steam mill, doubling for grinding grain and sawing wood, was installed at Lower Fort Garry. Fitted with grindstones brought in by cart from the United States, it was in operation by November 1865. Entries in the post journal reveal that the new steam mill ground the grain of the local settlers in addition to that harvested from the large farm the Company had maintained since the late 1850s at the Lower Fort. The mill used fuel at a prodigious rate and Company

servants were kept busy cutting and hauling wood when it was on steam. It continued to grind until 1879, "when in the face of competition from smaller private mills in the area it was finally abandoned."

The royalty that Red River farmers paid to the miller, what was known as the "moulter measure," varied according to the type of mill. The toll on wheat milling in 1869-70 ranged from one sixth of the wheat at the steam-driven to one-ninth at the water-driven mills, with the windmills probably exacting something between those extremes. It was George Henry Gunn's recollection, however, that certain clients of his father's water mill, such as the Hudson's Bay Company and the wealthier local residents, paid in cash.

In the early years of the new Province of Manitoba, which was created in 1870 and embodied the Red River Settlement, flour was turned out by a combination of wind, water and steam mills. During Manitoba's first decade, steam flouring mills were erected in Winnipeg in the parishes along the Red and the Assiniboine, as well as in the new farming communities that sprang up beyond the old riverfront settlements after 1870. At the same time there was a reduced need for the inefficient and unreliable wind and water mills with their one or two run of stones. These primitive gristmills, therefore, eventually fell into disuse. A few windmills were still working in the Winnipeg area, including one at Colony Creek owned by James Spence, at the time of J.C. Hamilton's visit in the mid-1870s. His comment was that "most of them have been dismantled and their machinery taken farther west, steam mills here taking their places."

The proliferation of steam mills did not, however, immediately eliminate the use of windmills in the settlements along the Red and the Assiniboine. In St. Paul's parish, for example, the windmills continued to operate even after Hugh Pritchard built a "fine" steam mill close by the parish church in the 1870s. The older settlers in particular preferred the parish windmills, believing that they turned out a "stronger and better flour."

St. Peter's Dynevor Windmill – A Graphic Recreation

As noted at the outset of this report, the purpose of this project has been to determine what the St Peter's Indian Settlement's 1835 grist mill looked like – that is, how it was put together with native materials at hand (thus without machine power), how those materials gave it a certain form, and how it operated.

Obviously nothing is left of this windmill, or of any of the 18 other windmill sites that once ground grain in early nineteenth-century Manitoba. But all the preceding information developed for the report has lead to this point – the suggested graphic recreation of this important early Manitoba milling operation, which is conveyed by a set of annotated drawings on the following pages.

Before the drawings are presented, it is useful to summarize the key historical, architectural, structural and operational facts drawn from various preceding materials, and to provide some additional salient observations:

The St. Peter's Indian Settlement Windmills

The following contextual facts are drawn from Donna Sutherland's book on Chief Peguis and Professor Kaye's article on Manitoba windmills.

- The second of two "Indian Settlements" was inaugurated in 1833 on the east bank of the Red River, near the present site of St. Peter's Dynevor Church. By 1835 the settlement was well established (35 acres under cultivation) and Reverend Cockran decided a grist mill was required for the community's self-sufficiency. Given that there was the need to cut and season the timber for the mill, it is likely either that Cockran's decision to build occurred in 1834, a year before construction, or that the mill was actually built in 1836.

- Whether it was constructed in 1835 or 1836, the St. Peter's windmill was built at a time when buildings at the Red River Settlement were made with materials at hand—logs, stone, long marsh grass—and with near-Medieval building technologies: thus no light wood frame, no wood siding, no wooden shingles, no brick, no concrete. The rudimentary, but still effective, approaches to building and carpentry will be kept in mind when we imagine the mill's construction.
- Cockran had trouble finding a carpenter in the Upper Settlement to build the mill. He hired a young Saulteaux man to dig the ground for the "foundation" – presumably the deep holes to take the long poles that formed the main structural features (see evidence of this following). It was then to the men of the village that he looked to build the mill.
- This first windmill at the Indian Settlement is the only one at Red River whose precise dimensions are known: 21 and a half feet in diameter at its base, while its height from the foundations to the top of the dome was 37 feet.
- It is noted that supplies for the construction project were purchased at the Upper Settlement (i.e., the thriving community formed by the Selkirk Settlers and others around Point Douglas in present-day Winnipeg and of the Hudson's Bay Company operation at Upper Fort Garry), which meant numerous trips were made up and down the river with supplies. This is a key fact, and while the absence of details in the record is unfortunate, the entry may actually go a long way to suggest a great deal about the windmill's construction. "Numerous trips" implies a fair number of pieces of apparatus and specialty materials that were required, perhaps even some components that were manufactured (and paid for) and assembled at the site – like the intricate cap railing and guide, or the brake wheel, or the various geared wheels.
- The mill stones were three feet six and a half inches in diameter and the sails, each of which contained 76 yards of canvas, were 17 feet six inches long and six feet wide.
- In 1852 this mill was sold on 12 month's credit to an Aboriginal settler named Thomas Cameron.

