



DIVERSIFIED FARMING IS SAFE FARMING



THE GULL LAKE, SASKATCHEWAN FARM



WESTERN CANADA NEEDS



1. A More Diversified System of Farming
2. More People, Better Farm Management
3. More Cultivated Crops and More Legume Crops
4. More Beef Cattle and More Dairy Cattle
5. More Hogs, Sheep and Poultry
6. Better Crop Rotation and Weed Control
7. A More Permanent and Safe System of Agriculture

DIVERSIFIED FARMING IS SAFE AND PROFITABLE

Our Sixteen Years' Experience in Growing and Feeding
Corn, Alfalfa and Sweet Clover, Rotating Crops and
Hauling Out the Manure, Demonstrates that
Yields and Quality Can Be Improved,
Production Costs Reduced, Weeds
Controlled, and Farming Made
Safe and Profitable

By
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Grand Forks, North Dakota
Supt., IHC Demonstration Farms
Oak Lake, Manitoba, Canada
Gull Lake, Saskatchewan, Canada
Larimore, North Dakota
Aberdeen, South Dakota

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FARMING GREATEST INDUSTRY

By *P. G. HOLDEN*

THE people understand, better than they ever did before, that farming is a business; that it is not only a business, but an exact science. They now know, what they never realized before, that the farmer is as certainly a business man as any other producer or manufacturer; that the successful farmer is as much of a scientist as those in charge of the most complete and elaborate laboratory.

No other business man is called upon to solve so great a variety of problems or meet so many or varied conditions as the farmer; no other scientist must be expert in so many different lines of scientific work.

No problem confronts any other business man that the farmer is not compelled to solve, and there are other conditions which he has to meet every year that no other set of business men are ever called upon to combat.

The farmer has much capital invested in land, buildings, stock and equipment. Most of them, like other business men, have interest to pay on borrowed money or notes given in payment for necessary equipment. In every event they are entitled to a fair rate of interest upon the capital invested.

Responsibility of Ownership

Whether he owns the land he farms or is a tenant, the farmer has the same responsibility of ownership as any man engaged in banking or mercantile pursuits. And every hour, from the day he puts his seed into the ground until he converts his crop into cash, he faces more risk than any other class of business men.

During the growing season he is subjected to the whims and uncertainties of weather and climate. He runs the risk of complete loss through hail, rain and wind, and after the crop is grown and stored, there is still risk in the marketing of the product, whether it is milk, grain, hay, live stock or other products.

It requires more brains to be a good farmer than to conduct any other business, and it is time we realize not only that farming is the most important of human activities, but that the farmer is entitled to and should receive just and fair compensation for his investment, for his labor, and for his responsibility.

INTRODUCTION

Diversified Farming

Periods of financial fluctuation, such as followed the Great War, succession of crop failures, over production, etc., have always brought distress to one-crop farming regions. The farmer who is dependent on a single crop, and buys most of his living, does not pass through such periods as easily as the one who has a diversity of crops and live stock. Diversification assures a good living, and a variety of products to sell, as well as more independence of price fluctuations and climatic conditions, which may affect one product more than another.

How to maintain the crop producing power, or fertility, of the soil, and at the same time make the farming operations profitable, is the most important problem of all farming regions. It is a problem that has not been entirely solved by any extensive agricultural country, but what we call diversified, or mixed farming, most nearly approaches a solution.

The farm should first provide the farmer and his family with a good living, and second, allow for an accumulation that will educate his children, and make it possible for him to live in comfort during his declining years. This should be done with due regard to maintaining the fertility of the soil, so that his descendants will not be left a worn-out farm. The region in which the farm is located, the climate and kind of soil, are factors beyond immediate known control, but it is not necessary to attempt farming in regions where conditions are hopelessly unfavorable. However, a careful survey made in a most unfavorable farming section of the Northwest by a noted agricultural authority, indicates that the most adverse conditions are successfully overcome in some cases. It is also known that some farmers fail to succeed under the most favorable conditions. Knowledge of proper farm practices, industry and thrift, may be named as essentials of success in any region.

All farming regions pass through various stages of development. The pioneers usually produce a diversity of crops and keep live stock, as they must produce their living on the farm. When transportation becomes available, the crop most easily and profitably grown becomes a specialty and is then grown exclusively. Sooner or later, for various reasons, this special crop has begun to fail, and a change to diversified farming becomes necessary. This diversified era of farming has always brought a more permanent and prosperous development. Already the older sections of western Canada have seen the light and are beginning to diversify their agricultural operations with consequent profit.

Diversified Farming Demonstrated

The 16 years' experience, and observation on our demonstration farms, confirms the opinion of many practical farmers and business men, that a more diversified system of farming—more corn, alfalfa, clover, and live stock—is essential to the permanent success of farming.

The growing of small grain exclusively in the older sections resulted in a decrease in yield and quality due to depleted available fertility, impaired physical condition of soil, rust and other plant diseases, an increase in weeds, insect pests and soil drifting. Growing a diversity of crops—grain, grass, legumes, and cultivated crops—feeding a part of these to live stock and returning the fertility in the form of manure, is the simplest and most practical means of overcoming these difficulties.

One-Crop System Unsafe—Grow a Living

The farmer, community or section of country whose sole dependence is, for instance, wheat, is unsafe. The risk is all in one crop. Dividing the risk between several crops, as wheat, corn, flax, alfalfa, sweet



Grow a Living. Don't Buy It. 1, 3, 6, IHC Demonstration Farm, chickens, pigs and garden. 2, Pigs, farrowing pens and summer sheds. 4, Garden, irrigated from stock well, central Montana. 5, A girl's garden display, western North Dakota. 7, Mothers of Prosperity, Red River Valley.

clover, beans, beets, etc., and live stock, greatly increases the certainty of having returns for the year's work. A season that is favorable for one crop may be unfavorable for another, but it is seldom that a year is so unfavorable that some crop will not make a fair yield, or that there will not be feed for some live stock. A diversity of crops and live stock also provides for growing the most of the living on the farm.



Feed Crops. 1, Cutting alfalfa 70 days after seeding. 2, Sweet clover for feed and weed fighting. 3, Corn makes most and best feed. 4, Looking for seed ears. 5, Sunflowers make lots of feed. 6, Hang up seed corn so it will dry. 7, Looking down long rows of feed. 8, Corn versus summer-fallow—corn pays for the work. 9, Shoeks too far apart; manure, sweet clover and corn needed. 10, Wheat after corn in rotation.

Few farmers can afford to buy meat, butter, milk, fruit, or vegetables, nor can they afford to do without them. The growing of a good living on the farm is one of the first essentials of success in any farming country. On our Aberdeen farm in 1926 grain was a complete failure due to drouth. Rain came in time to produce a good crop of corn and plenty of alfalfa and sweet clover, so that we fed out the usual amount of live stock and made a fair return on the farm.

