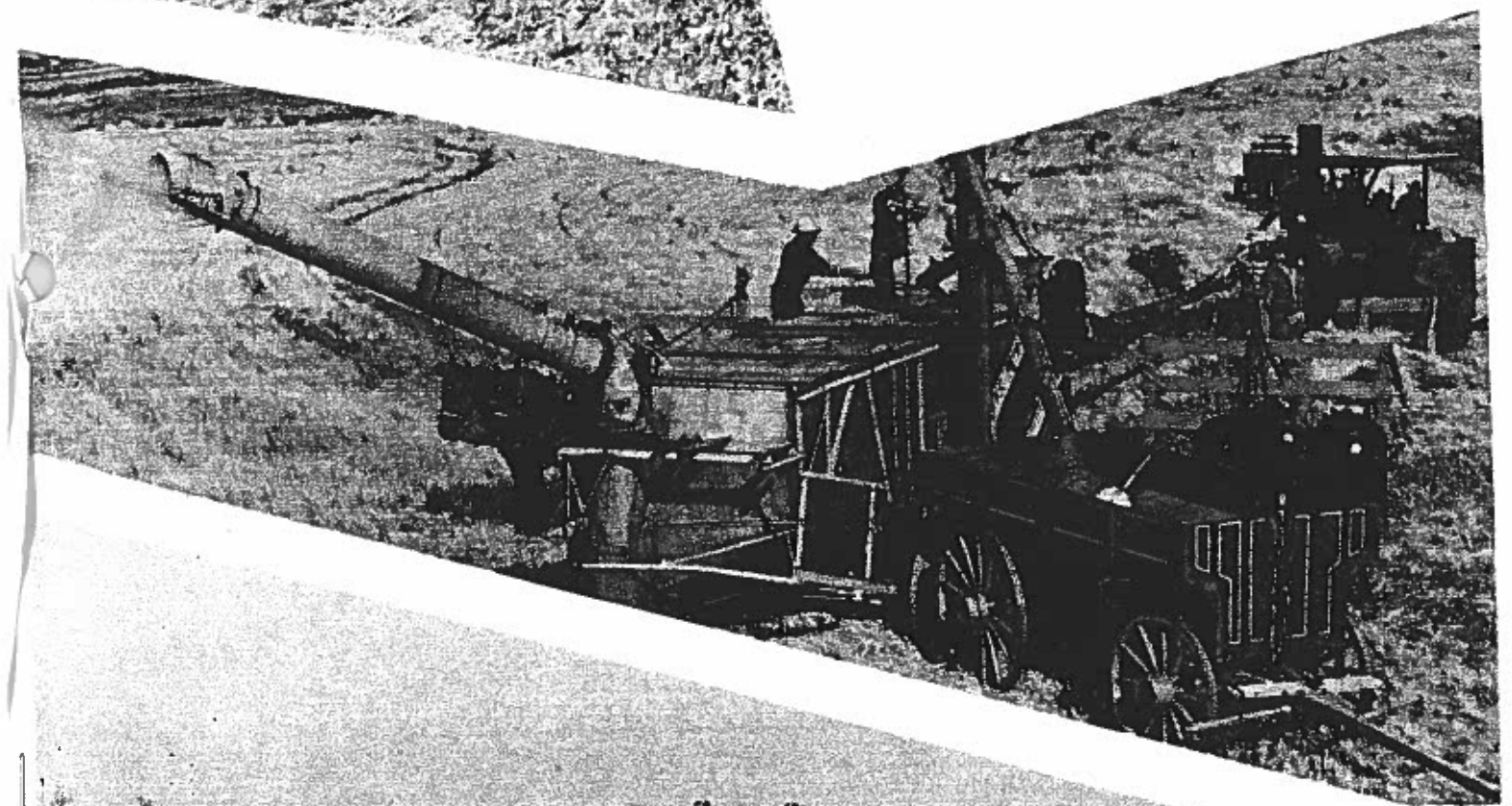


EARLY YEARS



Vocabulary: *Use a dictionary or other resources to define each of the following vocabulary terms:*

grain elevator: A granary equipped for machines for storing and raising grains.

agriculture: Farming: the raising of food crops, breeding and raising of livestock.

combine: A machine that reaps, threshes, and cleans grain while harvesting it.

barley: A hearty, bearded cereal grass.

cradle: A cradle scythe is a holder that is attached to the side of the scythe which catches the stalks as they are cut and allows the grain to be laid in rows.

head: The top of something example: head of lettuce.

flax: A plant with blue flowers with a slender stem that holds fibers used for making linens.

flail: A pioneer hand tool used for threshing grain, consisting of a long handle to which a shorter bar is attached at one end so as to swing freely.

pioneer: One of the first explorers, settlers, or colonists of a new country or region.

prairies: The broad, flat, grassy plain of North America.

kernels: The entire contents of a seed or grain within its coating.

separator: A device used to divide or separate parts, the chaff from grain (or cream from milk).

sickle: This is a sharp curved blade that was used to cut standing grain.

sheaf: A bundle of cut straw bound together.

stalk: The stem of a plant.

stooking: This is the bundling of grains, approximately 6-8 bundles set upright against each other to allow the grain to dry.

scythe: This tool replaced the sickle, the longer handle with a blade at the end allowed the person to stand straighter while cutting the stalks.

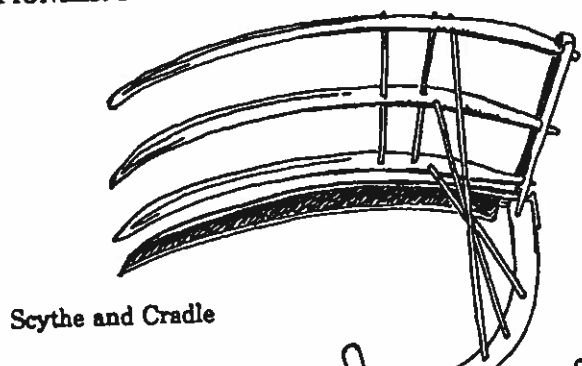
rye: The grains or seeds of a hardy cereal grass closely resembling wheat. It is used for making flour, whiskey, and feed for livestock.

threshing: To beat stalks of ripened grain with a flail or machine so as to separate the grain from the straw or husks.

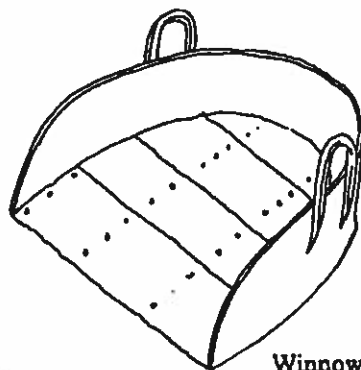
tones: A shade, hue, tint, of a particular colour.

winnowing: To separate and sort grain from the chaff by means of wind or currents of air (to separate the good parts from the unwanted ones).

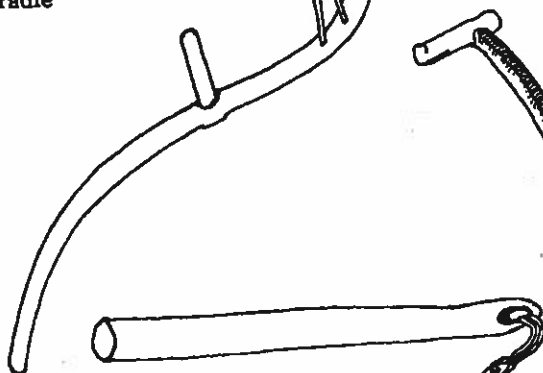
PIONEER FARMING



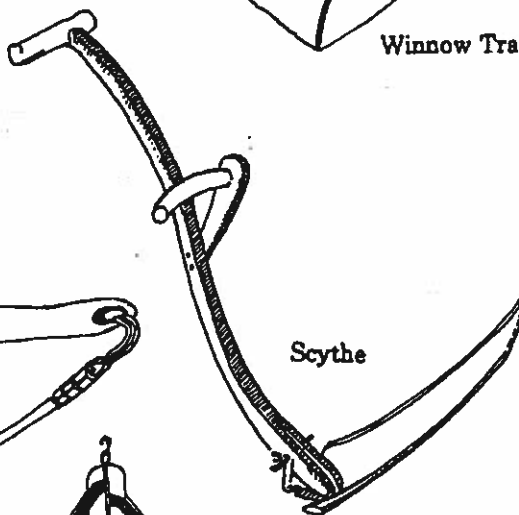
Scythe and Cradle



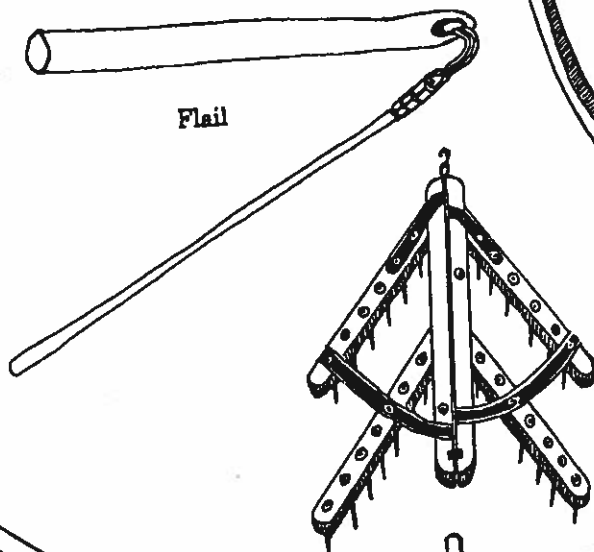
Winnow Tray



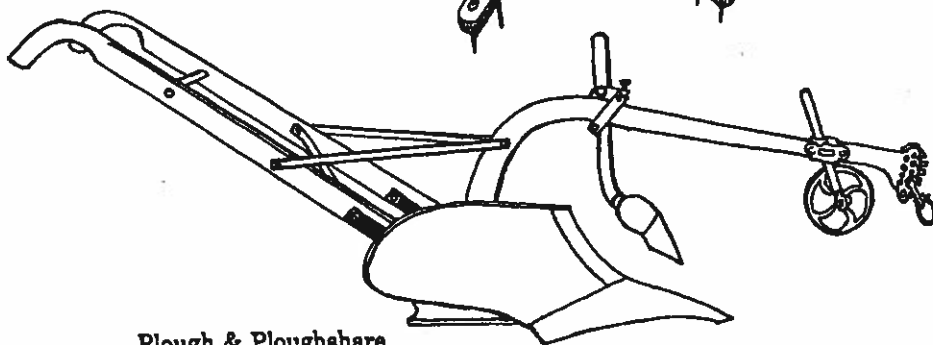
Flail



Scythe



Harrow



Plough & Ploughshare



Why Can Saskatchewan Grow Grain So Well?

Saskatchewan is able to produce grain and other crops because the soil is productive and the climate is appropriate.

Over the years, farmers have often found crop production to be a real challenge. Drought, hail, bugs, and weeds are just some of the problems farmers may face with each year's crop. There have been times when poor conditions have blocked every effort to produce a crop; yet when things go just right, the province has an awesome capacity for producing food.

History

The settlement of pioneers in the Canadian prairie provinces after the 1870's marked the beginning of cultivation of prairie lands on a large scale.

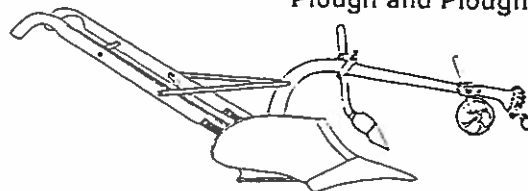
Although there was cultivation of crops by aboriginal people in some areas, the aboriginal people of this region lived in harmony with nature, content to hunt, fish, trap, and use the resources available to them in their natural state.

The settlement policy of the Federal Government in 1872

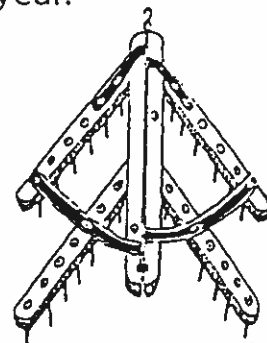
encouraged expansion West for the purpose of breaking the land and growing crops. Homesteads of 160 acres could be purchased for \$1.00.

Eastern Canadians, immigrants from the United States and Europe were encouraged to file for a homestead. Many people, unable to obtain land in their own countries, came to western Canada. These people were encouraged to break the tough and matted prairie sod and to battle the harsh climate and sparse rainfall of the area.

Plough and Ploughshare



The land was broken with a plough and harrow. The ploughshare had a blade which cut into the earth and turned it over. Usually, the plough was pulled by oxen or horses and sometimes by people with the farmer walking behind the plough to guide it. This was a very slow method of farming with often only a few acres broken in a year.



Harrow

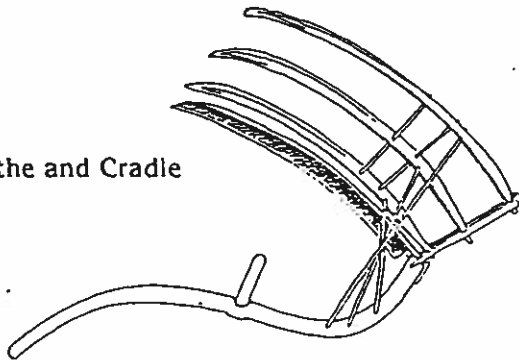
Diagrams provided by Saskatchewan Western Development Museum, Saskatoon.