- The windmill was rebuilt in 1845 under the supervision of the Reverend John Smithurst, at a cost of £100; it is difficult to convert that sum into a comparative modern value – one online inflation calculator suggests more than £60,000 (Canadian dollar value today of \$114,000!); more conservative sources suggest a value of \$10,000 Canadian. Any way you look at it, this was a major investment. And of course the sum raises questions about what was being paid for – labour, technical skills, specialty materials, transport, apparatus?
- In the same year a second mill was built at the Indian Settlement, with Cockran observing that this second mill “may be said to be entirely Indian property – It does a great deal of good & we get a regular supply of flour, & the two mills give a certain portion of employment to needy individuals and sell flour to others who have anything to represent it.” Note that Professor Kaye notes a construction date of 1852 for this new mill.

General Information about Red River Settlement Windmills

The following information is drawn from Professor Kaye’s article on Manitoba windmills.

- The first windmill in the Red River Settlement began to grind on October 1, 1825.
- It was built by trained wheelwright James Mitchell, aided by Captain F. Matthey, an officer of the De Meuron mercenaries who had accompanied Lord Selkirk to the settlement in 1817. The mill was almost immediately sold to Robert Logan for £400 by an agreement of June 11, 1825. Using a similar estimate for contemporary values as suggested above, this might be the equivalent of about \$40,000.
- Robert Logan’s daughter remembered that the mill was a “big round building like a tower – broader at the bottom than at the top, and it had great sails that flapped around and around when there was a good wind and there was grinding to be done.”

- According to Alexander Ross, who was himself a mill owner in the early 1830s, the windmills at Red River “were made with the materials of the country, iron only excepted, and finished by the workmen of the settlement, at an average cost, everything included, of £150 sterling.” As noted above – this would be the equivalent of about \$15,000 Canadian today.
- In addition to the iron work, many of the millstones were also imported. Visiting the colony in 1857, surveyor, geologist and explorer Henry Youle Hind was informed that, although millstones had occasionally been obtained from the Lake Winnipeg area, “they could not compete commercially with these imported by the Hudson’s Bay Company, which, for a time, were sold for a little above cost, even after their long and expensive journey.”
- In the 1850s there were two millwrights amongst the few tradesmen at Red River. One of the two was Hugh Polson of Kildonan, who had learnt his trade by helping his fellow Scotsman James Mitchell erect Logan’s mill in 1825. Polson built a windmill for himself in the 1830s and later erected “several others at different points in the settlement.”

General Information Tower Windmills

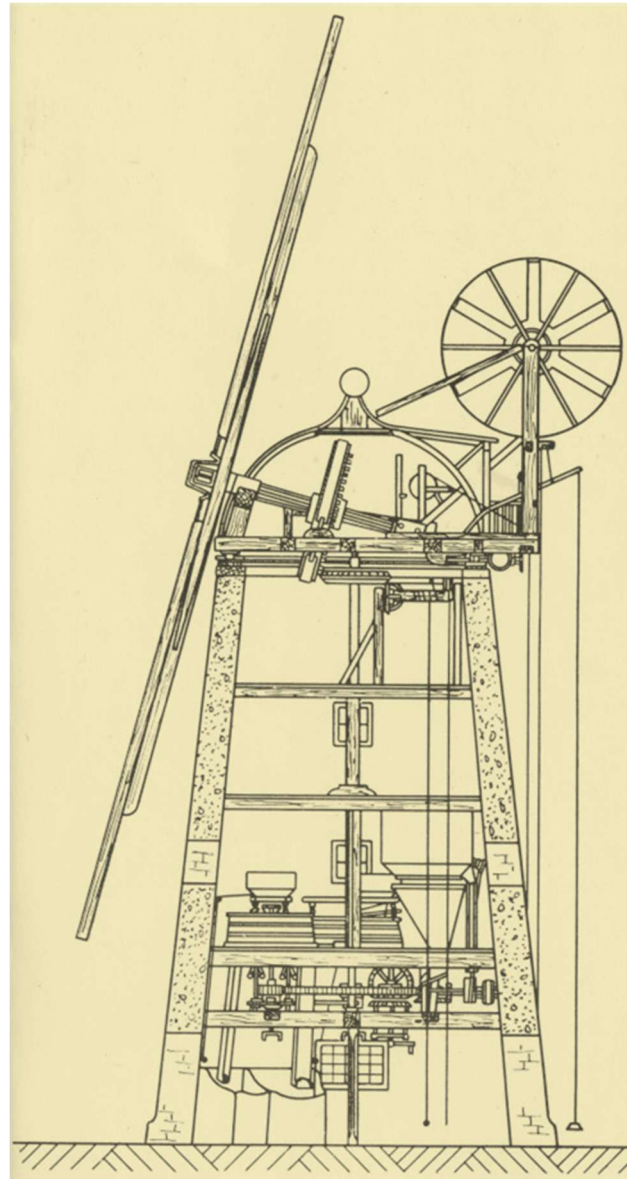
The following brief overview of the operation of a tower windmill is drawn from the extensive and detailed analyses developed by Professor Shepherd and Mr. Hearfield; an illustration is included for clarity. There are three key features of a tower mill that need to be clearly understood for a recreation of the St. Peter’s windmill: the sails, the powertrain/windshaft and the cap. A fourth aspect, the grain grinding apparatus, though not specific to the tower mill, also needs to be briefly explained.

The essential point here is that by the time of the St. Peter’s mill’s construction, in 1835 (or 1836), all of the following aspects of windmill construction and technology would have been well-known and understood by anyone undertaking this kind of major project.