How We Diversify

Increased yield at lower cost should be the aim of any change in farming operations. The Grand Forks, N. D., farm was a typical Red River valley wheat farm and needed just such treatment as all old farms do—a change of crops and the addition of active organic matter and plant food, to the soil. This called for a crop rotation. From 1913 to 1922 inclusive, this farm was handled so as to increase the yields and cut the cost of operating. Generally one-fifth was in pasture (land not suitable for farming), yards, garden, etc.; one-fifth in alfalfa or grasses, and rotated once in four or five years; one-fifth in small grain; one-fifth in corn—a cultivated crop; and one-fifth in sweet clover or red clover and timothy, in a regular three-year rotation. All the corn, clover and other roughage were fed to live stock on the farm, and the cultivated fields received a coating of manure—10 to 12 loads per acre once in each rotation. The manure was applied to the grass or sweet clover stubble, and fall plowed for corn. Small grain followed the corn, and the sweet clover or grass was seeded with the grain. This plan necessitated plowing the land only once in three years, as the corn land was only disked, or loosened with a cultivator for small grain. Plans for rotations are very elastic. This rotation suited this farm, and it is the most simple and easily carried out. The Aberdeen, Larimore, and Oak Lake farms are similarly located as to climatic conditions, and much the same rotation is followed. It will be noticed that a different rotation is practiced on the Gull Lake farm, as conditions there are different.

The IHC Demonstration Farms in the Northwest

These farms are located at Grand Forks, North Dakota (1913-22); Aberdeen, South Dakota (established, 1913); Larimore, North Dakota (established, 1923); Oak Lake, Manitoba (established, 1924); and Gull Lake, Saskatchewan (established, 1928).

The purpose of these farms is:

First. To demonstrate a more profitable and permanent system of farming in these regions—better farm management.

Second. To grow small grains, corn, alfalfa, and sweet clover in a systematic rotation; feed the corn, alfalfa, and sweet clover to live stock and return the manure so as to maintain the fertility and physical condition of the soil; control weeds, plant diseases, and insect pests.

Third. To distribute improved seed corn, alfalfa, sweet clover and other seeds.

Fourth. To broadcast the results in farm booklets, newspaper articles, and lectures at farm meetings.

Note: We call these "demonstration farms" because we do not experiment. The Federal, and local government experiment stations are followed in their recommendations as to varieties, methods, etc.

Land Cleaned—Yields Doubled

It is now realized by all who are interested in the future welfare of the Northwest, that the growing of small grain exclusively has resulted, or will result, in depleting the soil fertility, accumulating noxious weeds and plant diseases, and impairing the physical condition of the soil to the extent of making small-grain farming unprofitable. Corn, alfalfa,



Weed control is a big problem in the Northwest. Rye stubble, quack grass and sow thistle, worked with the field cultivator—without plowing or removing stubble. A good job economically done. The long, narrow points are used to tear the weeds out, and later the wide duck-foot shovels complete the job.

and clovers are being grown on our farms and fed to live stock and the manure returned to the soil in a systematic rotation of crops. On the Grand Forks farm for 10 years this system proved satisfactory in every respect. The soil was built up and freed of weeds until it produced twice or three times the former yield of wheat. This made possible the growing of as many bushels of grain on one-half or one-third of the land formerly devoted to grain, leaving one-half or two-thirds of the land on which to grow corn, alfalfa, clovers and pasture for live stock. Our experience demonstrates that this system is practical, profitable and desirable from every standpoint.

While it is hardly to be expected that these farms would prove a money-making proposition, we have felt that if such demonstrations did not pay, there would be little excuse for advocating them. The income and expense have varied with the yield of crops and prices, the better years showing a profit and the poorer, a loss. It must be considered, however, that a substantial cash rental was paid, and the labor all hired at good wages. Figured on a basis of self-owned-and-operated, there would be no reason for complaint.

The results of this work have been published from time to time in booklets, used as the basis of hundreds of newspaper articles, and explained at hundreds of farmers' meetings in 15 states and the three western provinces of Canada.

Practical Demonstrations

These farms are equipped and handled similarly to many of the best farms in these districts; the purpose being to demonstrate how to make money, rather than how to spend it. We have used straw sheds, trench, pit and homemade silos, bought common stock and used pure-bred males, because the farmer who needs most badly to diversify, would not have the means to do otherwise. The overhead cost on any farm must be given due consideration. You are invited to visit any of these farms, and observe that we have no fads.



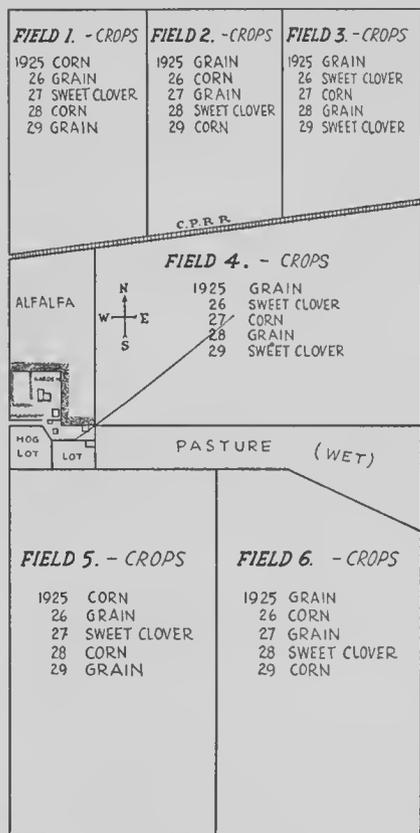
Neighbors asking how we grow alfalfa—The best way to learn.

OAK LAKE, MANITOBA, FARM

(Work started in the spring of 1925)

This half-section farm is located 35 miles west of Brandon, between Oak Lake and Griswold, on the main line of the C. P. R., and also on the main highway west from Winnipeg to Regina, Saskatchewan.

The farm is on the beach of an old glacial lake, the north quarter being partly on higher ground, and the south in the old lake-bed. Most of the north quarter is fairly well drained and has good soil, while the south is quite light and subject to being too wet for crops. In early spring and during wet seasons there is too much water on the surface, or so near the surface, that it is impossible to farm it, and crops are drowned out.



IHC Demonstration Farm, Oak Lake, Manitoba. Established 1925.

Rotation—Clean Up Farm

This wet, uneven condition has made the problem of cleaning the farm of sow thistle and quack grass almost impossible. We have followed a three-year rotation, similar to that on the Dakota farms. First year, cultivated crop or summer-fallow; second year, grain in which sweet clover was seeded; third year, sweet clover, pastured, cut for hay or seed. This land needed building up and cleaning up. Corn, when not drowned out, has made a lot of feed, so that we could handle

a car or so of stock, and return the manure to the fields. Sweet clover has made very satisfactory hay, pasture, and seed crops. It has grown as well, or better, than might have been expected. Even on the lighter parts of the fields, where the grain blew out completely, the sweet clover made a fair stand and a good second-year growth.

Small grain, when it had any chance at all, has made fair crops, but it has been too wet nearly every year on the lower parts of the farm. Corn and sweet clover seem to have grown better on the low land, as usually by August the land gets drier, but this is too late for the small grains.

Alfalfa—Sweet Clover

Grimm alfalfa, seeded with grain, has made a good stand, and apparently does not show any tendency to winter-kill. It seems to grow just as well as on the Dakota farms. It was sown broadcast in front of the disks of a single disk drill, using a grass seed attachment, and a surface packer run behind the drill. We seed sweet clover in the same way. A part of our alfalfa was seeded with sweet clover, mixing the seed half and half, and sowing 8 to 10 pounds per acre. This requires less seed and insures a more even stand. After a few cuttings, the sweet clover practically disappears.