The seed was then **broadcast**. This means the farmer would take the seed, usually carried in a bag slung over the shoulder, and scatter it by hand.

Between the time the crop was planted and harvested, it could be harmed or destroyed by many of the same natural events as drought, insects, flood, frost and disease which still affect our crops today.

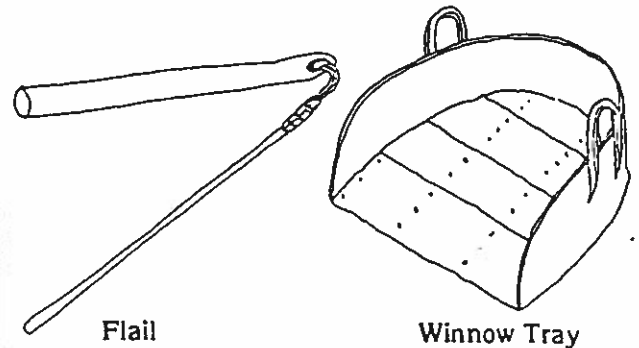
Scythe and Cradle



Once the crop reached maturity, it had to be harvested. This was done with a **sickle** or **scythe**. This equipment cut the grain and bundled it at the same time. The grain was then bound into stooks, ready to be threshed.

Threshing is the process of separating the kernels of grain from the hull and straw. From early civilization this was most often done by hand with a **flail**. A flail is a long stick tied to a cylindrical beater. The flail was used to beat the stooks, knocking the grain loose.

To separate the grain from the **chaff** (outer shell), the farmer used a process called **winning**. The grain and chaff were placed on a wooden



tray which was shaken lightly in the wind. The grain, because it was heavier, would fall back onto the tray and the chaff would blow away.

Gradually machines began to replace some of the labours. By the late 1700's, a successful **threshing machine** had been built. In 1874, a **binder** was made to bind together sheaves of grain. 1870-1920 was a period of experimentation in agriculture for the settlers of the Canadian west. Machines allowed farmers to farm greater amounts of land than they ever had before!

The power for farming went from human power to animal power to mechanical power all within the span of 150 years. Today, many pieces of machinery and equipment are required to carry out the work of a grain farm. These pieces of machinery do basically the same job as the pioneers' equipment, but because of mechanization, they are more efficient.

Advances in technology now forecast that with the aid of computers and robots, farmers will be able to operate their farms from their homes.

Farming Then & Now

About 10 000 years ago, people in different parts of the world began to gather wild seeds and cultivate them. They domesticated animals for meat, milk and labour. The farming of grain, mainly wheat and barley, started in the Fertile Crescent of the Middle East, and spread from there to Asia, North Africa, and Europe. Agriculture dramatically changed the way societies were organized. The hunter-gatherer lifestyle was no longer necessary, and large hierarchal societies, centered around villages and towns, came into being.

It is believed that agriculture in Central and South America began 3 000 years ago, with many different types of crops cultivated, including potatoes, corn, tomatoes, and squash. When Europeans first arrived in Saskatchewan, the First Nations people here were mainly bison hunters, but they also gathered more than 180 different plants for various purposes.

After the arrival of settlers, the First Nations people of The Prairies became interested in farming. Unfortunately, some governments made farming for First Nations people very difficult. They received marginal land that needed clearing, and they were only given poor implements. Still, they managed to build successful farms. The Pass and Permit system, implemented after the Northwest Resistance, put an end to that. First Nations farmers were unable to leave their reservations without permission- permission was often denied. This limited their ability to sell their crops when they were market ready.

Farming using Manpower:



The European settlers used hand tools to cut grain (*sickle and scythe*), a *flail* to separate kernels from the chaff, and a winnow tray to shake the seeds and chaff then sort grain. They would bundle and wrap the grains in a tipi style fashion called sheaves to dry out the grain. All these tools took a lot of labour and at times, was back breaking work when harvesting crops.

Farming using Horse Power:



The European settlers needed horses and oxen to help plough and cultivate the land. As time progressed farmers made farm machinery that used horse power to make their job easier and allow them to cultivate larger areas of land. The *plough* was used for breaking up soil and cutting furrows in the land, so seeds could be planted. A plough could be pushed using manpower but was more effective when being pulled by a horse. The *swather* is used to cut the grain and lay it in a row, which is also pulled by a horse. The *reaper* was the first machine to cut the grain and with horses pulling it, it did the same amount of work as 4 cradles. The *binder* was invented later but was like the *reaper*, it tied the stalks of grain into sheaves with wire. The groundhog replaced the flail that it separated the grain kernels from the straw and chaff. It usually took 4 men to operate it. The horse's energy was used on a tread mill or a sweep to power a pulley. Tractors and bundle wagons also made horse power easier to move and gather bundles.

Farming using Steam and Gas Power:



As the technology advanced, machines were upgraded using steam power in the early 1700's. Farmers had large families to help with the vast amount of work that needed to be done. Often groups of settlers from the same country of origin would settle close to one to build a community. They would work together to build barns and houses, harvest the crops. Many farms were mixed farms, where farmers grew wheat and other crops, and raised pigs, cattle, sheep, horses and chickens. The threshing machine encompassed many jobs when harvesting grain. The steam engine got its power from burning wood or coal. The steam engine was hooked up to a separator. It took 30 men usually to operate the machine to cut, separate and bundle. Many farmers, neighbours and family members helped each other with harvesting.



Gas engines replaced the steam engine. This required fewer men to do the threshing process. In modern farming using gas powered engines, a *swather* is usually pulled by a tractor to cut the grain and lay it in a row. The combine is the most recent technological advance in farming. The combine picks up the grain and separates it so that only the kernels are left. The combine only requires one person to operate it. Another person is requiring driving a grain truck to collect the grain.

With low prices for grains and animals and high costs of machinery, fertilizers, and pesticides there has been a trend toward bigger farms. As farms get bigger, there are fewer farms thus smaller communities. Many farms have gone to single operation, specializing in hogs, chickens, beef or grains. While the small family farm still does exist, there is often at least one family member working off the farm to earn an income to make ends meet. Many large farms are also incorporated and operate as a business. Farming today is far less labour intensive due to modern machines. Farmers continue to find innovative ways to care for the land in a more sustainable way. Saskatchewan farmers lead the way in new advances in technology and farming practices.

Date: _____

Name: _____

The Evolution of Farming

In the beginning farming was very labour intensive. Over the last 200 years technology has changed the way people farm. There are also many people involved in agriculture in addition to the farmers. Farmers faced many challenges and they found creative solutions in both equipment and farming practices to solve these problems.

When the early pioneers came, the wheat seeds they brought weren't good for Saskatchewan climate. Soon new varieties of wheat were developed that had a shorter growing season so the wheat didn't freeze. Crop research has continued and now farmers grow a wide variety of crops. Research continues to find crops that are more resistant to diseases and give higher yields.

The equipment change started in 1797 with Charles Newbold, who patented the first cast-iron plough. By 1819 steel ploughs were being manufactured. Tractors replaced horses on the farm.

Equipment became bigger and better. Usually the farmers were the ones who invented new equipment because they knew what would make their job easier. The development focused on tillage (ploughing), seeding, and harvesting to begin with. Threshing machines replaced stooks and combines soon replaced threshing machines.

Weeds became a problem and people who liked science founded companies that developed herbicides that could kill the weeds but not the crops. As more plants were grown and harvested, the soil lost nutrients and people found that fertilizer improved the soil and helped crops grow.

Farmers found that if they rested their land for a year they could control the weeds and grow a better crop the following year. This practice was called "summer fallow." Wind erosion devastated the farmers in the 1930s, and much of the rich, black topsoil ended up in bushes and ditches. Trees were planted to stop soil erosion from the wind. Lines of trees and high bushes are known as "shelter belts" and can be seen in many parts of the province.

Equipment improved and now farmers do not need to till their land as often. Today, many farmers use air drills where the small shovels barely disturb the soil. This is good for the soil because it doesn't blow away and the plants that are left on top of the soil eventually turn into compost, which adds nutrients for the soil. Crops new to Saskatchewan, such as peas and lentils, put nitrogen back into the soil, so farmers don't have to rest their land anymore. Instead they rotate different crops on the land.

Date: _____

Name: _____

The Evolution of Farming - Continued

Most new equipment uses computers and Global Positioning Systems (GPS). These help farmers use the correct amounts of seed, fertilizer, and chemicals so there is less waste. Combine computers help farmers find out if the grain is ready to combine and calculate which parts of the field are producing the best. GPS units also collect precise data the farmer uses for planning of next years' crop.

The increase of high-tech farm equipment has reduced the need for as many farmers to manage the land. This means fewer people are farming. However, many more people are involved in the agriculture industry, from scientists to salespeople.

Technology has also played a big role in animal agriculture. Chicken and pigs are usually raised indoors so the temperature can be controlled, they are safe from predators, and they always have food and water. Dairy cows are no longer milked by hand. Farmers use sophisticated milking systems that tell them how much milk each cow gives.

Many barns today also have advanced computer systems that let the farmer know if something is going wrong.

Researchers are constantly working to improve animal genetics by breeding animals that have certain desirable traits (for example, dairy cows that give more milk). They also find new and better ways to care for the animals.

With every improvement in technology, farmers can produce more food on the same amount of land. This is important because more food will be needed to feed the world's growing population and there is no new soil to farm on. In fact, because cities and towns are growing, and taking up more and more land, there is less land for farming.

THE EARLY HARVESTING PROCESS

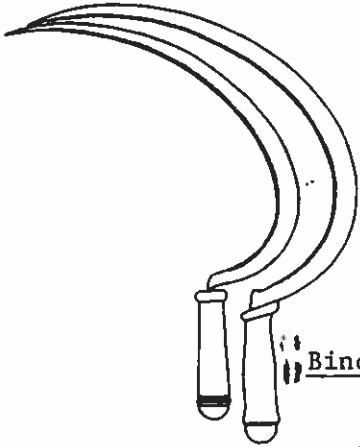
The harvesting process would begin in late summer or early fall. The total process can be subdivided into the following four operations:

- i) cutting the stalks of grain,
- ii) binding the stalks of grain,
- iii) stooking the bound stalks to allow them to cure or dry, and
- iv) separating the kernels of grain from the straw and chaff.

If the conditions were ideal the whole process could be completed in three or four weeks, however, it frequently carried on much longer due to seasonal changes in the weather.

The Cutting Process

The cutting process was first done using a sickle. This one-handed tool, with a sharp curved blade, meant that a harvester had to work in a stooped position as he clutched the stalks with one hand, and worked the sickle in the other hand. It was slow, backbreaking work. With perseverance about half an acre could be cut in one day.



Binding and Stooking the Grain

The newly cut stalks had to be bound into sheaves. Stalks of grain were twisted together to form a rope-like

strand and tied around a bunch of stalks to form a sheaf.

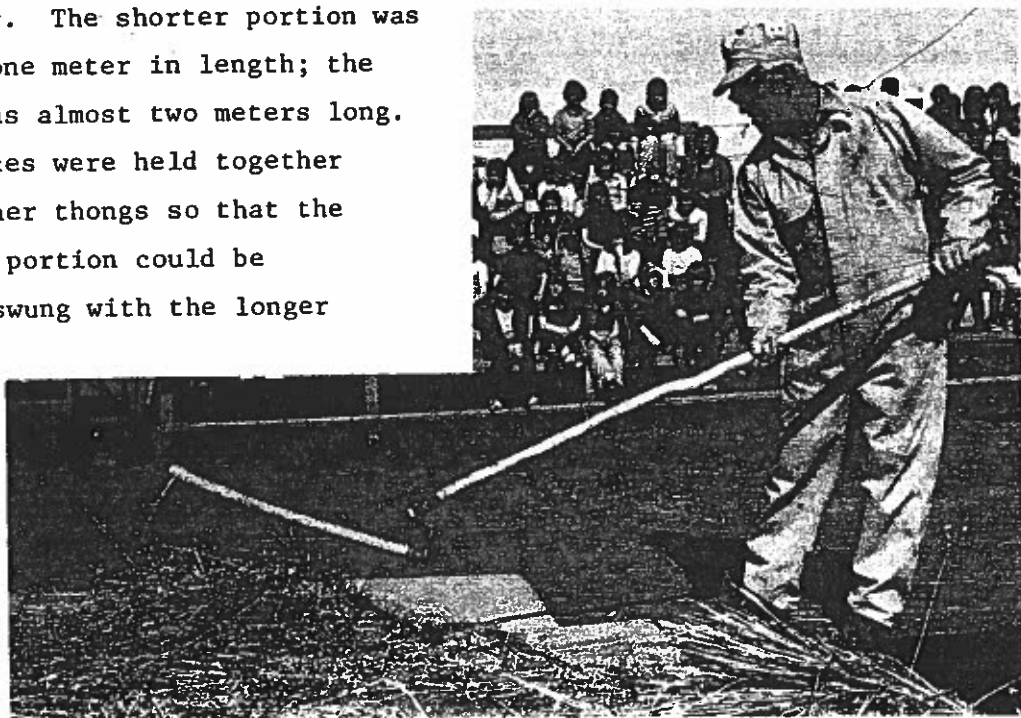
These sheaves were then set up in a tent fashion so that the heads of grain would be dried in the sun and wind.