- **The Sails** – There are three key facts that will inform the following drawings: the lattice of the sails will be set at an angle of 15 degrees to the plane of the main stocks, and angled inwards to the mill; the lattice frame will be attached to the stocks along one edge (rather than along the middle); and the sails will be made of cloth – likely canvas. It is presumed that the main wooden elements of the sails would have been local oak.
- **The Powertrain/Windshaft** – The timber that forms the main element of the powertrain—the windshaft—is invariably at a 15 degree angle to the horizontal, defined by the angle of the main sail feature that is set at this angle to better catch the wind. It also will need to be large—at least a foot square, and presumably of a stout material, oak probably. It may also have been tapered and lathed at certain key points along its length to fit or accommodate other features – like the neck bearing, brakewheel, tail bearing or tail beam. The brake wheel, which is invariably quite large—most images of this feature show it at least six feet across—will have been built up of various cut and formed members and assembled into a perfect circle, with a central cavity to allow it to fit over the windshaft. The perimeter of the main wheel will be covered with notched features (likely wooden shingle shapes) to ensure effective braking. A secondary attached wheel will be studded with small wooden teeth that will ensure its mechanical engagement with the wallower gear, which itself will also need to be carefully shaped and detailed.
- **The Cap** – The cap atop the tower must be capable of turning – this is a prerequisite of the successful operation of a tower mill, ensuring that the sails are placed in good positions to catch and exploit the wind, and also that the brake wheel and wallower gear are constantly aligned so as to engage with lower level axles and gears and of course finally with the grinding stones. This is a key point to note and remember – the St. Peter’s mill, and likely other Red River windmills, may have been rudimentary in their construction, but they still had to be sufficiently sophisticated so that their various pieces of machinery ran smoothly.

As noted earlier in the report, the feature that facilitated the cap's revolution is not highlighted nor fully explored in any sources: Professor Shepherd only provides this basic observation: the cap "required a fixed curb or rail on which the cap could turn with a minimum of friction." To extrapolate from this essential but vague presumption – the rail or curb, presumably attached to the top level of the tower, would need to be nearly perfectly circular (and level), while a similarly configured feature that rested on it (and presumably overlapped it on one edge for stability) would likewise have been nearly perfectly round and level. And each of these large features would have to be rendered smooth, to ensure ease of turning. We know that this level of craftsmanship would have been available at the Upper Settlement – where various millwrights experienced with windmill construction had already proved their worth with several windmills. And so it is assumed that there must have been considerable sharing or knowledge, and perhaps even paid service, in the production of this part of the St. Peter's windmill. As noted above, there were many trips taken to the Upper Settlement for various supplies required for the project, so it is assumed that some of the most complex features of the mill—the windshaft, brake wheel, gears—might also have been procured there and that other features were manufactured there.

- **The Grain-grinding Machinery** – The various wheels, gears and axles that define nearly every grist mill operation (powered by water or wind) will naturally have been developed for the St. Peter's mill. In a windmill, the process and the apparatus start at the engagement between the wallower gear and the brake wheel and continue down until power is transmitted to the primary turning feature – the upper grinding stone; the lower stone was always stationary. The stones were sheltered in a metal or wooden box, through which raw grain was poured, and upon grinding fed by the design of the stones and gravity to a spout that directed the flour to a lower level for bagging.



A cross section of a tower mill used for grinding grain. As per the summary entries above, notice the angle of the sails and windshaft, the details at the joint of the tower body and cap (allowing for cap turning) and the various axles, wheels and gears required for grain grinding that are all aligned below the cap.

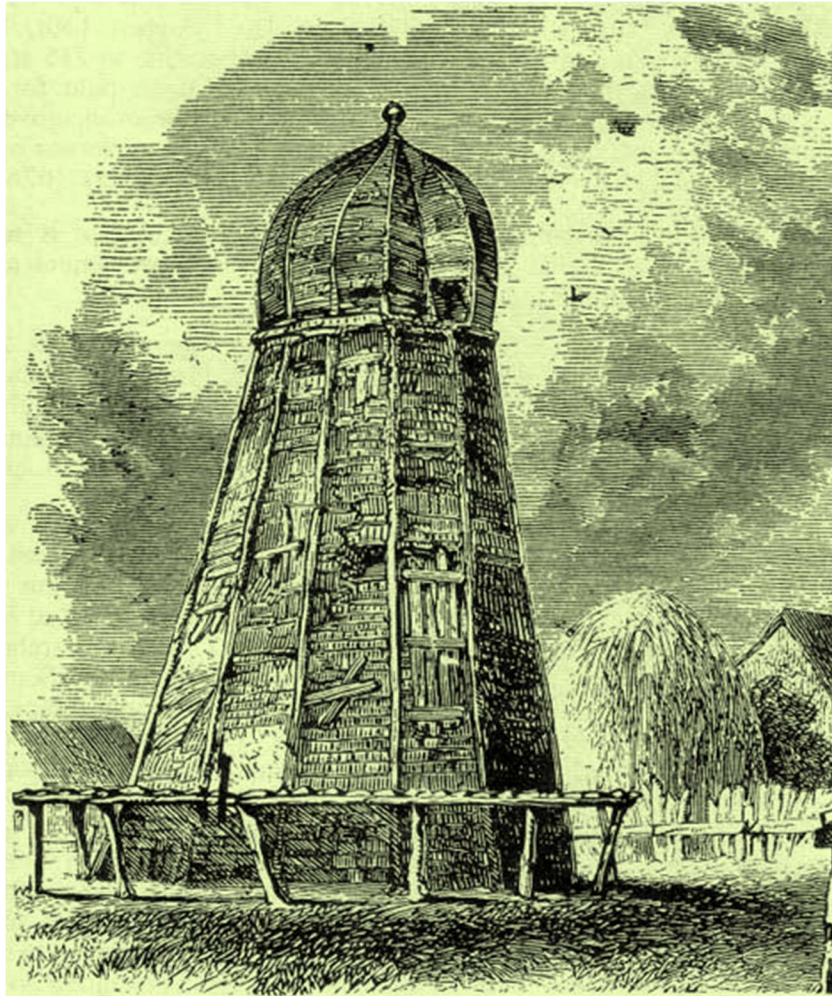
Available Images of Red River Windmills

There are four archival images that are very useful for this present project, discussed below. It is assumed that the St. Peter's mills would have looked very much like these.