In 1926 considerable winter-killing of sweet clover was experienced in parts of Manitoba. There was no such effect noticed on this farm. Whether it was due to the character of the soil, or the yellow variety, which we grow, being more hardy, we do not know. Except where the sweet clover completely drowned out, it has made a most satisfactory growth, producing good pasture, hay, and seed crops.

Corn

About 80 acres of corn have been planted each year, part to be hogged off, and part for silage. The Gehu flint is planted for hogging off, and Minnesota 13 (early strain) for silage. Considering the condition of this farm, and rather poor corn seasons, results have been satisfactory. Last year, 1928, while not a good corn year, we had a good crop of matured corn, which was saved for seed. The rotation is now on the second run, and the effect of building up the soil with sweet clover and manure, is being shown in better growth and maturity.

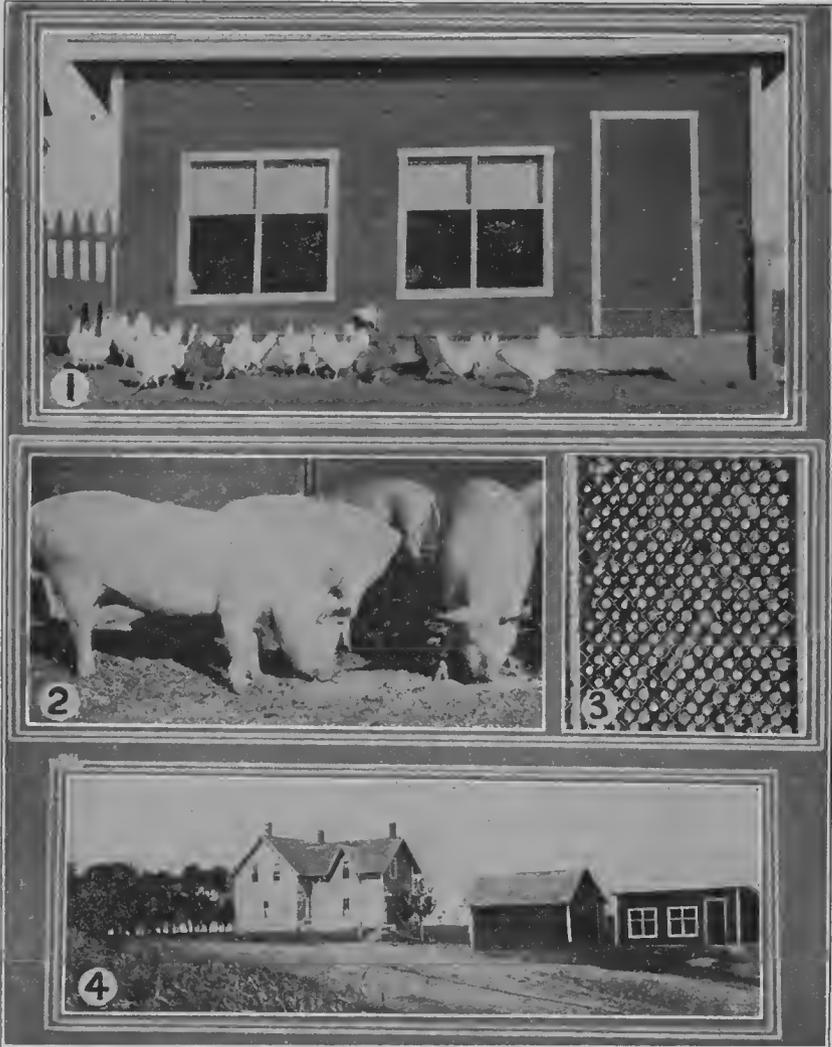
The corn is planted and handled just the same as on the Dakota farms. Planting begins about May 10, and the corn is check-rowed, three grains per hill. Fall plowing is preferable, but due to the fact that this soil drifts badly, we cultivate the sweet clover stubble in the fall, and plow just before planting. We try to cultivate to control weeds and conserve moisture. (We plant as soon after May 1 as possible.)

Live Stock—Silo—Straw Shed

We keep about 10 brood sows, and buy stock cattle when there is a surplus of feed on hand. A trench silo was built in 1925, but as the soil is sandy and the trench caved in, a pit silo, 16 feet across and 12 feet deep, with a four-inch concrete wall, was put in in 1926. (The pit is a round hole—like a well.) We expect to extend this silo above ground, but have not needed the addition to date. This pit holds a lot of silage, when tramped in with a horse.

A straw shed, 30 x 60, handles a car of cattle very comfortably. It is our plan to buy feeder stock during the winter or early spring, run them on sweet clover pasture until late fall, and feed until the beginning of cold weather. Last year, 1928, we bought 16 head of thin cows and

heifers, April 2. They ran on sweet clover pasture until September 15. They cost \$45.42 per head, and 10 head were sold for \$79.20 each—a gain of \$33.76 per head. Three heifers still remain on the farm. Calves and two cows, sold locally, brought \$246.84, or a total of \$1,038.84 for the year, for cattle. We also sold \$139.79 worth of cream during the year, in addition to the butter and cream used on the farm. We bought additional stockers in the winter to utilize the silage and clover hay.



Oak Lake Farm. 1, Hen house. 2, Yorkshire brood sows. 3, Seed corn on drying rack. 4, House and surroundings.

From the 10 brood sows last year, 1923, we raised 60 pigs. We sold 58 head of hogs for \$1,091.74. (Ten brood sows and two small pigs are held over on the farm.) These pigs are grown so far as possible on pasture crops—rye, alfalfa, sweet clover, hulless barley and corn, hogged off. We raise only one litter a year, having the pigs farrowed in February or March.

A small herd of milk cows is being accumulated by selecting good grades. We weigh and test the milk, so that we know what the cows are doing. Grade Shorthorns are being used, but we will probably change to Holsteins, as they are more profitable for milk production, as is proven by our experience on the Larimore (North Dakota) farm.

Weed Control

Unquestionably, the greatest problem confronting the farmers of Manitoba is weed control. The crop damage from weeds averages more than 21 per cent. This damage does not vary like rust, dry or wet weather, hail, etc., but is always present, and is increasing.

Our attempt at control has been to work the weedy parts of the fields in the late fall, with the field cultivator. Where quack grass was too heavy to use the duckfoot shovels, we put long, narrow shovels on the stiff gangs and worked the quack without plowing. As this land has been in sweet clover or corn, the weeds are somewhat weakened and not difficult to work out. The trouble on this farm has been the many wet places that could not be worked, which allowed the weeds to spread. The higher parts of the fields have been fairly well cleaned up. Wild oats and stinkweed bother also, but are being eliminated by the rotation. The annual weeds are not to be dreaded as much as are the perennials, like sow thistle, quack, and Canada thistle.