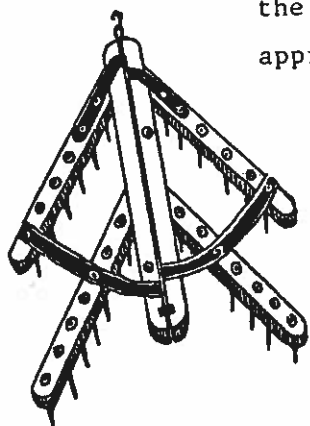
Separating the Grain Kernels

The threshing of the grain by the early pioneers also involved the use of simple tools. Sometimes the sheaves were brought to the farm yard, then stacked or stored in the barn until the separating could be done. Some of the early barns were built with doors on both sides so that the separating could be done in this passageway.

One of the earliest tools used in this separation process was the flail. The flail consisted of two round sticks about five centimetres in diameter. The shorter portion was almost one meter in length; the other was almost two meters long. Two pieces were held together by leather thongs so that the shorter portion could be freely swung with the longer handle.

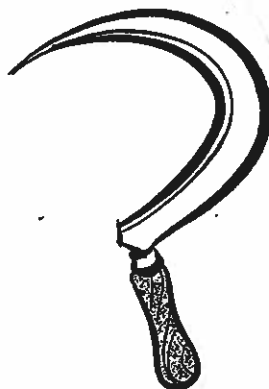
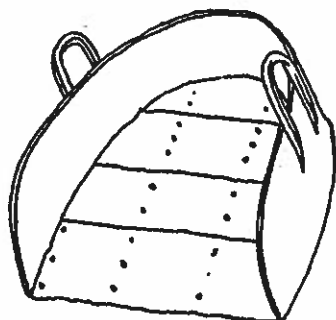


Hitting the stalks of grain with the flail freed the kernels from the stalks. The winnowing process followed to separate the kernels from the chaff. A hard day's work could yield approximately eight bushels of relatively clean grain.

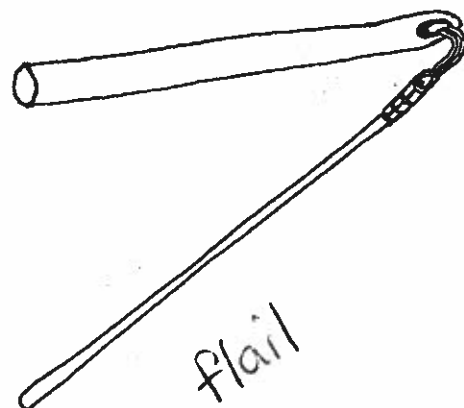


harrow

winnow
tray



sickle



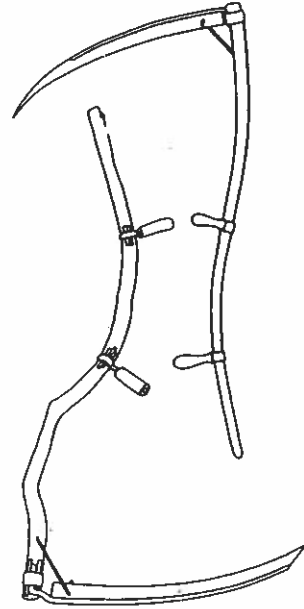
flail

CHANGE IN MACHINERY

a. Cutting

Harvesting methods changed dramatically as man advanced from simple tools to simple and complex machines. The sickle was replaced by a two-handed tool called the scythe. This piece of equipment allowed the harvester to work in an upright position and a strong man could cut two and a half to three acres of grain in one day. The stalks of grain still had to be gathered together and tied into sheaves.

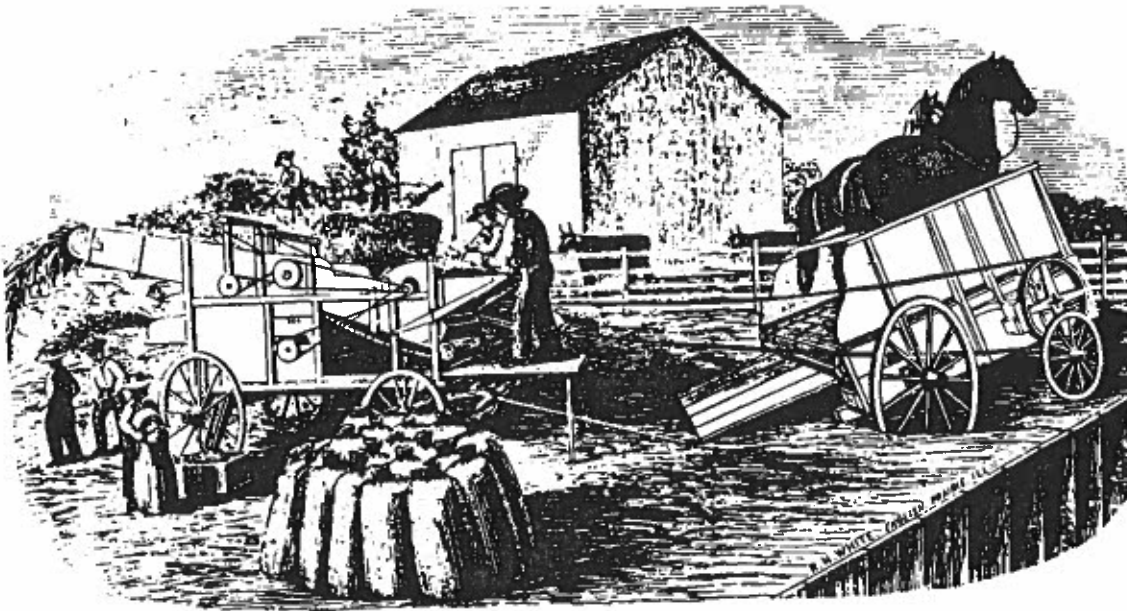
To the scythe the inventive pioneers added a cradle. These three or four long curved fingers caught the stalks of grain and as a result the harvester could deposit the cuttings of each sweep in a bunch. This made the tying process much easier.



a. Evolution of Power

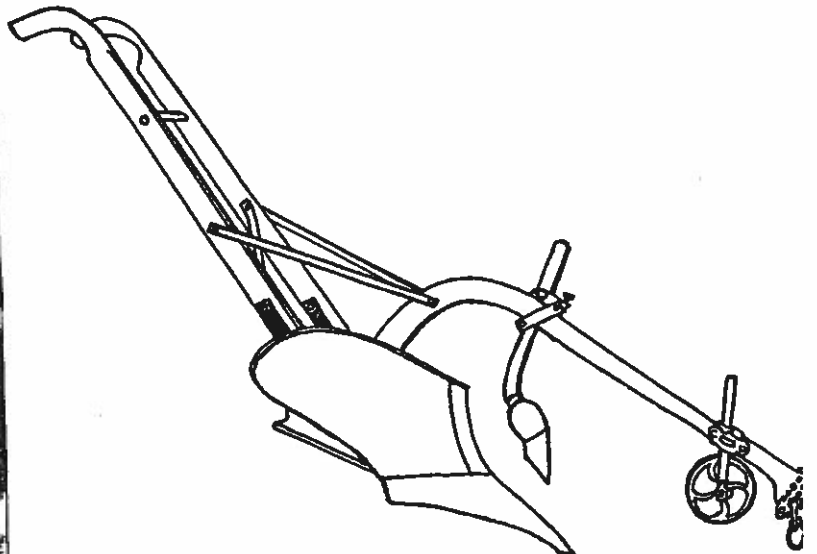
The development of the prairies could be characterized by the changes of energy forms used to accomplish the variety of tasks. In the early years much of the energy output came from man as he worked with hand tools.

Horses were utilized to provide energy not only for pulling but also on a treadmill or a sweep. Both of these machines transferred the energy of the horses to power on a pulley.



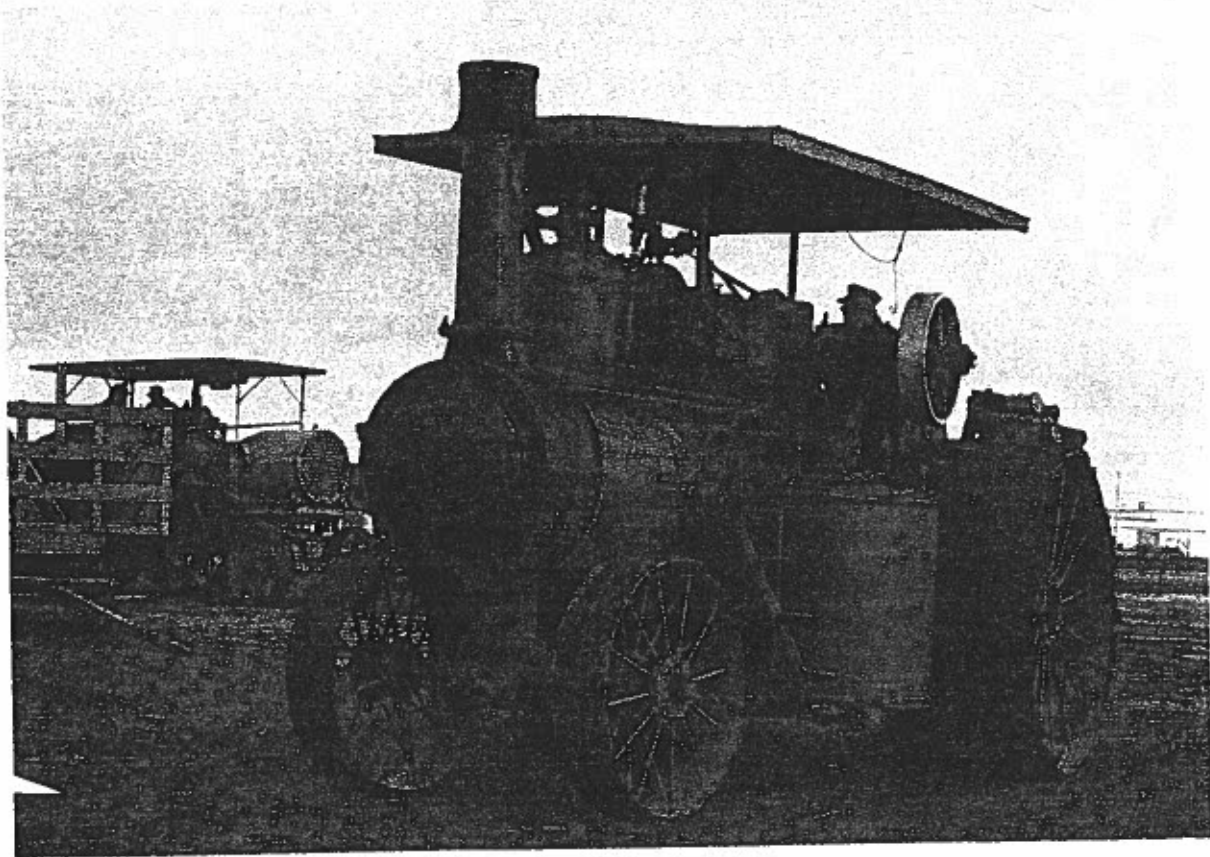
Horsepower by Means of a Treadmill

This meant that machines that were powered by hand could now be run longer, and likely at a steadier rate.



Horsepower by Means of a Sweep

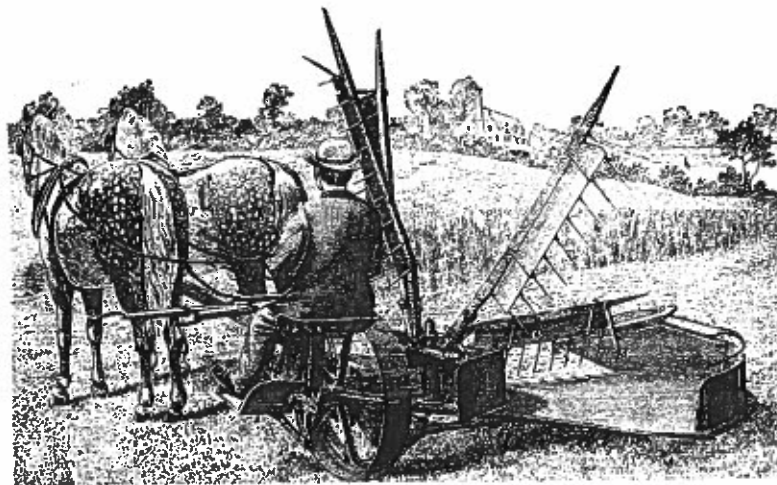
Steam power ushered in a whole new era in the pioneer years. These machines were huge and had almost a majestic character about them. These fifteen to twenty ton giants lumbered along at a slow but steady pace of about three km/hr. Even so, they were known for their quiet efficiency. The engineers, who required steam papers, were able to communicate freely using the steam whistles. In describing the power of these units two numbers were always used.



For example, a 25-75 H.P. Gaar Scott engine could generate the same amount of power as twenty-five horses and the draw-bar (pulling power) and the belt power was equivalent to seventy-five horses.