- **View of Robert Logan's House and Mill, Fort Douglas, 1860** (Image Courtesy Archives of Manitoba) – This image clearly shows a tower mill with a distinctive Tudor-esque cap (symmetrically sloped and finished at a point). A raised platform encircles the lower section, with a door opening into the mill at this level. The four sails, with offset lattices, appear too short for likely operation. Ropes shown here presumably provided stability to the whole sail assembly.



- **View of Robert Logan's Mill, ca. 1875** (Image Courtesy Archives of Manitoba) – This image shows Mr. Logan's mill in a nearly ruined state, long past its active life. But the details in this image are extremely valuable for insights into a Red River tower mill.



- First we can see six long poles forming the structural frame of the main tower element – so we assume there would be 10 poles in total. We also see that the poles are visible – thus not covered with siding – the interstices between poles is where the sheathing material is situated – it looks like shingles but must have been thatch. They are not clear, but there must have been windows in the upper levels – perhaps here covered with boards. We can vaguely discern the connection between the tower and the cap – clearly the feature that allows the cap to turn, but not rendered in detail. We see the platform around the tower and the door that would require a few steps up to gain entry. We can see that the cap was formed of curved wooden pieces and also infilled – apparently with boards rather than the thatch used on the tower body. The draftsman has rendered the cap so that one section is inset – presumably where the sail / windshaft feature was positioned.

- **Young's Mill** (Image Courtesy Archives of Manitoba) – This rendering by artist Paul Kane (an Irish-born Canadian painter, 1810-1871, famous for his paintings of western landscapes and Aboriginal people) showing a windmill near what appears to be Lower Fort Garry. The sketch reprises key features from the Logan images – a tall tower, long sails offset from the stocks, and what appears to be a thatched body. The cap has the distinctive Tudor form that suggests its English architectural heritage. There is no raised platform in this image, with the door several feet above ground level and here set a few feet back of the sail line. It is interesting to note that the poles forming the tower's structural framework are visible at the bottom of the tower where it touches the ground – perhaps to reduce rot in the thatch. Barely discerned at the left of the main tower is a thin line – presumably the long pole that would have been used to turn the cap.

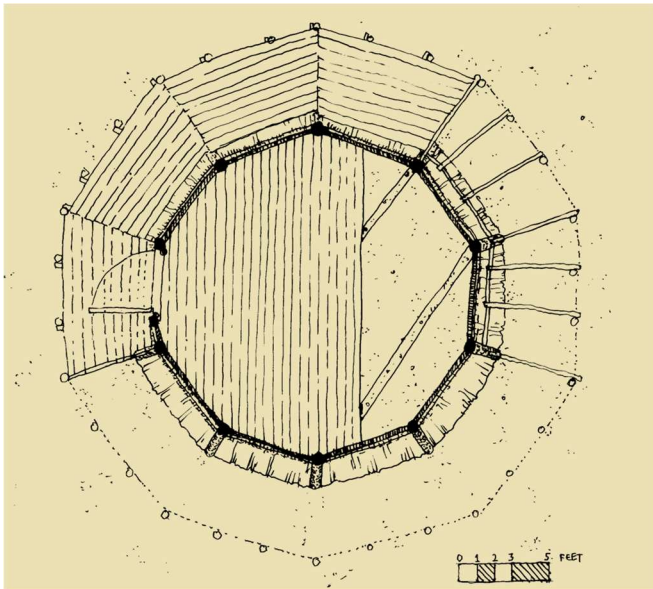




- **The making of a windmill** (Image Courtesy Archives of Manitoba), date and place unknown – this image clearly shows some of the key parts of a typical Red River tower windmill, with the long poles forming the structural frame and the interstices between poles infilled, here with boards. The top of the tower shows the built up wooden bands that ultimately would form the turnable base of the cap in which the sail feature and windhaft would be housed.