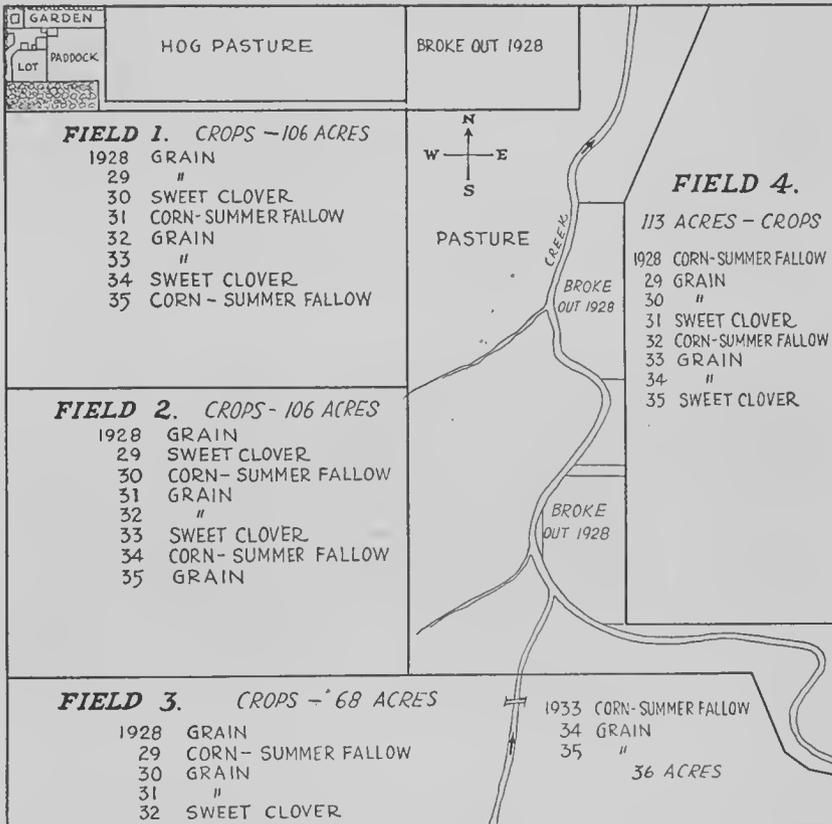
We find that late summer and fall working of these weeds with the cultivator (stiff-gang) is more successful, as to the amount of work required, than keeping the land black all season. It may take longer to completely eradicate them, if such is possible, but there is no loss of the use of the land and good crops can be produced. Sow thistle land worked with the cultivator after the corn is off, spring plowed and seeded to grain, does not produce many blooms, even if they are not completely killed. Fall working also germinates a lot of wild oats and other weed seed, that is killed by later working or freezing. The land should be worked just as soon as possible after the crop is off. Wet seasons make weed control very difficult, but unquestionably the weeds that are disturbed by late cultivation, even if not killed, will be less vigorous the following year.

GULL LAKE, SASKATCHEWAN, FARM

(Bought and established 1928)

This farm is a section of land, typical of this district, being located one mile south of the town of Gull Lake, on the main line of the C. P. R., 140 miles west of Moose Jaw and 80 miles above the international boundary, north of Chinook, Montana. This district has been farmed for 20 years, but the land on this farm has been farmed for only 12 or 15 years. The farm is cut by a small creek from the Cypress Hills, which range southwest from Gull Lake, about three-fourths of the land being in the valley which slopes gradually to the higher land. The land is all good soil, though varying from quite heavy to lighter in places, and is all tillable except along the immediate course of the creek, which is quite crooked. The land along the course of the creek will be used as pasture.

The farm is well improved, having a good house, barn, granary, and



IHC Demonstration Farm, Gull Lake, Saskatchewan. Established 1928.

wire fence outside and around the pasture land; about 480 acres have been broken.

One Year's Results

No great amount of value can be credited to one year's results, and we can hardly hope to have an average that will equal 1928. Possession was obtained in the fall of 1927, and as about 180 acres had been summer-fallowed, this was given a good working with the duckfoot before freeze-up. As the former tenant did not get his crop threshed until spring, we were somewhat handicapped, but were able to get full possession and begin work March 1.

As the farm had been rented for a number of years, the buildings and fences were in rather bad condition, and it required a lot of work to get the farm cleaned up and in shape.

Seeded Early—1928

The summer-fallow was worked with the cultivator just as early as possible (field work was begun on April 21), and seeding followed immediately; wheat seeding was started April 25. As the land was rather dry and loose on top, and winds blowing, we followed the drill with a surface packer, which firmed the soil about the seed and insured prompt and even germination. As the spring continued dry and windy, the benefit of this packing was very noticeable. The grain came up evenly and made a fine early growth, while grain on similar land, not packed, came up very unevenly, much of it not sprouting until rains came in June. There was no real soaking rain until June 16. A few light showers in late April and early June did not do much good, and there were strong winds. This uneven germination gave the fields a ragged appearance, and the grain ripened very unevenly. The grain that did not come up until after the rains in June was caught by the August frost, while the early seeded, that germinated promptly, was not greatly damaged, as is indicated by the fact that the first ear of wheat delivered from our earliest seeding, graded No. 1 Northern.

While we seeded all crops as promptly as possible, there was some frost damage in the latest seeding, part of which may have been due to the later seeding being on slightly lower land. But there is a field adjoining ours on identically the same land as to elevation, that had been summer-fallowed better than ours, but was not packed, and seeding was delayed due to wind and dry weather. The crop on this was very uneven and badly damaged by frost.

Early seeding, and using the packer to insure even and prompt germination, gave us 39 bushels per acre on 140 acres of Marquis. This was harvested with a combine, using a swather.

Stopped Soil Drifting

Owing to a shortage of rain and to high winds during late May and early June, there was considerable drifting of the lighter soils, which retarded the growth of grain that had come up before the soaking rain,

June 16. Drifting started in several parts of our early-seeded wheat, but was stopped by promptly spreading coarse manure with a manure spreader. Observation indicated that drifting was held to the minimum by spreading straw and coarse manure, and no damage of consequence resulted. Damage from drifting on other fields in the district was noticeable, particularly in delaying growth and maturity. We have followed the same practice on the Oak Lake (Manitoba) farm, using a straw-spreading attachment on the manure spreader. The manure or straw is spread over and around the blow spots, particularly in front of the blow spot. This prevents the spots from spreading, as it is the



Gull Lake Farm. Buildings and live stock.

fine soil drifting over the surface, loosening other particles—like an avalanche—that does the harm.

Oats and Barley

One hundred acres of oats and 40 acres of barley were seeded on spring plowing. We attempted to plow, pack, seed and pack as nearly as possible at one operation—not giving the soil a chance to dry before seeding. This stubble land had not been cultivated, or disked, but was moist and in good shape at seeding, and the grain germinated promptly. We did not burn the stubble. The oats yielded $58\frac{3}{4}$ bushels per acre, and the barley 39 bushels per acre. These crops showed very little frost damage, as the seed germinated as soon as seeded, due to the firm soil. We packed immediately behind the plow, and followed with the drill, and a packer behind the drill.

Rotation Planned

The object of these farms is to demonstrate a profitable and permanent system of farming. Were we assured of a continuation of such yields as we secured in 1928, we might not be justified in considering any other than straight grain farming. However, as we do not expect such yields every year, the farm is being divided into four fields that will be cropped in rotation. First year, wheat (following summer-fallow or cultivated crop); second year, oats or barley on spring plowing, in which we will seed sweet clover; third year, sweet clover cut for hay, seed, or pastured, and fall cultivated; fourth year, summer-fallow or cultivated crop.