Steam engines were not without their problems. First of all, they required a crew of at least three for effective operation. The engineer, the fireman, and water boy were all needed to keep it going. Second, it needed water and fuel. Third, the danger of fire from a hot fire box and boiler certainly had to be considered. In early years cost was also a factor. In 1913, a 25-75 H.P. Gaar Scott engine was priced at between \$2300 and \$2800.

In 1831, Cyrus Hall McCormick, a young American farmer of Scottish-Irish ancestry, invented the reaper, a horse-drawn machine which cut the grain but did not bind it.

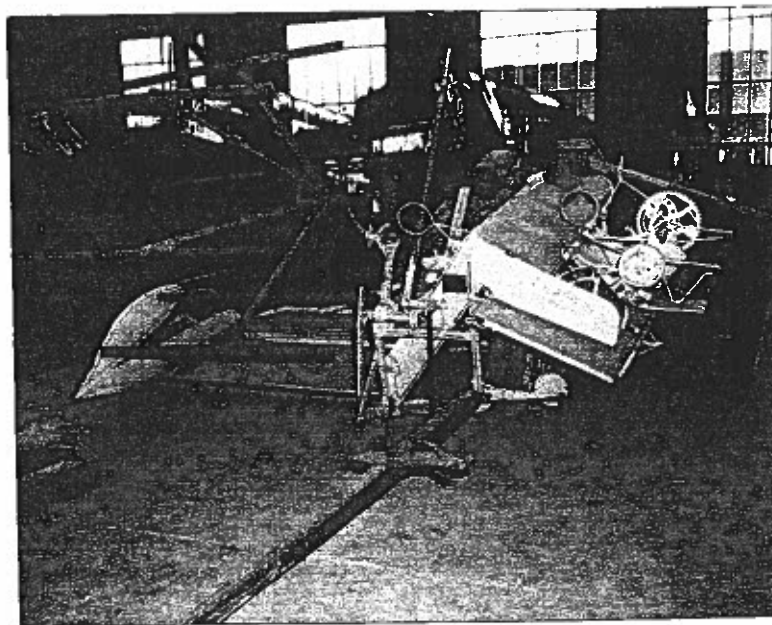


reaper

During the first half-day's trial the reaper cut as much grain as four men could cut in the same time with cradles.

b. Binding

In 1874 a machine was developed that bound the grain with wire, and in 1881 the first binder twine appeared. The grain binder was a remarkable machine.



binder

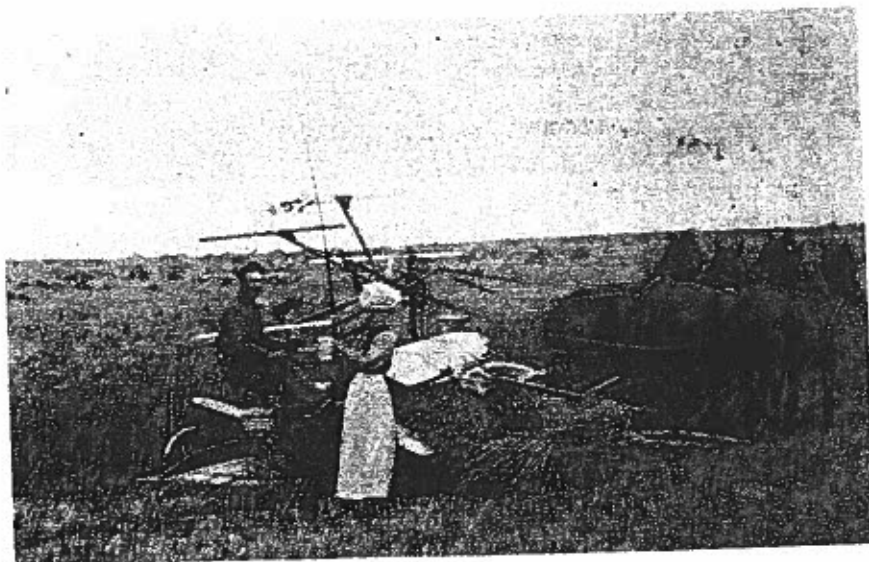
It not only cut the grain but also packed it into compact sheaves with the heads of grain all at one end, and bound each sheaf with a length of stout wire securely knotted. The sheaves were then gathered up by hand and placed upright in stooks of about eight sheaves each.



Stook

Later a sheaf carrier was added to the binder so that a group of four sheaves were dropped in rows along the field.

The binder was usually drawn by three or four horses. Since it was very steady work for the horses, the field work generally started at about seven A.M.,



COFFEE BREAK

had an hour's rest at noon and carried on till about six or seven P.M. Stooking was another matter. Women and teenage children would spend the day setting stook after stook in rows across the field. It was hot, itchy, back-breaking work. Occasionally on cool, clear, moonlit evenings the farmer and his wife would go out to stook for several hours.

c. Threshing

One of the first types of threshing machines was developed in the 1700's. It was similar to the groundhog which is at the Western Development Museum.



groundhog

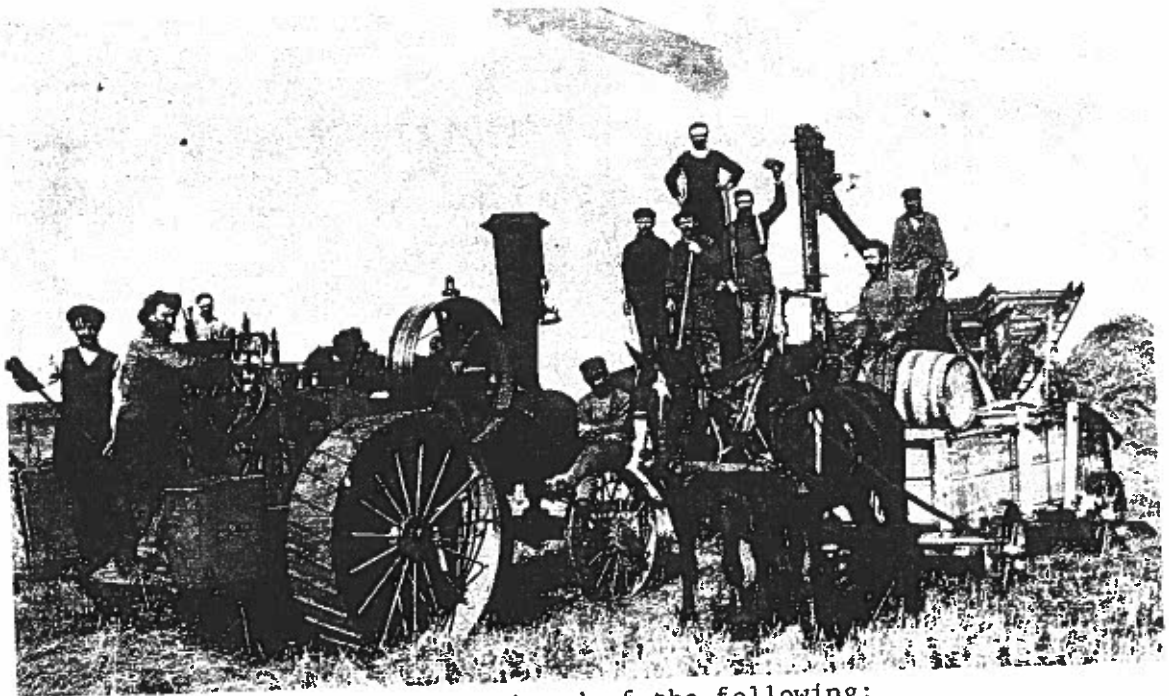
THE GROUNDHOG IN ACTION

A large cylinder with many rows of spike-like teeth rotated through a stationery concave shaped panel which also contained rows of teeth. As the stalks of

grain were fed through this machine, the kernels were again knocked free from the stalks. The number of men required to operate this machine also increased. Whereas flailing could be done by one man, the groundhog required at least four men. Two men were required to turn the cranks, one man fed the stalks into the machine, while the other cleared the straw away and carried on the winnowing process. The requirement for additional manpower almost certainly dictated that neighbors had to work together.

d. Separator

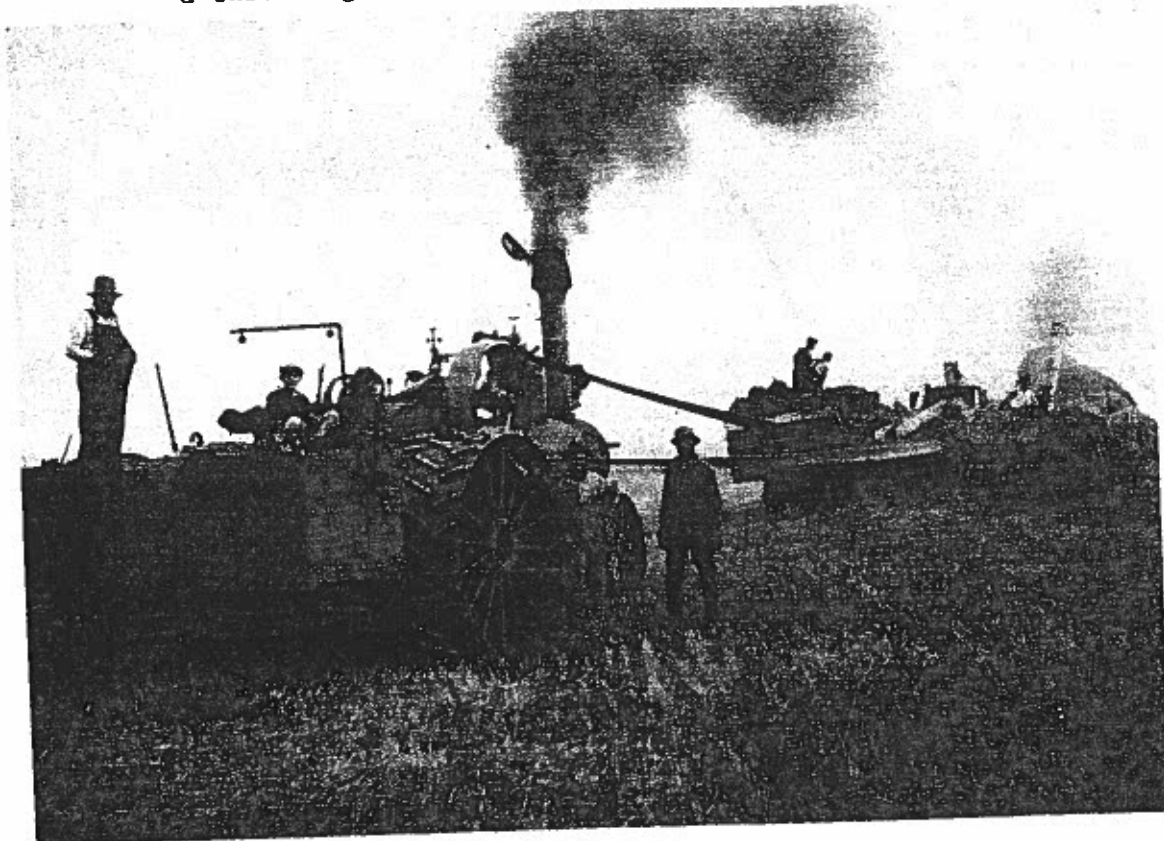
Just as there were changes to the machines which did the cutting and binding, so too were there changes to the machines which did the separating. The principle of the groundhog was expanded to include sieves, fans, grain spouts, and straw blowers. The crew grew from four to almost thirty.



The larger crews consisted of the following:

- | | |
|----------------------|---|
| * a steam engineer | - in charge of the steam engine |
| * two water flunkies | - responsible for keeping water in the boiler |
| * two firemen | - responsible for stoking the fire |
| * a separator boss | - in charge of the separator |

- * twelve teamsters - each in charge of a team and bundle wagon
- * two field pitchers - to assist the teamsters in loading bundles
- * two spike pitchers - to assist the teamsters in unloading
- * two grain men - responsible for the grain tanks
- * an oiler - responsible for keeping moving parts lubricated
- * two or three younger boys - responsible for cool drinking water and running errands
- * a threshing boss - in charge of the whole operation



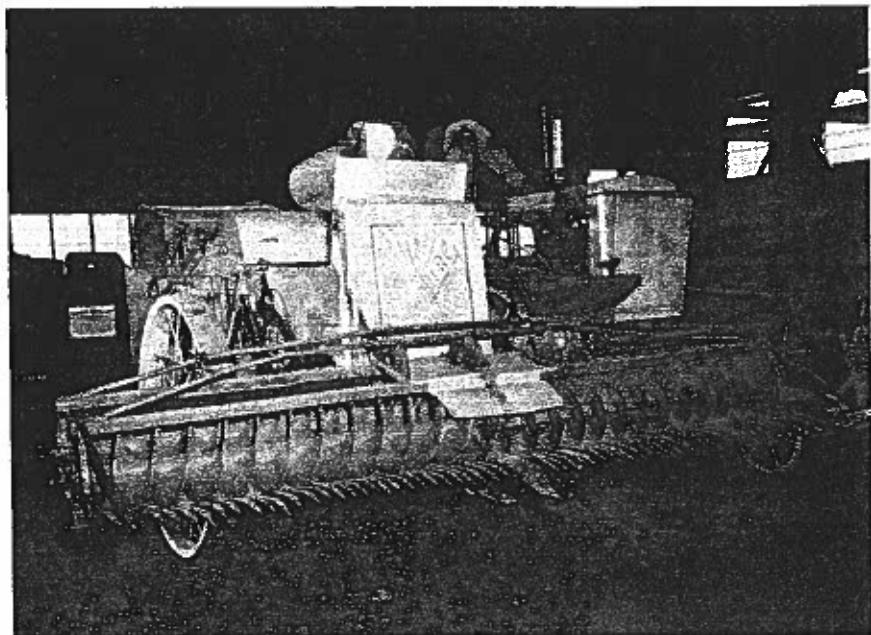
The separator usually started at about six a.m. which meant that the fireman was at the steam engine several hours earlier to get the steam up. An hour was allowed at noon and the machine usually stopped for the day at about seven p.m. To keep this crew operational they were fed a hearty early morning breakfast, a nourishing snack at about nine thirty, a big meal at noon, another snack at three thirty and another big meal at the end of the day. This meant that the cooks had a very

long day as they did not enjoy the convenience of refrigeration to prepare dishes ahead of time. If the family did not have several older daughters, two or three women would assist in the mammoth task of food preparation. Some threshing crews had their own cook shack and cook right out in the field.