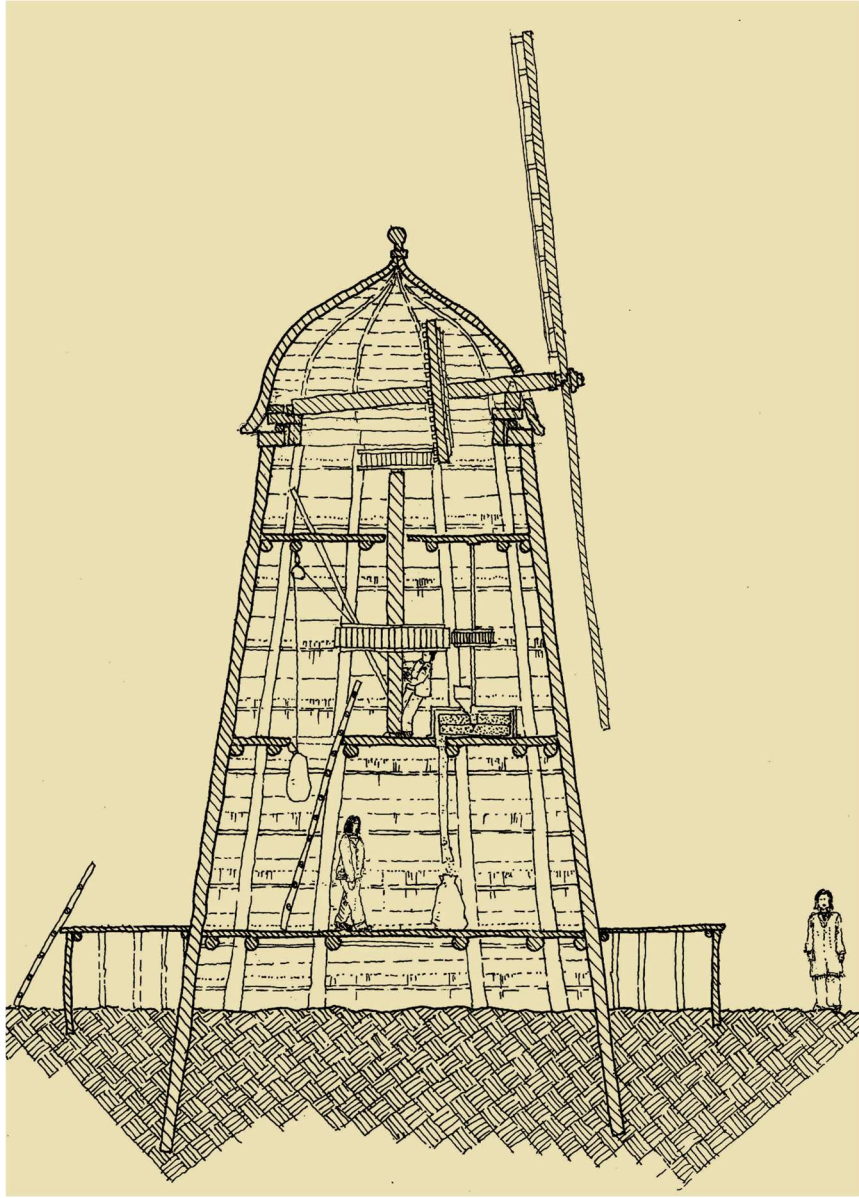
St. Peter's Indian Settlement 1835 Windmill, Plan

A floor plan is a common graphic expression of a building as if seen from above, via a horizontal cut that allows walls and room arrangements, as well as some structural details, to be clearly presented. Most plans employ the cut at ground level, but given that the windmill's main floor was about four feet above grade this plan shows the cut at that point. The plan shows the main floor area, entrance and some construction features. The dark shaded lines define the ten-sided form, interrupted at their interstices by the main structural poles (which are also shown extending down to ground level). The dark lines also express the top edge of the thatch sheathing in between the poles, cut at this point for the drawing. The thatch itself flares out slightly to extend to the ground level. The pole supports are shown as much as they would be visible in this plan view. The floor planks are set atop logs attached at key juncture points of the main timber supports – some of the planks have been removed at the right side of the drawing to show this situation. The 'stage' area that enlarges the whole plan, shown encircling the main floor area (and with planks only on the top and left side), allowed the miller access to the sails. Thin posts are continued around the whole drawing to show the full extent of this feature.



St. Peter's Indian Settlement 1835 Windmill, Transverse Section

This vertical section, or cut, through the windmill from top to bottom, shows the interior arrangement of key pieces and their placement, as well as a sense of dimensions and scale suggested by the figures. We are essentially looking south, with the sails facing to the west/northwest (right on the drawing). Starting from the top of the drawing: we note a finial at the crest, decorative but with an important functional aspect – to bind in place the thin structural elements of the cap. We notice the opening at the west/front of the cap that allows the windshaft to enter the cap; note that the shaft is at a slight angle to a level position. The large wheel set on the windshaft transfers the power of the wind and sails to another gear feature in this upper level. There is not much headspace in this area – about five feet, but enough to manoeuvre to get at the shaft and wheel and other parts of the cap if they needed attention. The secondary gear, itself a wheel with slats, turns the thick shaft below it to which is attached another large gear wheel in the higher second floor of the windmill. This shaft in turn rotates the smaller gear box connected to the grinding stones, which are shown at the right (front) of the mill. Raw grain would be poured into an attached spout on the millstone housing and once ground (and manoeuvred to the edges by the design of the top stone's grooves) dropped down a chute to the main floor, where bags would be positioned to collect the resulting flour. Other features to note in this drawing: the stage around the lower floor that allowed easier access to the sails; the basic structural frame of long logs and thatch (with the thatch shown only on the far walls, given that the section cut is through the poles); the ladders that provided access to upper floors; a grain bag being hoisted on the left (east) side. It is also important to note that the drawing has been developed according to the basic dimensions provided in sources presented above: 21.5 feet in diameter at its base, 37 feet high from ground to the top of the dome, mill stones that were 3.5 feet in diameter, and finally sails, each containing 76 yards of canvas, that were each 17.5 feet long and six feet wide. It is presumed that the long log structural posts were dug into the ground – to get past the frost line by about six feet, and thus about 40 feet long. There is of course no way of knowing the wood species used for various features, but the map of the area included in the opening section, "St. Peter's Indian Settlement," identifies aspen (likely poplar), willows, elm, oak and maple as nearby tree species, and so there were considerable options for matching wood types to structural and operational requirements – thus perhaps oak for the windshaft, wheels and gears, elm for the main structural frame, maple for support features and sail lattice, and willow for the cap structure.