Last year (1928) we had 50 acres of corn that made a lot of feed, but "a good wheat year is a poor corn year," held true, and we hope for better results. The corn land, however, is in fine shape, and we expect practically the same grain crop on it as on summer-fallow. The corn land was plowed and worked with a spring-tooth cultivator before seeding. The check-rower was used, and the corn cultivated four times. After the corn was cut and removed, the land was disked and left rough to catch snow and avoid drifting.

Live Stock for Surplus Feeds

This rotation calls for live stock to utilize the surplus feed, and we raised nearly a carload of high-grade Yorkshire pigs from brood sows shipped up from our Oak Lake, Manitoba, farm, last spring.

A carload of stock steers has been bought to utilize the corn fodder and part of the barley and oats. Ten head of Holstein cows and heifers will soon be on the farm to help consume this feed and add to the farm income.

Legume Hay—Sweet Clover

Ten acres of sweet clover were seeded alone on summer-fallow last spring, and produced a good crop of fine hay. This will help balance the fodder and grain for the cows. During another year, if the 100

acres of sweet clover seeded with the oats and an excellent stand secured, does as expected, we will put up enough hay to feed two years. No alfalfa was seeded last spring, as the land was not in condition, but we hope to soon have alfalfa to seed with silage and grain. About 20 acres of oats were cut for green feed last year (1928) and the oat straw had a lot of sweet clover in it, which made excellent feed, as we cut it a little on the green side.

Hold for Reserve Feed

It is our intention to get ahead a reserve of feed on this farm so that a year of short rainfall will not handicap us. All oats and barley grown on the farm last year (except what we fed) was held over, as we can, undoubtedly, realize more by feeding it to cattle and hogs than by selling. Sweet clover is apparently almost certain to produce a lot of hay, and corn properly planted seldom fails to make feed.

A large, partly underground silo (combination pit and above-ground) will be built in which to store the corn as silage. This would have been built last year, but we had an extra amount of work getting the farm cleaned up and in shape. Also, the corn was badly set back by the August frost and would make nearly as good feed run through the silage cutter with green oats, and fed dry, as if siloed, but it cannot be held over as well as silage.

On the Manitoba and Dakota farms we have practiced chopping corn fodder and sweet clover and feeding them with very satisfactory results, even when we fed silage.

Plowless Summer-Fallow

The land summer-fallowed on the farm last year was not plowed. The spring was very dry and the land to be summer-fallowed was quite heavy—inclined to be “gumbow.” As soon as possible after seeding, this land was double disked to work up the stubble, and cultivated three times during the summer and fall with the duckfoot cultivator. Apparently this land could not be in better shape, and this condition has been secured with less work than if the land had been plowed. We also believe that a less amount of weed seed is in the surface soil ready to germinate this spring. That is, most of the weed seed has germinated and has been killed by cultivation.

The use of the combine makes clean land very desirable, as clean grain can be let fully ripen and be cut with the combine without swathing. There is no question but that this method of harvesting has come to stay.

“Reward” Wheat and “Gophers”

The Dominion Experimental Farm at Indian Head sent us one bushel of Reward wheat for trial. This was sown along an old sod pasture. Evidently the rodents had never had a taste of poison, as they dug up considerable of the wheat for several rods out from the

fence before their depredation was realized, but from the one bushel of seed we threshed 35 bushels of fine wheat. We noticed very little difference in the time of ripening between the Reward and our second-generation Marquis.

As soon as noticed, the gophers were given a good bait of poisoned grain and they fell for it by the dozens. The pasture was gone over several times and apparently practically every gopher killed. The expense and time for doing this amounted to very little, and it is rather a wonder that so many of these pests are allowed to continue their depredations.



1, Speeding up work at night. 2, Make hay while the sun shines. 3, Seeding on time. 4, Cultivate corn often. 5, Once over, all over. 6, To the butcher in a hurry.

The Weather at Gull Lake

Fortunately there was a good supply of fall moisture (1927) so that the soil was in good shape, or the dry winds in May would have done much more damage.

A rain gauge and a thermometer were supplied us by the Dominion Weather Bureau, and from June 6 a record of rainfall and temperature has been kept. There was very little spring precipitation before that date. From June 6 to 15, 1.64 inches fell in five showers. From June 16 to 19—the first general rain—2.16 inches fell, and later showers brought the June 6 to 30 total to 4.58 inches. In July there were eight showers—only one, on July 17, going above one inch, the total for the month being 2.46 inches. There were six light showers in August, with a total precipitation of only .30 of an inch, making a total, from June 6 to August 30, of 7.34 inches. The moisture in the soil at the beginning of the season, together with the timeliness of these rains, account for the splendid crop. Only a few light showers fell in September and October, so that harvesting and threshing weather was almost ideal.

Farmstead and Fencing

The buildings on this farm are very poorly located, being in the extreme northwest corner of the section. They should have been a half mile south or east, so as to be nearer the extreme parts of the farm. No shelter belt or other tree planting had been done, and such protection is badly needed.

Four rows of forest trees—ash, box elder, and poplar—were planted south of the buildings, and around the outside of the farmstead, comprising 10 acres, a row of caragana was planted. The rows of shelter belt were planted 12 feet apart and four feet apart in the row; the caragana, two feet apart. As most of the land on which planting was made, had been summer-fallowed, it was in good shape and an almost perfect start of all trees secured, including some plum, cherry, and crab apple trees.

Fortunately the prevailing winds and snow drifting is from the south, due, doubtless, to the Cypress Hills which lie immediately to the south. Between the rows of trees, Russian sunflowers were planted, and as these made a growth of six to 10 feet they will afford ample protection from snow this winter.

The farm is all fenced, but heavy barnyard and paddock fencing is being added so that handling feeder stock, hogs, and cows will be as convenient as possible. Some moving and remodeling of buildings was done, including granary, cow stalls, modern septic tank for the house, etc.

All these improvements are possessed by many farms in this district, and none of them is beyond the reach of all employing modern methods of farm management.

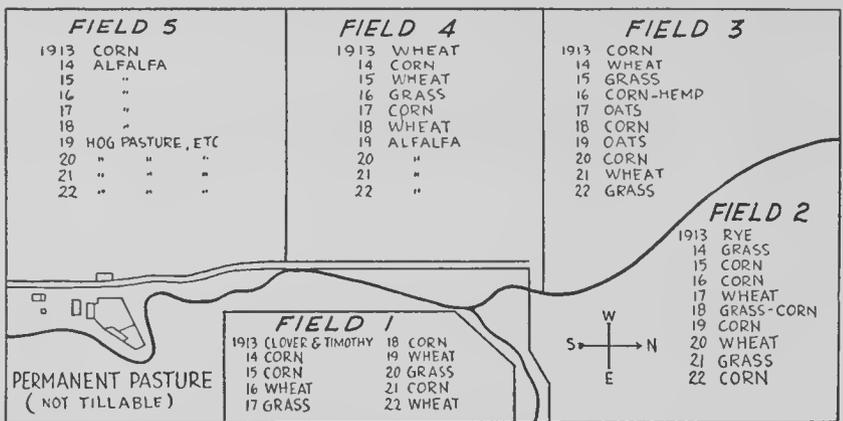
Not an Experimental Farm

It is not our purpose to experiment, but rather to demonstrate and

emphasize the findings and recommendations of the Dominion and Provincial Experiment Farms and Departments of Agriculture. This farm is just one mile south of the fine town of Gull Lake, and visitors are welcome at all times. We want this farm to be a real help to South-western Saskatchewan and Southeastern Alberta.