The man power for large crews required a co-operative effort so neighbors joined forces in order to supply the men needed. Transient workers also helped swell the work force in the fall.

The size of machines changed with time and advancement so that not all crews were so large. These smaller units meant that three or four neighbors could get together to carry out the separating process. It also meant that they had greater control over when the operation would take place.

Not only did the size of the crew and machine change, but also the nature of the machines. The harvesting process was eventually combined in one machine. The "combine" was able to cut and separate the kernels of grain all in one machine. Thus the machine was taken to the wheat rather than the wheat taken to the machine. The use of the combine resulted in a decrease in the size of the harvesting crews from twenty or thirty, to four or five, and eventually to two.



Threshing Crew

Engineer

The engineer is the "head man" on the steamer. His job is to keep the steam engine in running order, and to make sure the engine has what it needs. He must have papers or permission to operate the machine. He uses the whistle to signal breaks and to tell the water, fuel and bundle haulers to hurry.

Pay: In 1907 - \$70.00 per month

Tankman

The tankman's job is to make sure the steam engine has plenty of water. He fills the water wagon several times to keep the steam engine's barrels supplied. If the water level is too low it could blow both the boiler and crew right out of the wheat field.

Pay: (Wage unable to locate - estimated to be fairly low)

Bundle Men

These men drive the bundle wagon across the field from stook to stook so that the field pitchers can load the bundles onto the wagon. Then they take these wagons to the separator.

Pay: In 1907 - \$3.00 per day

Separator Man

The separator man must keep the separator in running condition. He must make sure the machine is oiled and the belts have the correct tension. He also gives orders to the crew - when to bring the sheaves, how quickly to load the sheaves and when to belt up. Only the separator man and the engineer can stop the operation.

Pay: In 1907 - \$50.00-\$60.00 per month

Fireman

The fireman must rise early in the morning. He must clean the pipes in the steam engine, lay the fire, kindle it and nurse the engine until it has built up steam.

Pay: In 1907 - \$50.00 per month

Grain Haulers

These men make sure there is always an empty wagon on hand to receive the grain. They loaded the grain to the farmer's storage bin, and unloaded it quickly so they could make it back in time to receive the next load of grain.

Field Pitchers

The field pitchers walk across the field from stook to stook and loaded the bundles onto the bundle wagons.

Pay: In 1907 - \$2.25 per day

Spike Pitchers

The spike pitchers have to unload the bundles from the wagons onto the separator using pitch forks. They have to make sure the heads of the grain go into the machine first. They also have to make sure the bundles aren't put in too fast or too slowly.

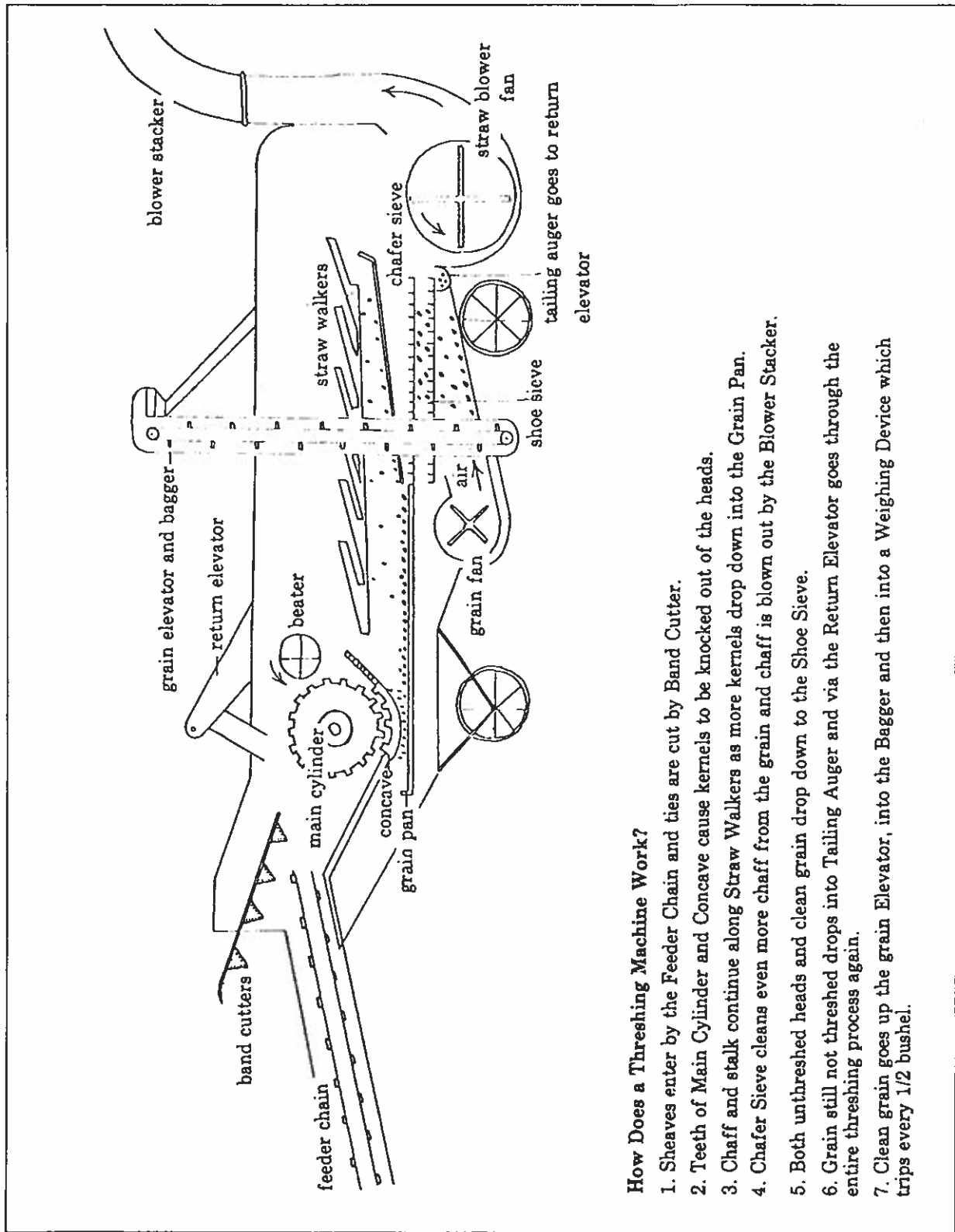
Pay: In 1907 - \$2.50 per day

Women

The women were the first ones up in the morning. Their days were spent cooking and cleaning. They had to prepare breakfast, dinner and supper for all the men on the crew. They often prepared sandwiches for the morning and afternoon breaks too.

Children

The children were kept busy too. They did the chores - looked after the cows, horses and chickens - while the men were threshing. They also ran errands, took lunches, messages and drinking water to the crew in the field.



How Does a Threshing Machine Work?

1. Sheaves enter by the Feeder Chain and ties are cut by Band Cutter.
2. Teeth of Main Cylinder and Concave cause kernels to be knocked out of the heads.
3. Chaff and stalk continue along Straw Walkers as more kernels drop down into the Grain Pan.
4. Chaffer Sieve cleans even more chaff from the grain and chaff is blown out by the Blower Stacker.
5. Both unthreshed heads and clean grain drop down to the Shoe Sieve.
6. Grain still not threshed drops into Tailing Auger and via the Return Elevator goes through the entire threshing process again.
7. Clean grain goes up the grain Elevator, into the Bagger and then into a Weighing Device which trips every 1/2 bushel.

The Sunshine Combine was one of the earliest attempts at a self-propelled model, that is, it was able to move across the field under its own power.

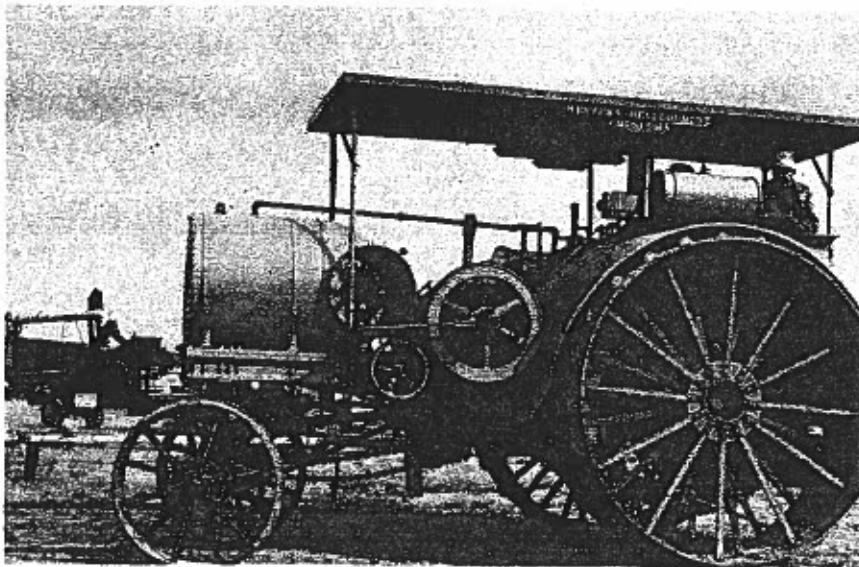
In order to speed up the ripening of the grain, a swather was developed to cut the grain and lay it in rows to allow it to cure. A pick-up was attached to the combine so that it would pick up the swath and then carry out the separation process.

The number of people required for threshing has come full cycle. The early pioneers started out with a very small work force, usually involved only his own family. Because the amount of grain harvested has increased with every change, the crew became very large, and then began to taper off. Today the whold operation can easily be done by two individuals.

The discovery of petroleum led to the development of the internal combustion engine.

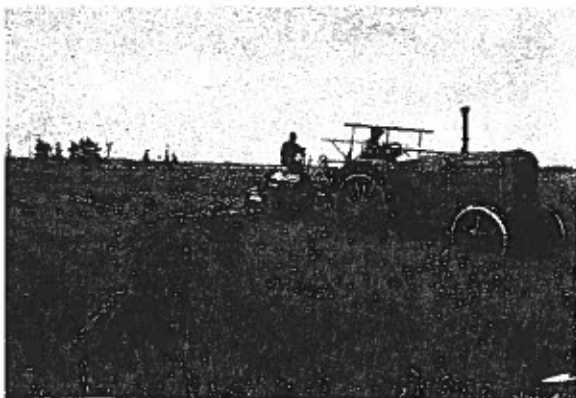


Kerosene, diesel fuel, and gasoline were all used as fuel in various models. Although the earliest models of these tractors were of a size smaller to the steam engine, smaller models soon began to make their appearance. With farm help in short supply during the First World War, these lighter tractors



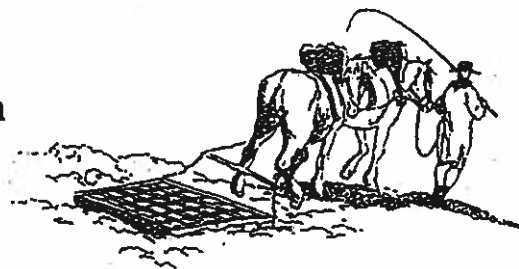
offered an attractive solution. Only one man was required to operate this unit as they did not have to content with the fire-boxes and boilers. Steel tires were used on both steam and gasoline tractors until the 1930's when the rubber tire was introduced. The rubber tire allowed for a more comfortable ride and greater traction on all gasoline tractors, particularly the smaller ones which were moving at a much faster rate than the earlier models.

The increased economy and efficiency of the gasoline tractor had a strong appeal, and signs of mechanical change were clear in the second decade of the twentieth century. The place of the steamer in threshing declined. As farmers began to acquire their own small gasoline tractors, they



found it to their advantage to have their own small threshing separators and become less dependent upon the big travelling outfits.