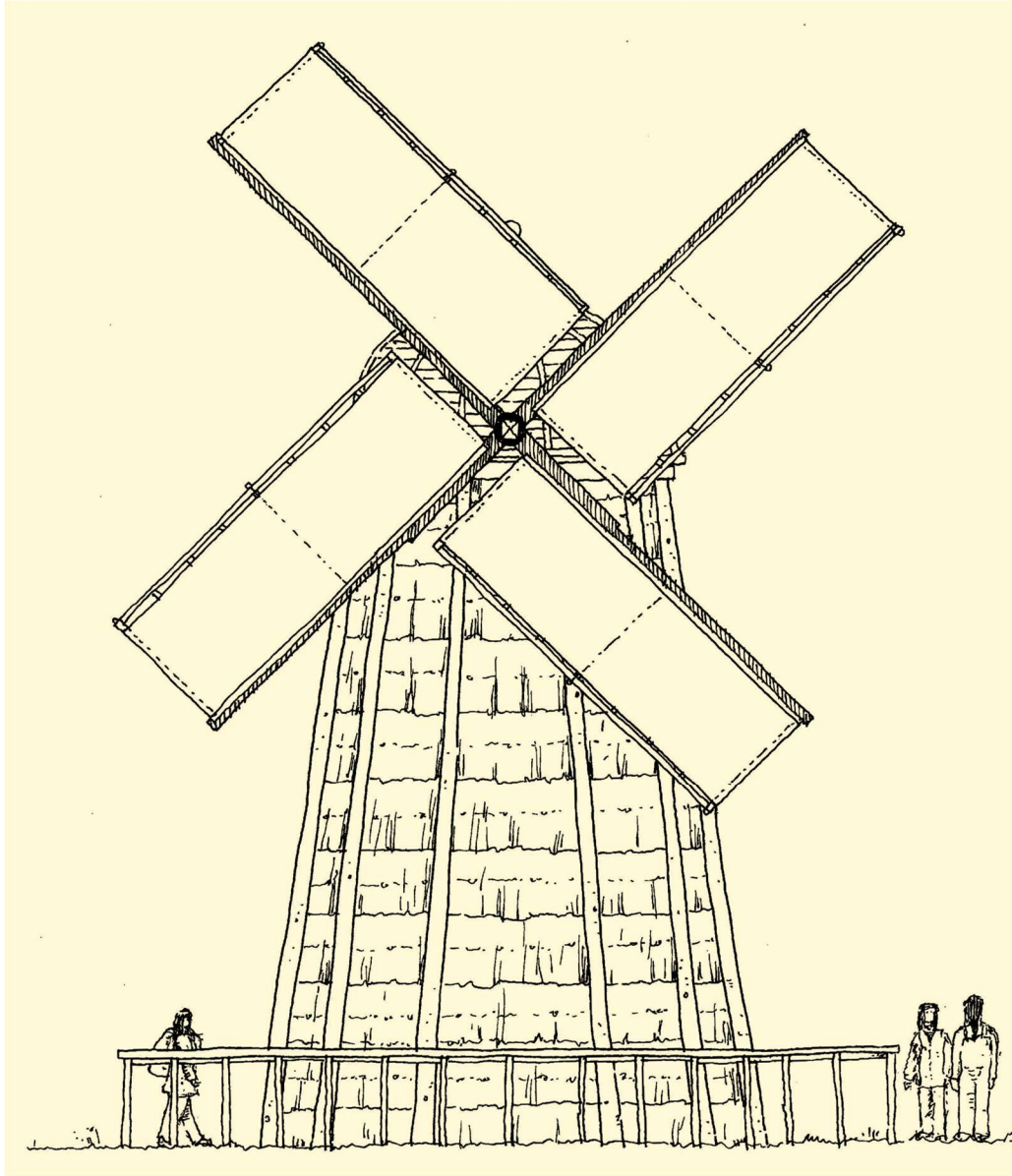
St. Peter's Indian Settlement 1835 Windmill, Elevation With Sails Unattached

This basic elevational drawing shows the windmill facing west/northwest, and thus viewed looking east/southeast, from the river edge. The drawing shows key external elements, visible with the sail cloth excluded. Thus the elemental tower form, created by the use of tall log framing elements infilled with thatch, is very clear. The 'stage' that surrounded the tower at the mill entry level, and which gave the miller easy access to the sails—at least at their lowest point in rotation—is evident in this image. And the sail framework, of stocks and lattice (uplongs, hemlaths and sail bars) is also obvious. Figures, as usual, give a sense of scale.



St. Peter's Indian Settlement 1835 Windmill, Elevation With Sails Engaged

This elevational drawing, reprises the previous image but in this case with the sail clothes attached. This then gives a sense of how the mill looked face-on to people approaching it when it was in its working stages. It is presumed that given the prevailing wind directions—from the northwest and west—that the sails would have turned clock-wise.