Modern Farm Equipment

This farm is large enough to warrant the use of practically all power equipment. Only one team of horses was bought, and they were used very little. All plowing, packing, seeding, cultivating, and harvesting can be done much more expeditiously and better with power farming equipment. The farm must use modern methods and equipment just as industries do. We doubt if there is a railroad or other large industry in the United States or Canada that would not go bankrupt in two years if compelled to return to the use of the methods and equipment employed 20 years ago.



IHC Demonstration Farm, Grand Forks, N. D., showing fields and system of crop rotation, 1913 to 1922, inclusive. Contains 308 acres. In 1923 the equipment was moved to Larimore.

THE GRAND FORKS DEMONSTRATION FARM

(Operated 1913 to 1922, inclusive)

(Located one mile southwest of the city of Grand Forks, N. D.)

This half-section farm was selected as being typical of the Red River valley. Having rather heavy soil, it responded very satisfactorily to the rotation of crops, and was easily cleaned of common weeds. At the end of 10 years, we felt that more was to be gained by moving to a different locality. A farm in the lighter soil area, near Larimore, was secured, as this offered quite a different problem of much importance.

While it is nearly 1,000 miles from Aberdeen, S. D., to Gull Lake, Saskatchewan, we find much less difference in handling these farms than is usually supposed. The following suggestions as to growing and handling of crops apply to all the farms, but particularly to the Grand Forks farm.

Corn, alfalfa, sweet clover and other clovers and grasses were grown and fed on the Grand Forks farm with as great success and profit as could be expected in any part of the United States. It is doubtful if a similar farm in the more favored regions would show more satisfactory results in growing and feeding these crops and returning manure to the soil. Our results indicate that the only reason why corn, alfalfa and clovers are not grown on every farm in the Northwest, is that acclimated seed is not planted, on properly prepared land, and given the needed attention.

We may add that the above applies to all the farms, particularly those at Aberdeen and Larimore, and the Oak Lake, Manitoba, farm. The Gull Lake, Saskatchewan, farm, while more recently established, gives equal promise.

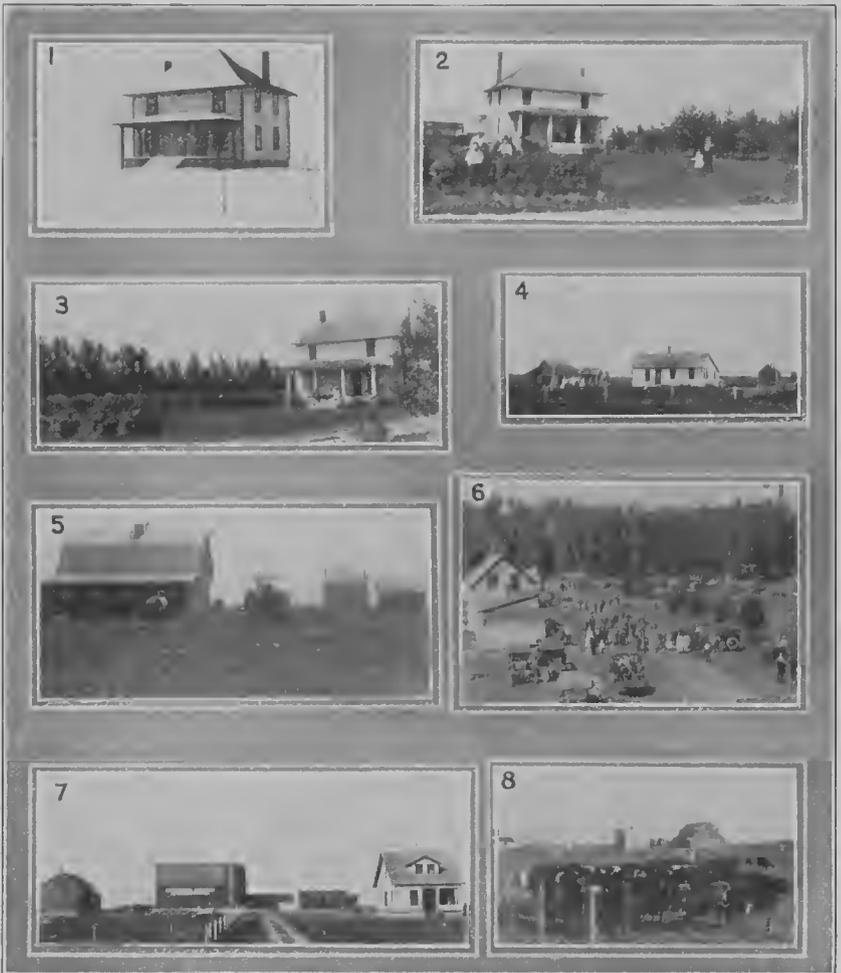
Alfalfa

Hardy Alfalfa Essential—Yields High. Grimm, Montana, South Dakota, and Kansas seed, planted under like conditions, gave good results, but the Kansas variety was badly winter-killed, indicating that hardy seed should be planted. Grimm has given most satisfactory results. A yield of 8,800 pounds of cured hay was secured from three cuttings, but two tons from two cuttings is as much as should be expected under ordinary conditions, or until the soil is greatly improved by the use of manure.

Seeding Alfalfa. Our 16 years' work indicates that alfalfa may be seeded successfully in almost any manner, and at any time during the growing season when conditions are right. Considering all the methods, combinations, time of seeding, etc., more than a hundred different trials have been made, and in no case on either farm has a complete failure resulted. We seed eight to 10 pounds per acre, but have secured a good stand with only four pounds per acre.

Seeding Alone Gives Best Results. Land well manured and fall plowed, planted to a cultivated crop, or summer-fallowed the following year, is in ideal condition for seeding alfalfa. This land should be cul-

tivated in the spring, as early as possible, to stop evaporation and destroy weeds, and kept in this condition until about the 25th of May to the 10th of June. At any time during this period when the ground is full of moisture, the alfalfa may be seeded, either broadcast in front of the disk and packed, or seeded in the drills. In any case, it is essential that the seed be put into moist soil and covered as shallow as possible and yet insure prompt germination. Alfalfa will come up when seeded an inch or more deep, providing the soil is not packed and baked above by an untimely rain and hot sun. But it is best to plant as shallow



Farm Buildings. 1, 5, Aberdeen Farm, 1913. 2, 3, Aberdeen Farm, 1923. 4, Somebody's "Place" 20 years ago, no trees. 6, Barbecue day, Grand Forks Farm, 5,000 visitors. 7, New location, Larimore Farm, 1923. 8, Grand Forks Farm buildings and grade herd.

as possible and have the seed in moist soil. **A moist, firm seed bed is essential.**

Seeding with a Nurse Crop. On the Aberdeen, Grand Forks, and Larimore farms seeding with a light nurse crop of Marquis wheat, flax, or early barley, on well-prepared land, gives as good results after the second year, as seeding alone. This method proves more successful after the land has been built up and is thoroughly inoculated, particularly if alfalfa is preceded by a crop of sweet clover. Very dry, hot seasons may reduce the stand, but the value of the nurse crop offsets this risk. When the desire is to make certain of a good stand and secure a good crop of hay the year after seeding, which would be worth more than the nurse crop, seeding alone would be most certain of success.