Harvest Demonstration



Picture Descriptions

1. *Sickle* This is a sharp curved blade that was used to cut standing grain.
2. *Scythe* Replacing the sickle, the longer handle allowed the person to stand straighter while cutting the stalks.
3. *Cradle Scythe* A holder is attached to the side of the scythe which catches the stalks as they are cut and allows the grain to be laid in rows.
4. *Flail* This hand tool is used to separate the kernels from the stalk by pounding the cut stalks of grain. Then the grain must be winnowed - the chaff blows away and the kernels fall to the ground.
5. *Threshing Roller* This was pulled by oxen over the bunches of straw to pound the grain out of the stalks. Winnowing must follow.
6. *Groundhog* This machine separates the grain from the stalk using manpower. Two men turn the handles, one man feeds the bundles and one man pulls away the straw. Winnowing must follow.
- 7.&8. *Hog & Shaker* This is a separator similiar to the groundhog but is powered by a team of horses on a treadmill. It also shakes the grain from the stalk.
9. *Treadmill* The horses walk on the treadmill and in turn provide power to operate the equipment.
10. *Reaper* It cuts off stalks close to the ground and lays them in a row. It is pulled by horses.
11. *Binder* It cuts the stalks close to the ground and lays them in a row. It is pulled by horses or a gas engine.
12. *Stook* Approximately 6-8 bundles of grain are set upright against each other to allow the grain to dry.

13. *Bundle Wagon* After the sheaves have dried, they are loaded onto the bundle wagon and transported to the separator to be threshed.
14. *Steam Engine* Power is provided by burning wood or straw to heat water to produce steam.
15. *Separator* With power produced by a gas engine the separator is moved into place.
16. *Threshing In Operation* Power for the separator is provided by a gas engine.
17. *Grain Wagon* A wagon is used to carry grain from the separator to destination (elevator or storage).
18. *Lunch Time* The women brought lunch by horse and buggy to the working men in the field.
19. *Sunshine Combine* It is self-propelled and able to cut the stalks and separate the kernels from stalks and chaff. This one machine replaced the four operations of reaping, binding, stooking and threshing.
20. *Separator With Straw Walker* The straw walker carries the straw away from the separator.
21. *Portable Steam* This engine could not move on its own power. It was pulled by a team of horses to the spot it was needed to provide power. Fuel was straw, wood or coal.
22. *Gasoline Engine* It took the place of the steam engine using gas as fuel.
23. *Gas Tractor* This tractor would run a smaller separator used at smaller farms.
24. *One-Horse Saw* This is a machine used to saw logs using a horse for power. The logs were burned in the fire box of the steam tractor's engine.

Activity -2

MACHINERY TIME LINE

Aultman & Taylor Machinery Co., Mansfield, Ohio

1867 — originated by Cornelius Aultman and Henry H. Taylor as Aultman, Taylor & Company.

1892 — firm reorganized as Aultman & Taylor Machinery Company.

1910 — gas tractors added to farm machinery offered.

Jan. 1, 1924 — Advance-Rumely took over Aultman-Taylor because of financial difficulties.

Deere & Co.

Feb. 7, 1804 — John Deere born Rutland, Vermont

1837 — Deere built first steel plough, using steel from a discarded sawmill blade.

1842 — built 100 plough this year, production increased.

1852 — 4000 plough per year produced; grain drill added.

1875 — Gilpin Moore patented a sulky plow for Deere.

1912 — farm tractors added to the line.

1918 — Waterloo Gasoline Engine Co. bought by Deere for \$2,100,000.00 with complete line of proven tractors.

1924 — popular Model D was brought out by Deere.

1934-1952 — Deere's most popular Model A tractors were built.

1949 — first diesel tractor put out.

1949 — several different models of the diesel tractor developed by John Deere co., all the ultimate in engineering and performance.

1952 — first numbered tractors came out, the "50" and "60".

1953 — the "70" series came out.

1956-58 — the "20" series came out of Deere factories.

1958 — 60 — the "30" series built.

1960 — Deere abandoned the 2-cylinder models and introduced a four-cylinder series.

1963-72 — "power shift transmission" built in 4020 models.

Reference: Encyclopedia of American Farm Tractors by C. H. Wendel, Crestline Publishing Co. Ltd., Florida.

FARM LIFE



SPRING - PLANTING THE CROPS

- Seeding usually begins in mid May and is completed around the second week of June. Seeding can demand long hours of work.
- Crops are changed or "rotated" from year to year to help the soil replenish its nutrients.
- Different implements are used depending on whether the farmer is seeding into stubble or cultivated soil.
- A farmer prepares for seeding by adding fertilizer and seed to an air-seeder. The air-seeder plants the seeds and places the fertilizer in the soil near the seeds.
- A drill is another machine used to plant the seeds. A farmer puts the seed into the seed box on the drill.



SUMMER

- By the time all the seeding is completed the first fields planted are ready to be sprayed for weeds.
- June, July and August are spent cutting hay from around the sloughs. The hay is fed to the cattle in the winter.



FALL - HARVESTING

- Harvest may begin in late August and continues through September.
- The crop is cut down using a swather. The swather is like a huge lawn mower. It cuts the plants off above the ground and creates a "swath" behind the

machine. The swath lies on top of the stubble. The grain needs to dry before it is combined.

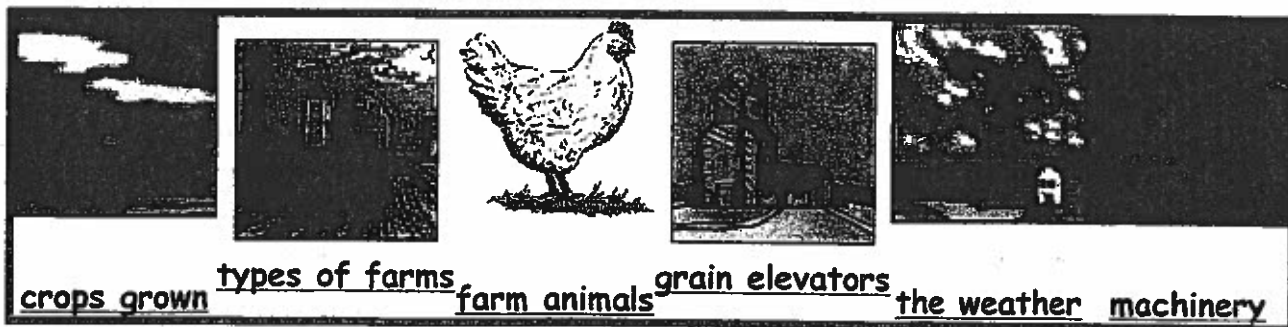
- The drying period can be days or weeks, depending on the weather.
- The combine picks up the swath and separates the seeds from the straw. The grain is saved in a large holding tank on the combine. The chaff and straw are thrown out the back of the combine.
- The grain is then dumped into a truck for hauling to the grain elevator or storage bins.
- Farmers cannot deliver all the grain to the grain elevators at harvest-time. so some of the grain must be stored on the farm in granaries or bins. Machines called "augers" are used to fill and empty the grain bins.
- The farmer has to work many long hours to "get the crop off" before snow falls. Harvest goes from dawn to dusk, using floodlights if necessary.
- Sometimes "straight-combining" is used to harvest the crop. Farmers cut and combine the crop at the same time.
- Harrowing after combining is a way to spread the straw evenly.



WINTER

- In the summer the cattle are usually left on pasture land to graze (eat grass). During the winter cattle need to be fed and given water.
- Winter is a good time to check over the machinery and make some necessary repairs.
- Grain is transported by truck to the grain elevators and sold.

OTHER FARM DUTIES



crops grown types of farms farm animals grain elevators the weather machinery

FARM MACHINERY



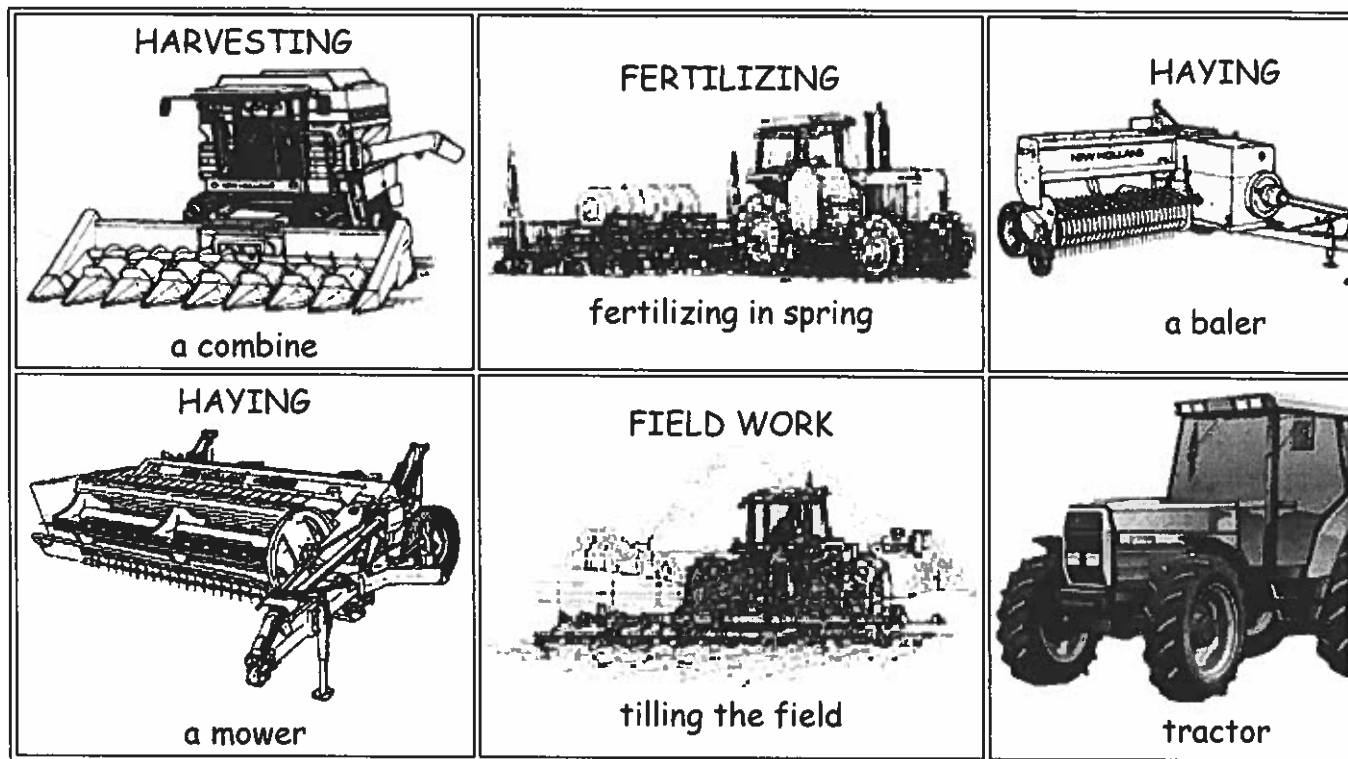
The farmer needs a wide range of tools and machines - for loosening the soil, getting rid of weeds, planting, mowing and harvesting the crops.

There are specific machines designed for the different crops that are grown on farms. Some are designed for grain crops, while others are designed to plant and harvest potatoes, lentils and other crops.



- **TRACTOR** - the work horse of the farm; tractors pull farm implements and are used for many tasks.
- **CULTIVATOR** - has blades or shovels that work up the soil without turning it over; is pulled between rows of plants to kill the weeds.
- **DISKER** - kills the weeds and smooths the soil; metal plates dig deep into the soil
- **HARROW** - has iron teeth or spikes; it breaks up clumps and smooths out the soil
- **DISK HARROW** - a harrow that turns and loosens the soil; has rolling saucer-shaped metal plates that are set on an angle to dig deep into the soil
- **DRILL (seeder)** - plants seeds ; a shovel cuts a trench in the soil, the seed falls into the trench and loose soil covers the seeds.
- **AIR SEEDER** - has separate tanks for seeds, fertilizer and herbicides.
- **SPRAYER** - used for liquid herbicide or insecticide; solution is sprayed through nozzles.
- **SWATHER** - (windrower) cuts down the crop and lays the plants in a swath on top of the stubble.
- **COMBINE** - picks up the swath, separates the seeds from the stems and throws the straw back on the field
- **AUGER** - a long metal tube (on wheels) which carries grain upward and dumps the grain into a granary or truck.
- **TRUCKS** - used for hauling the grain to the granaries and storage bins, or to the grain elevators.

- MOWER - cuts hay or feed crops
- BALER - picks up hay or straw and forms it into round or square bales for storage.



Tractors, trucks and other farm implements are very expensive. A farmer's investment in land, buildings, machinery and livestock may reach over a million dollars. Seed, fertilizer (plant food), herbicides (weed control) and pesticides (insect control) must be purchased. Fuel is needed to operate the machinery.



FARMING

site with [photos of farm equipment](#)

Harvesting is probably the highlight of any farm year. It is the time of year when all the hard work pays off. The rich golden grain, secure in the bins, brings about a feeling of relief and contentment in men and women of our prairies. Relief, in that the elements have been kind rather than destructive, and contentment in that all the time and energy have been rewarded. This feeling is common to all people attached to any farming community.

Purpose of Crop Production

The whole purpose of crop production is to provide food for human and animal consumption. The four cereal crops grown on the prairies are wheat, oats, barley and rye. These crops are easily distinguishable both in appearance and in uses made of the grains.

Types and Uses of Crops

The hard red wheat of the prairies is world famous for the quality of flour which is produced. Even in early years the main use made of wheat was flour for bread baking.



Wheat, Oats, Barley



Rye provides a different type of flour for rye bread. Oats and barley are used for a variety of cereals, however, their major importance would more likely be for livestock feed.