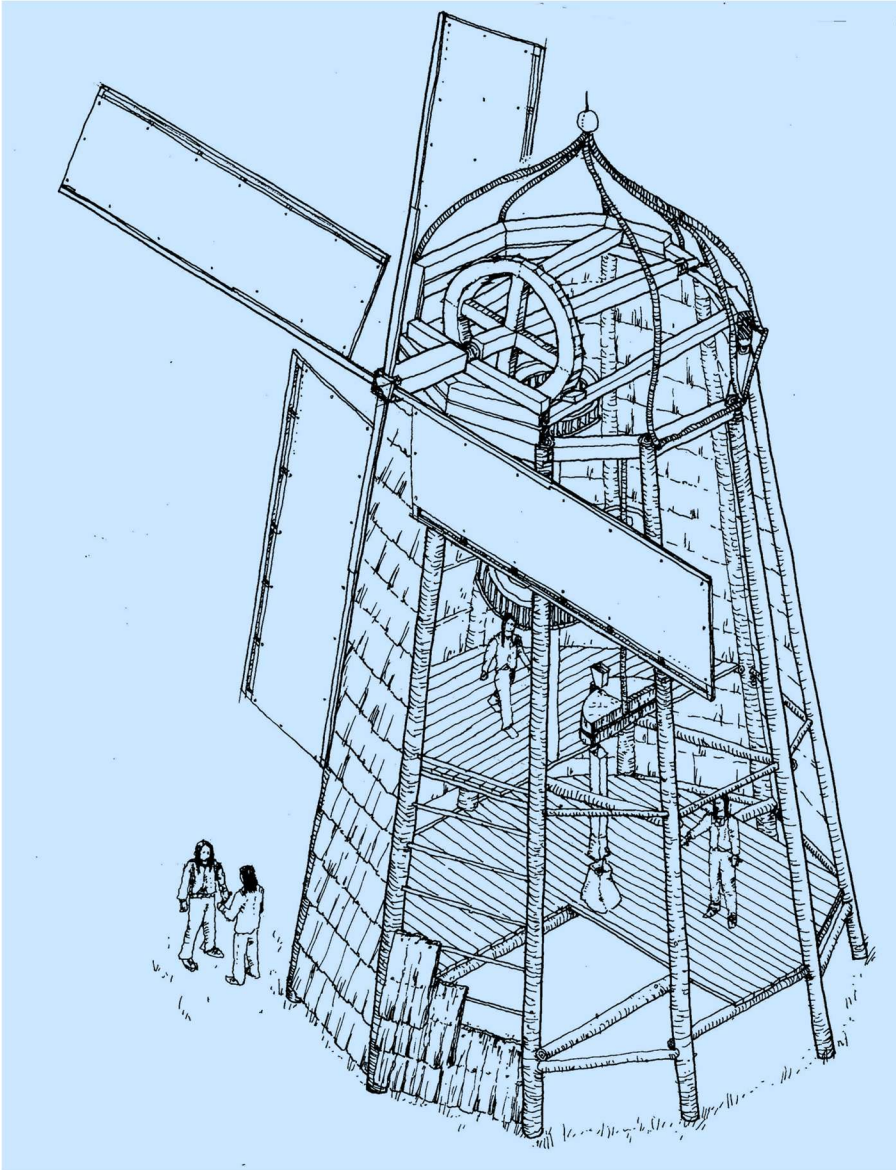


St. Peter's Indian Settlement 1835 Windmill, Building Isometric 'A'

This drawing presents the information developed in the four preceding drawings to create a three-dimensional view of the building. Certain parts of the mill have been cut away or excluded (topmost part of the upper sail for example) to better present interior features, arrangements and conditions. And the main floor platform encircling the tower, best seen on the previous elevations, is not featured for a better focus on the mill structure and interior. There is not much more to be said here about the building or its operations that has not been noted in the previous drawings – this image is mainly to be explored and enjoyed.

And because there is not much more to say about the building via this drawing, perhaps it is useful here to recall some of the facts noted earlier, and thus provide at least some modest speculation that will make an exploration of the drawing more engaging.