Clip the Weeds. Alfalfa, seeded alone, may be smothered by weeds unless clipped often. Careful watch should be kept, and when it is seen that the weeds are crowding the alfalfa, the mower should be used. Unless the growth is so heavy that it might smother the alfalfa, it should be left as a protection. We mowed our first alfalfa field four times the first year, to keep weeds down, and got a good stand of alfalfa.

Winter Protection Essential. It appears absolutely essential that a good growth of eight to 12 inches be left on the alfalfa field as a winter protection. This is so essential that it must not be neglected. Cutting alfalfa after the growth has stopped in the fall, or pasturing it late, is almost certain to result in winter killing. This apparently holds true of the hardier varieties as well. We have not yet seen a stand of alfalfa winter kill when a good protection was left on the field. If it should be so dry after the last cutting that little or no growth is made, the alfalfa may be protected by coarse, strawy manure.

Inoculation. Soil in the older farming regions seems to be well inoculated, as sweet clover is so commonly grown. Where sweet clover or alfalfa has not been grown previously, the seed should be inoculated. Seeding sweet clover and alfalfa together—five pounds of each—may insure inoculation; or the alfalfa may be seeded alone, following sweet clover. It is essential to inoculate, and it does not cost much. Sweet clover has softer roots and inoculates much more readily than alfalfa. Information regarding the best methods for inoculating may be obtained by writing to the nearest agricultural school.

Alfalfa Seed. Our experience indicates that seed production in the Red River valley is rather uncertain. Only an occasional seed crop is worth as much as the hay.

Some good seed has been saved at the Aberdeen farm. Drier sections are more favorable to seed production. The years 1917 and 1918 were much drier than usual and the seed crop was much more satisfactory at the Aberdeen farm. We grew some seed at Grand Forks in 1921 and 1922. In drier regions seed is more certain. The first crop may make the best seed, unless frosted after considerable growth has been made. Clipping the first growth early so that seeding will be

delayed until more favorable weather and insure early ripening, is a good practice.

Sweet Clover and Red Clover. Sweet clover has largely replaced red clover, as it seeds abundantly every year and makes good hay and pasture. It also greatly improves the land when plowed under and is a good crop to clean the land. Alfalfa and sweet clover seeded with wheat—eight to 10 pounds per acre—give good results. Sweet clover is more hardy than alfalfa, and should be seeded on the land to build up and inoculate for alfalfa.

Cutting and Stacking Alfalfa. We cut alfalfa for hay when the new shoots have started at the bottom—before they get so high that they will be cut by the mower, or when about one-tenth in bloom. Do not cut while damp. Rake into windrows, preferably with a side delivery rake, as soon as wilted; let cure in windrows or small cocks, and stack or put in the mow. If hay is rained on, turn as soon as dry on top and stack within a reasonable time after cutting, whether thoroughly cured or not. The hay may heat and turn brown in the stack, but will be much better feed than if allowed to dry and mould in windrows or cocks. Alfalfa cannot be spoiled so badly in the stack that cattle will not eat it readily. Alfalfa is no harder to cure, and is not so badly damaged by rains, as some other kinds of hay. Our booklet,



Stacking Alfalfa Hay on the IHC P

"Alfalfa in the Northwest," covers this subject more fully. Sweet clover is most valuable for pasture and to plow under, but makes good hay when properly cured. The first crop may be cut with mower or binder, for hay, and the second growth plowed under for summer-fallow. Ask for sweet clover book.

Corn

Acclimated Varieties Essential. Minnesota No. 13, Minnesota No. 23, and Northwestern Dent are considered good varieties for the Northwest. Minnesota No. 13 corn left in the field at Grand Forks and husked about the 1st of November made a yield of 40 bushels of dry corn per acre; 10 to 12 tons of silage are produced per acre on manured land, by this variety. Seed has been matured each year, even in 1915. It has not been necessary for us to buy seed corn except the first year, 1913. The early flints are preferable for hogging off—North Dakota White Flint or Gehu.

Distributing Seed Corn. Selected and tested seed corn is distributed to farmers from our farms. We find our corn improving with each year's selection. Our Minnesota No. 13 was grown in North Dakota five years before our farms were established. We have field-selected our seed every year, and consider this variety best adapted to



Farm, Grand Forks, North Dakota

our needs. Corn matures quite as satisfactorily at Grand Forks as at Aberdeen, but is more difficult to dry properly at Grand Forks. We have saved some seed at Oak Lake, and the corn makes excellent silage.

Manure Helps Corn. Remarkable results are seen in the improvement of corn planted on manured land, especially sweet clover or clover and timothy sod, manured and fall plowed. Corn must make a quick growth and needs the available fertility and improved physical condition of the soil provided by manure.



Corn on the IHC Farms. 1, Prize-winning corn, Aberdeen Farm. 2, North Dakota white flint corn, Grand Forks Farm. We let the pigs gather it. 3, Corn grows big, Grand Forks Farm. 4, Corn replaces summer-fallow, Canadian Experimental Farm, Brandon. 5, Corn, ripe and dry. 6, Best ears saved for seed. 7, Corn in ventilated crib.

Early Planting. We never have begun planting later than May 12 on any of the farms. We plant shallow, checkrow, on manured alfalfa or sweet clover stubble, fall plowed and thoroughly cultivated to destroy weeds before planting. Frequent shallow cultivation so as not to cut the corn roots, but destroy weeds and conserve moisture, insures rapid growth and early maturity.

Small Grain

It has not been our plan to eliminate small grain, but to increase the yield and reduce the cost of production by growing it in rotation. Wheat following corn on manured and fall-plowed clover or grass stubble has made very satisfactory yields. Three crops on the Grand Forks farm before the rotation, averaged only 11 bushels per acre; the seven crops, following corn on manured land, yielded as high as 35 bushels per acre with an average of 24 bushels, or more than double—nearly three times the average yield of this section. Oats have yielded 75 bushels, and barley 45 bushels per acre. We grow nearly as much wheat on a third of the land, and have the other two-thirds for corn, alfalfa, and other feeds for live stock.

Live Stock

Sheltering Cattle. Straw sheds have been used on all our farms and provided excellent protection for live stock during winter. A shed, 30x80 feet, shelters 100 head of cattle, and costs about \$85 for labor and material, where native poles are available. These trials indicate that cattle and hogs may be fed and handled profitably in the Northwest. It is generally supposed that the severe cold weather would be a great handicap to the cattle business, but with straw sheds, such as



Interior of straw shed, 30 x 80 feet, IHC Farm, Grand Forks, N. D. Part of top has been thrown off. Note the subdividing panels.

we have built, and with good feed, it is surprising how little the weather seems to affect them.