The whole plant of the cereal crops was used in some way. The part that was left in the field was tilled into the soil to add fibre and nutrients.

The grain was used for such foods as flour, cereals, noodles, bran or rolled oats. Wheat straw was usually used as bedding in the barns so that animals would have a warm, dry area in which to lie down. Oats and barley straw contained more nutrients and so was used as fodder to supplement the hay supply.

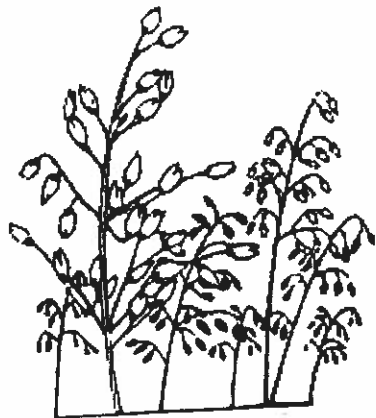
In early years the major focus was to produce grain so that the pioneer family might survive. Slowly grain production was increased and the pioneer farmer used grain to trade for other produce. Elevators were established as collection points and surplus grains were sold for production of food locally or for export.

Farm income was rather seasonal. Even though the pioneer increased his crop production, his income from grains would occur at the time of delivery. To supplement the income from grain, most early farming operations were of the mixed farming type. That is, production, cattle and poultry were also raised. The garden plot which produced vegetables was also very important to the pioneers. Just as the size of pioneers' grain plots increased, so too did the garden area. Potatoes and corn were early staples but soon many other vegetables were added to these to enhance the offerings at the table. Fruits such as wild strawberries, raspberries, choke-cherries, and Saskatoon berries were gathered to round out the store of good foods to eat. Any surpluses were marketed, thus providing an income throughout the year. This income was used to improve their situation and to acquire necessities such as salt, spices, and other materials which they could not produce.

Weather Considerations

The one element the pioneer frequently worried about was the weather. Late spring or early fall frosts severely affected the crops both in terms of yield and quality. Hail storms caused serious damage. Drought or dry conditions hindered production of foodstuff. Weather frequently compounded the threat of other problems. Dry conditions increased the hazards of prairie fire and of insects such as grasshoppers flourishing. The uncertainty of the weather was one factor which necessitated the development of faith and hope in pioneering communities. When the year's crop was hailed or frozen, instead of giving up, farmers would start planning for the coming year.

OATS



SPRING
WHEAT



FLAX



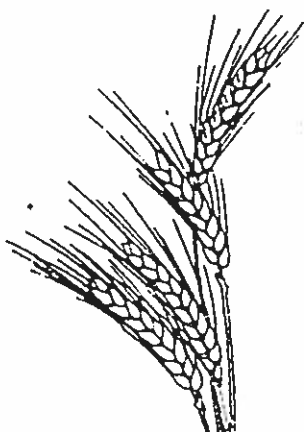
CANOLA





The Major Grains

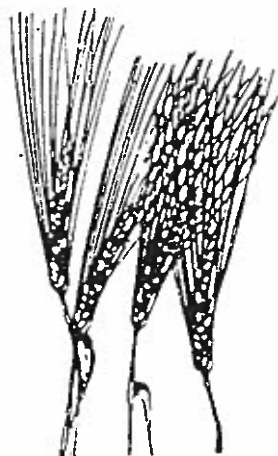
Wheat



Wheat is the number one crop grown in Saskatchewan. More than eight million hectares (20 million acres) are devoted to wheat production each year. That's equal to an area about 32 km wide and 24 hundred kilometres long. (A strip about 33 km wide stretching from Regina to Toronto.)

Hard red spring wheat, which is used mainly for bread, makes up most of the wheat production. Nearly six million hectares (16 million acres) are seeded to hard red spring wheat varieties.

Another two million hectares (4.9 million acres) are usually seeded to durum wheat, used to make pasta products like spaghetti and macaroni.



Barley

Barley is a high yielding cereal grain. Because it takes less time to grow, it can be planted further north than some other crops. Barley is mainly a feed for livestock. It is also used in the malting and brewing industries.

Barley can sometimes be found in soups and in specialty flour products. On average 1.5 million hectares (3.7 million acres) are seeded to barley each year.



Oats

Oats has enjoyed a growing popularity over the last couple of years. It's now used to make a variety of health foods as well as oatmeal and traditional baked goods.

A high protein level and essential materials also make this crop an excellent livestock feed. In 1990, Saskatchewan farmers seeded over 500,000 hectares (1.25 million acres) of oats.



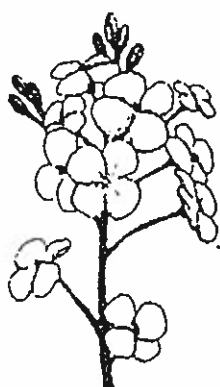
Flax

Flax is an oilseed. Approximately 364,000 hectares (900,000 acres) were devoted to this crop in 1990. Oil from flax is used for **industrial purposes**, such as the manufacture of paint. Flax can be recognized by the purplish-blue flowers in the summer.



Rye

Rye is used in **specialty foods** like rye bread, and in the manufacture of Canadian liquor. It is also used as cattle feed. It is seeded in the fall for harvest early the next summer. Some 291,000 hectares (720,000 acres) of rye were seeded for harvest in 1990.



Canola

Canola, a type of rapeseed, has become a major source of income for prairie farmers.

The oil extracted from the seed is used in **margarine**, **salad oils** and **cooking oil**. The pulp that is left after the oil is squeezed out of the seed is a high protein animal feed. Saskatchewan farmers planted around 1.1 million hectares (2.75 million acres) of canola in 1990.

Canola can be recognized by the bright yellow blossoms in early spring.

Think about the products we'd be missing in our daily lives without these grains.

The Grain Elevator

A grain elevator is a vertical warehouse used for cleaning, weighing, and storing grain. It is also used to unload grain from its elevator bins into railway cars and trucks. These tall, often brightly painted wooden or concrete towers may be seen along railway sidings in many towns and villages across the Prairies and within easy reach of grain farms. Saskatchewan now has about 2,300 grain elevators. It once had over 6,000!

About 70 per cent of the grain grown in Saskatchewan is spring wheat. After the wheat is harvested, it is brought to a grain elevator to be sold. The manager of the elevator weighs and grades the wheat and then stores it. The farmer does not sell all his wheat to the company that owns the elevator. Some is kept for seed for the next year. Some is also kept for feeding livestock.

The wheat is usually delivered to the elevator by truck. At the elevator, the wheat is weighed. Samples are taken to check its quality, appearance, and protein content. The wheat is then dumped into a delivery pit. A series of buckets on a conveyor belt lift or "elevate" the grain from the pit to the top of the elevator. From there, it goes through a spout to one of the storage bins. The bins keep separate the different grades of wheat.

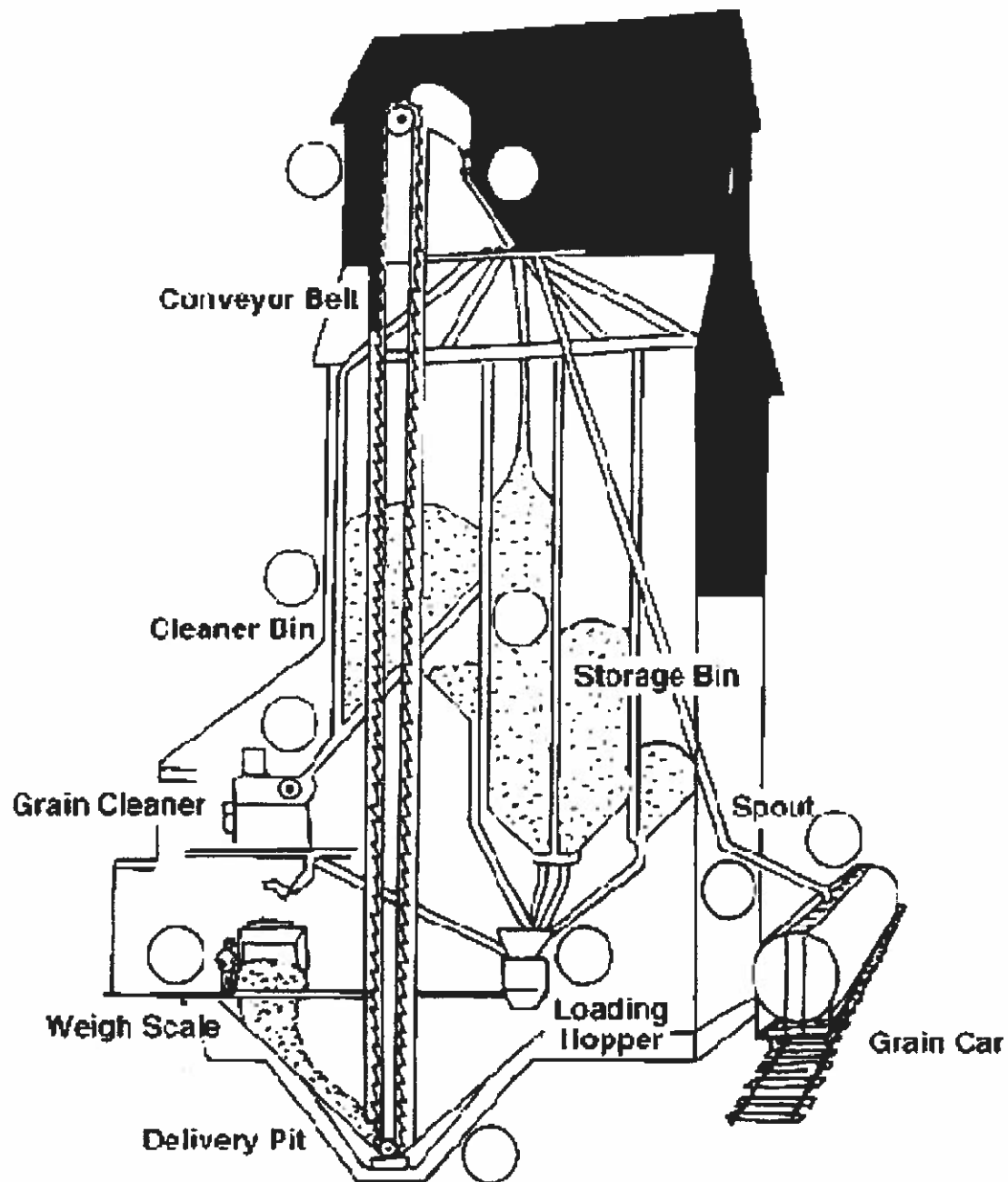
When the wheat is ready to be shipped out, it is sent into a loading bin called a hopper. From the hopper, the grain goes through a grain cleaner and into the cleaner bin. From there, it is sent to the top of the elevator through a special spout. The spout leads to a boxcar or hopper car beside the elevator.

The wheat is shipped out by grain car to the Pacific ports of Vancouver or Prince Rupert, to the Hudson Bay port of Churchill, or to the Great Lakes port of Thunder Bay. At one of these ports, the grain is unloaded and cleaned, then dried and stored in huge terminal elevators. There it remains until it can be loaded into ships and sent to other countries.

Source: *Saskatchewan Past and Present*, Saskatchewan Learning,

Inside the Grain Elevator

Name: _____



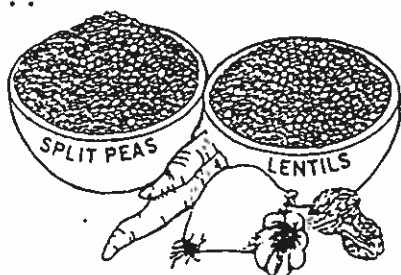


Pulse Crops

Pulses are the edible seeds of legumes consumed by humans. A legume is a plant having a number of seeds in a pod, such as peas, beans, and lentils. Legumes can add nitrogen to the soil if they are inoculated with nitrogen-fixing bacteria.

History

Legumes are known to be one of the first cultivated crops. Lentils are believed to have originated in the Middle East. Peas were found in ancient tombs in Egypt and the ruins of Troy. Peas were grown in Britain as early as the 11th century and were used as a staple in the diet. One popular dish was pea porridge, as in *peas porridge hot, peas porridge cold*...



Early explorers brought dried peas to North America as a portable food source. They were easy to carry and were non-perishable, as well as being an excellent protein source.

White pea beans (navy beans) have been grown in Canada since 1850.

Production



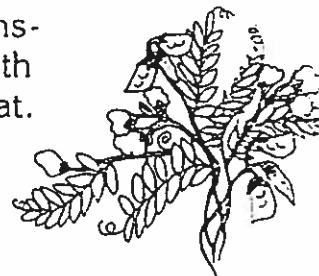
Farmers grow pulse crops for several reasons. Pulse crops contribute to soil nitrogen levels which add to the soil's ability to grow more food. The same equipment can be used to plant and harvest pulse crops and wheat.

In Canada, pulse crops are grown in Alberta, Saskatchewan, Manitoba, and Ontario. Most of the peas, beans and lentils we grow are exported (sold) to other countries.

Lentils

Lentils are lens-shaped seeds with a green seed coat. Lentil varieties developed by Saskatchewan scientists are

Laird, Eston and Rose. These varieties are grown in Saskatchewan





Dry Peas



Field peas are grown in Manitoba, Alberta and Saskatchewan. Dry yellow peas are the main type grown, with green peas making up a small percentage of production.