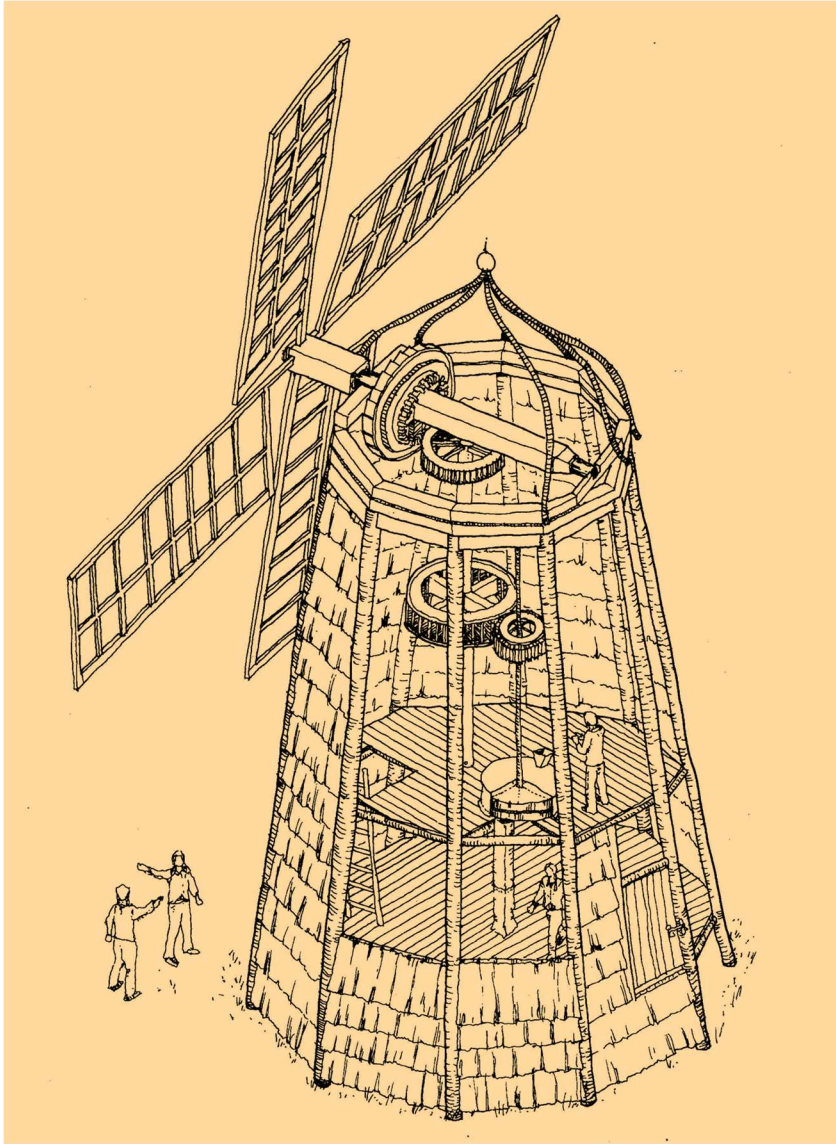
In 1835, when the mill was built, there were about 15 farmsites (with 35 acres under cultivation) and as many houses at the settlement – and so about 75 people. It is possible that the three men who built some of the early houses at the settlement—the Wind, Houlup and The Cannibal—who had building experience, were in charge. One can well imagine all the men of the settlement involved in the construction of the windmill. And then perhaps three to five in its ongoing operation. It is indeed impressive to consider the foresight, ingenuity and determination of this small band of Aboriginal people, dealing with agricultural and building technologies completely foreign to them, and yet within a few short years erecting a windmill – acknowledged by Mr. Hearfield above as the height of engineering of its day. It was an astonishing achievement.



St. Peter's Indian Settlement 1835 Windmill, Building Isometric 'B'

Like the previous isometric drawing, this image presents information developed in the four preceding drawings to create a three-dimensional view of the building. In this image the building has been rotated 45 degrees to allow for a slightly different view into the mill. Certain parts of the building have been cut away to better present interior features, arrangements and conditions. As with the previous isometric, the main floor platform encircling the tower, best seen on the previous elevations, is not featured to ensure a better focus on the mill structure and interior. It should be noted that there would have been an opening in the second storey, likely in the section that also contained the door (but above it), which would have provided light into that area – it is also likely that stretched fish skins were used rather than glass, which was not readily available at this time (see Reverend Cockran's observations on this "technology" in the earlier section, "St. Peter's Indian Settlement"). Again, there is not much more to be said here about the building or its operations – the drawing is mainly to be explored and enjoyed.

Like the previous entry, this view of the windmill might be enlivened through some imaginative thoughts. While this project has focused on the 1835 windmill (given that this mill is the only one with measurements of a Red River Settlement mill), we might also recall that it was repaired in 1845 and then joined by a new mill in 1846 (1852 according to some sources). And both appear to have been operating for several years, including in 1851 when there were 87 families, and nearly 500 people, industriously involved in farming and in grinding their grain at their two windmills. Imagining this mill at that time reminds us that this was no rough pioneer situation – this was a small but busy and industrious community, and the windmills must have been a very visible symbol of their success.



St. Peter's Indian Settlement 1835 Windmill, Context Isometric

This final drawing shows our windmill in context, with the Red River at lower right and two adjacent farm properties, one likely for the miller. Two details are worth noting: the long pole at the back of the windmill, used to turn the cap into the wind (not shown on earlier drawings); and the presence of fences that divide farmsites, as noted in Reverend Cockran's descriptions of the settlement.

This view, looking to the northeast, shows just a section of the Indian Settlement, focused on the immediate vicinity of the windmill. We can imagine it's the summer of 1837, when the mill had been in operation for a few years. A skiff has beached on the river bank and two men make their way up the bank, heading to the mill; a man in another small boat, with a sack of grain in the bow, manoeuvres his way to the same spot. Other figures go about their business – a man on the main road along the river's edge is carrying his own sack of grain, presumably heading to the mill. The scene is bucolic and inviting – and why not: a "pretty day" as they used to say at the time.

But we should recall that this is the scene of profound pioneer experience. These people, and many others at the Red River Settlement, were struggling to wrest a living from a completely new environment. And in their buildings we can see real evidence of that struggle – of small log buildings with tiny windows and rudimentary construction of logs and grasses.

And we can see those qualities in the windmill, with its body covered with thatch and the long log poles that define its framework, suggestive of the nearly medieval construction practices required when building only with materials at hand. But we can also see in the windmill the deep reservoirs of technical and architectural sophistication that were beginning to define the whole of the Red River Settlement, with fine churches, stone forts and scores of busy little farms.

The first windmill at St. Peter's Indian Settlement was a grand achievement for all involved – Reverend Cockran, Chief Peguis, the mill builders, the local people. And while every vestige of its existence is long gone, it is hoped that this project has stirred some wonder at its mere existence, as well as a humble recognition of the determination and hard work that must have gone into its creation and operation.