Beans



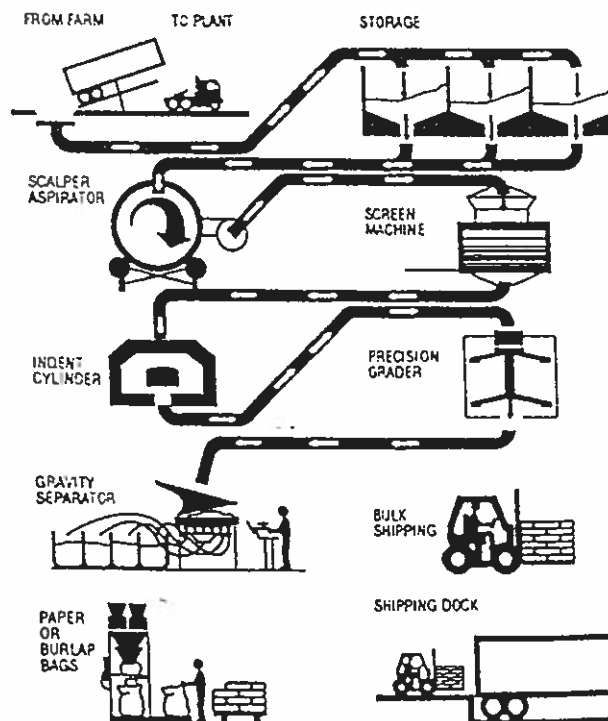
The major growing areas are Alberta, Manitoba and Ontario. There are a wide variety of beans grown in Canada, but the most popular is the white pea bean or navy bean. Other beans grown are the black bean, pink bean, and pinto bean.

Processing Lentils

Processing is necessary to remove foreign material, broken and under-sized seeds. A variety of machines are used:

- Scalpers remove large foreign material such as pods.
- Aspiration machines remove dust, weed seeds and chaff.
- Screen machines have a series of different-sized screens which remove particles larger than the lentil seeds.
- Indents remove large foreign seeds.
- Graders remove seeds wider than lentil seeds.
- Gravity tables remove heavier or lighter particles in a final cleaning.

The seed is then bagged, so it is ready for sampling, grading and shipment to the final consumer. Some pulses are canned or processed into other products, and the remainder is bagged for sale at the store.



Canada's Grain, Oilseed, Specialty and Forage Crops

...Where they grow and how they're used

SEED											USES
	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	NOVA SCOTIA	NEW BRUNSWICK	PRINCE EDWARD IS.	NEWFOUNDLAND	
Hard Red Spring Wheat	•	•	•	•	•	•	•	•	•		Flour, Livestock Feed
Durum Wheat		•	•	•							Semolina For Pasta Production
Hard Red Winter Wheat		•	•	•							Flour, Livestock Feed
Soft White Winter Wheat					•	•					Livestock Feed, Flour
Prairie Spring Wheat		•	•	•							Livestock Feed, Flour
Oats	•	•	•	•	•	•	•	•	•		Livestock Feed, Rolled Oats
Barley	•	•	•	•	•	•	•	•	•		Livestock Feed, Malt, Distilling
Rye	•	•	•	•	•	•					Flour, Livestock Feed, Distilling
Triticale		•	•	•							Flour, Livestock Feed
Corn	•	•		•	•	•	•	•	•		Livestock Feed, Starch, Oil, Distilling
Canola (Rapeseed)	•	•	•	•	•						Vegetable Oil, Protein Meal
Flaxseed		•	•	•							Linseed Oil, Protein Meal
Sunflower Seed		•	•	•	•						Vegetable Oil, Protein Meal
Safflower		•	•	•							Edible and Industrial Oil
Soybeans				•	•	•					Vegetable Oil, Protein Meal
Mustard		•	•	•							Condiments, Seasoning
Buckwheat		•	•	•	•	•		•			Specialty Flour, Livestock Feed
Canary Seed		•	•	•							Bird Seed
Field Peas		•	•	•							Soups, Livestock Feed
Lentils		•	•	•							Soups and Other Food Uses
Dry Beans		•	•	•	•	•					Soups and Other Food Uses
Faba Beans		•	•	•							Livestock Feed
Forages	•	•	•	•	•	•	•	•	•	•	Hay and Silage Production

The seed samples and informational chart will help you to recognize Canada's principal grain, oilseed and specialty crop seeds, and to know their major uses and where they are produced. Then, from British Columbia to Atlantic Canada, the booklet "Canadian Agriculture From Sea to Sea" tells you about farming. Detailed maps have been coloured to indicate the major farming activity in each census district within the farming areas of Canada, and the text gives a

Much of Canada's barley, oats and corn production is fed to livestock on farms where it is grown, but almost two-thirds of our major grain and oilseed crops is hauled from farm to market by Canada's railways. Most of these grains are exported through terminal elevators at the West Coast, Churchill or Thunder Bay, the remainder being either fed to livestock or processed domestically.

Where Does It All Come From?

Whether we live in an urban or rural community in Saskatchewan, agriculture is important to our local, national and global communities and the food and resources it produces. We are all a part of the natural environment, largely as users of its resources. These resources are extracted from the natural world through primary, secondary, and tertiary. Farms also use the natural resources of soil, water, and air to produce crops and animals. Farms provide us with much more than the food we eat; many produce products we use in our daily lives contain animal and/or plant by-products. All products ultimately come from the earth as either crops or natural resources.

Many people have the misconceptions that farms simply provide us with raw produce and other foods. Agriculture provides us with many raw materials from which we make clothes, books, cosmetics, medicines, sports equipment, etc. Resources we use everyday are found in the environment. These resources are either extracted from the natural world through industries such as mining, or they are products of agriculture.

Types of industries:

Primary industry: One in which a natural resource is harvested directly from the earth. This includes farming (crops or animals raised) and mining (mineral extracted from the earth), fishing and forestry.

Secondary industry: one that uses the raw materials from a primary industry to produce finished products. For example, manufacturing, food processing, and construction (canning goods, packaging, furniture etc).

Tertiary industry: a service industry that provides services to other business and industries. This includes transportation, retail sales, insurance, banking, agribusiness).

The development of natural resources drives the Saskatchewan economy and affects our community, environment, and culture. Saskatchewan is a world leader in innovation and technology and Saskatoon is a hub for agricultural research and biosciences.

Taking Care of Our Resources

The development of natural resources drives our economy, helps form our communities, and affects the environment. To ensure that these resources are used wisely and will endure for the future. It is necessary to consider factors: environment, economy, culture, and communities.

Sustainability is the capacity to endure, and it relies on the conservation, protection, and regeneration of resources over time. The idea that today's decisions affect the future of human health, the environment, and the economy is central to the concept of sustainability, because everything we need to sustain ourselves relies on our natural environment. Therefore, in order to ensure the healthy future, it is important that the decisions we make today about our use of the land and its resources will not damage-and can perhaps even improve-the environment and economy for future generations.

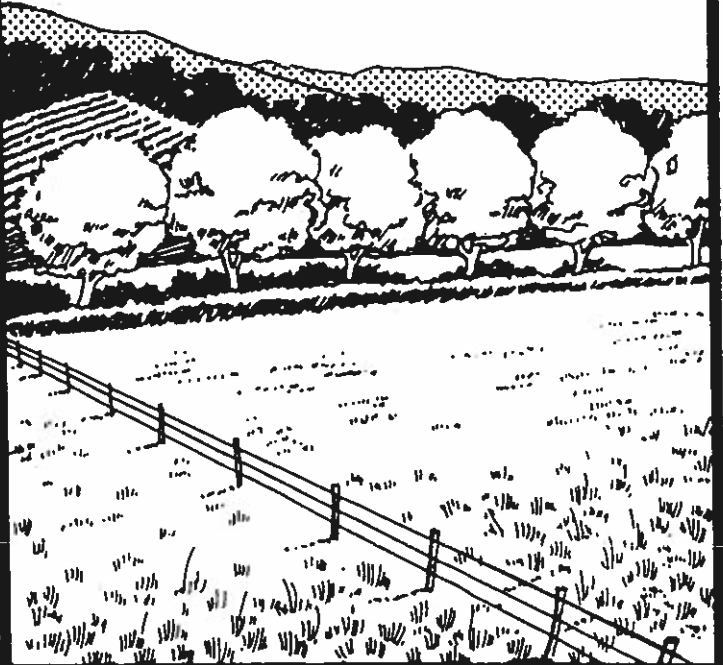
Sustainability has traditionally guided Aboriginal people in every decision they make about the use of resources from Mother Earth. They believe that decisions about land use must be sustainable now and for seven generations to come.

SOIL CONSERVATION

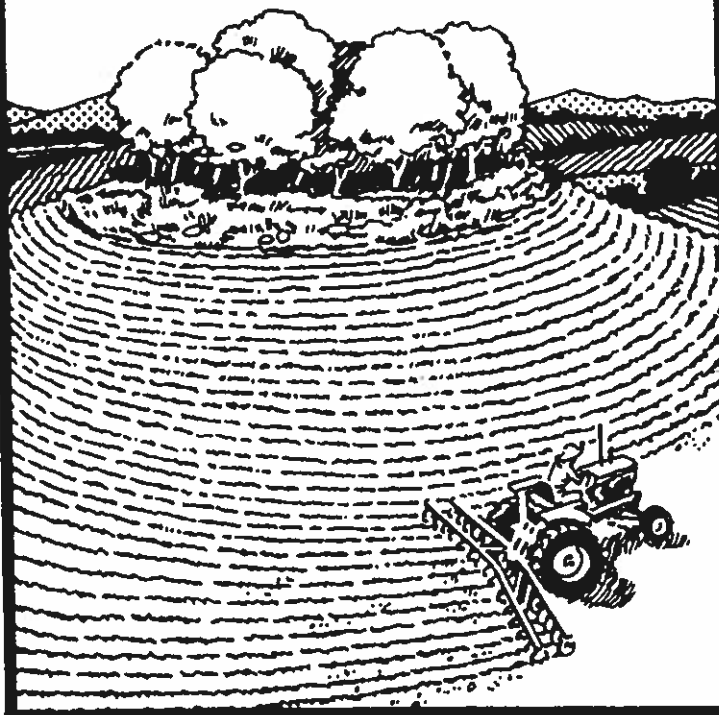
Terracing



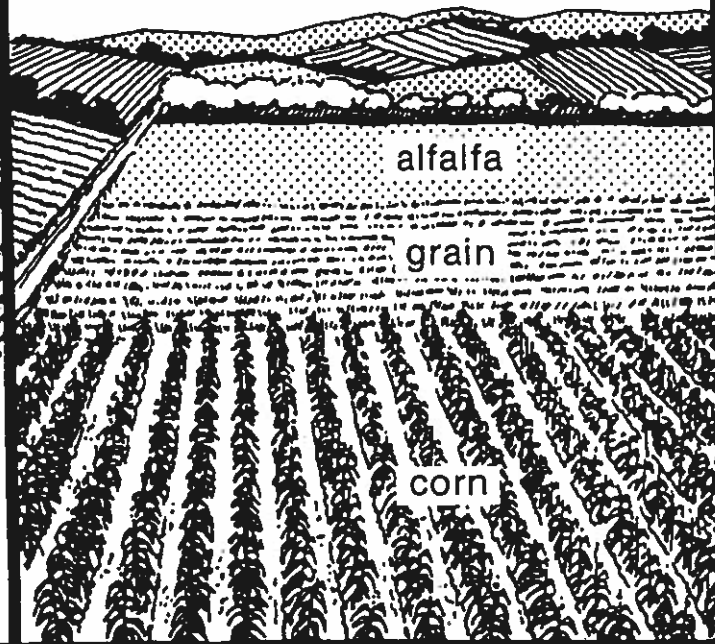
Windbreak and Grass



Contour Plowing



Strip Cropping



SOIL CONSERVATION

CONSERVATION means the protection and wise use of natural resources such as soil, water, and wildlife. Soil conservation tries to keep the soil deep and fertile (good for

growing things). The depth of topsoil is usually thin enough to be measured in inches. It takes several hundred years to build an inch of topsoil. Erosion can carry it away in a few months or years.

Read the list of soil problems below. Then read the conservation methods. Write the number of a soil problem on the line beside the method that will help prevent that problem. Numbers may be used more than once.

SOIL PROBLEMS

1. Wind may blow topsoil away (wind erosion).
2. Running water may carry away the soil (water erosion).
3. Soil may lose its richness by too much rain or by crops that use up certain elements.
4. Soil may become polluted (unclean). Certain harmful chemicals have caused soil pollution. When such chemicals get into fields used for farming, the food and water supplies can be spoiled. Chemicals that were buried underground have leaked out and caused health problems.

CONSERVATION METHODS

- Fertilizing: returning needed food elements to the soil
- Crop rotation: changing the kind of crop that is planted from year to year
- Contour plowing: planting around a hill rather than up and down the slope. The ridges of soil catch the rain water and keep it from running downhill.
- Plant cover: keeping land covered by closely growing plants or trees
- Windbreak: planting a row of trees at an angle to the wind direction to slow down the force of the wind
- Wise use of chemicals

How could **you** prevent erosion on a yard or playground that has no plant growth on it?

What could **you** do to help prevent soil pollution?