Cattle Profitable—Make Rotation Possible. Our plan has been to raise or buy cattle to consume the surplus feed grown in the rotation. No feed of any consequence has been bought. In November, 1914, we purchased 30 head of grade cows—Shorthorns—and used pure bred bulls, keeping the best heifers for breeding, and disposing of the less desirable older cows. In the 10 years we built up a very good, high-grade herd. Some of the cows were milked. We are putting some pure bred milk strain cows on all the farms, which will increase our income.

During the 10 years on the Grand Forks farm, including the first purchase, we bought 107 head of cattle of all kinds, at a cost of \$4,238 and sold 161 head, for \$9,200. We had on hand, January 1, 1923, 66 head valued at \$2,420. Adding the amount on hand to the amount sold, leaves a total income from the cattle, for this time, of \$11,620, or \$1,162 per year. This does not include the sales of butter and cream, nor the value of what was used on the farm.

Pigs Make Easy Money

We keep 10 to 12 brood sows on each farm, and have raised an average of eight pigs per sow. We do not have regular hog houses on all the farms. The sows winter with the cattle, and we use a machine shed, stalls in the barns, and some small portable pens, at farrowing time. We raise one litter a year, farrowed February to April. Alfalfa, barley, and sweet clover are provided for early pasture. About four acres of hullless barley are sown and the sows and pigs turned into this about the middle of July. Alfalfa and sweet clover are sown with this barley for fall pasture. North Dakota White Flint or Gehu corn is ready to turn the hogs into by the time they have the barley eaten off, and 15 to 20 acres fatten out the bunch. They are sold before cold weather, and have made a return of over \$40 per acre for the barley and corn hogged off. We have Yorkshires on three of the farms and Durocs on the other. We find this number of hogs one of our most profitable projects.



Straw sheds showing sawed lumber and pole construction of framework.

THE ABERDEEN DEMONSTRATION FARM

(Established 1913)

(This farm is located in Brown County, South Dakota, two miles east of the city of Aberdeen, and contains 312 acres.)

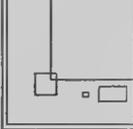
When first leased from the State School Land Department, this farm was virgin sod. It was partly broken out and seeded to flax in 1913, and the regular rotation started in 1914. The handling of this farm differs somewhat from that of the other farms, as it was new land. The object of the rotation is to maintain the physical condition and fertility of the soil.

In this region there is usually sufficient rainfall to produce good crops on new land, but after the land has been cropped to small grain for a number of years, the crops at times may fail to mature properly on account of a lack of moisture. Consequently, the rotation should maintain the humus content of the soil, which is the most essential factor in retaining moisture.

For convenience in handling, the Aberdeen farm was divided into four fields of 80 acres each. The rotation consists of small grains with which sweet clover or alfalfa is seeded, followed by one year in these crops, and if possible, manured, fall plowed, and followed by corn, and the corn ground seeded again to small grain. It is believed that such a system of farming properly distributes the work, makes it necessary to plow only one-third of the land each year, supplies a cash crop and furnishes feed for 50 to 80 head of cattle. The 80 acres on which the buildings are located is not included in the regular rotation, but this is used for alfalfa, hog and cow pasture rotation, etc.

Alfalfa and Sweet Clover

We have seeded these crops nearly every year, and at different seasons. Alfalfa has occasionally winter-killed to some extent, when left bare, due to late cutting and a dry fall. We have never failed to

1913 PASTURE	1913 FALLOW	1913 FALLOW	COW AND HOG PASTURE SMALL POTATION PERMANENT ALFALFA AND FARMSTEAD 
14 FLAX	14 WHEAT	14 CORN	
15 CORN	15 GRASS	15 WHEAT	
16 WHEAT	16 CORN	16 GRASS	
17 GRASS	17 WHEAT	17 CORN	
18 CORN	18 GRASS	18 SMALL GRAIN	
19 SMALL GRAIN	19 CORN	19 GRASS	
20 GRASS	20 SMALL GRAIN	20 CORN	
21 CORN	21 GRASS	21 SMALL GRAIN	
22 SMALL GRAIN	22 CORN	22 GRASS	
23 SWEET CLOVER	23 SMALL GRAIN	23 CORN	
24 CORN	24 SWEET CLOVER	24 SMALL GRAIN	
25 GRAIN	25 CORN	25 SWEET CLOVER	
26 SWEET CLOVER	26 GRAIN	26 CORN	
27 CORN	27 SWEET CLOVER	27 GRAIN	
28 GRAIN	28 CORN	28* SWEET CLOVER	
29 SWEET CLOVER	29 GRAIN	29 CORN	
30 CORN	30 SWEET CLOVER	30 GRAIN	

III C Demonstration Farm, Aberdeen, S. D., showing fields and system of crop rotation followed since 1913.

get a fair stand, either seeded alone or with a nurse crop. Our first seeding was on sod, following a flax crop. This produced fine for four years, when it was plowed up to kill some spots of wheat grass which had grown after the breaking.

When the alfalfa has killed out, or needs reseeding, we manure, fall plow and grow corn one year. The corn land is disked in the spring and alfalfa seeded with small grain. We usually seed broadcast in front of the disks and follow with a packer. Sweet clover is seeded in the regular rotation, in the same way, and we have never failed to get a stand.

Grimm alfalfa is now obtainable and we grow it exclusively. The yellow blossom sweet clover is preferable for hay and pasture, but for plowing under as fertilizer, the white blossom gives best results. We sow 10 to 12 pounds per acre for seed, but a finer quality of hay is produced by sowing twice as much seed.

The Corn Crop

There has not been a year in the 16 when the corn crop did not make a large amount of feed, the returns from which were equal to or better than the returns from small grain crops. The cause of short crops of corn has been lack of moisture and early frosts. By using an acclimated, early variety of corn, mature seed has been saved each year. Except for what corn is sold for seed, the entire crop is fed on the farm as silage and fodder.

We very seldom fail to have fall-plowed land on which to plant corn, and this land has grown sweet clover or alfalfa, and has been manured the previous year. The land is thoroughly worked with disk or cultivator just before planting, May 5 to 20. The corn is given good, clean cultivation—wide, short-pointed shovels being used after it is large, so as not to damage the roots.



This tractor outfit does a fine job of plowing.

Refill the Silo

The silo is filled as soon as the corn is ripe—in the hard roasting ear to glazed stage. Our silo holds only a part of the crop. What the silo does not hold is cut and shocked in the field until dry, and the ground frozen. It is then hauled in and stacked so that the silo can be refilled later. The silo is refilled from three to five times each year. We have much better results feeding the corn as silage. Water is added to wet the fodder as it is put through the cutter into the silo. Care is necessary in refilling, as there must be enough water added to replace the sap lost in drying, and the silage must be well packed in the silo. Very dry fodder may require an equal weight of water to wet it sufficiently. There is more danger of too little water than too much.

Small Grain

Eighty acres are devoted to this crop each year in the rotation, being seeded on corn land, which is disked and harrowed as a preparation. As the sweet clover and alfalfa are seeded with the small grain, a rather light seeding is made. While the yields average low, they are above the returns in a strictly grain-growing system.

Yields have varied with the seasons, low yields being due to a shortage of moisture or to rust.

Good Results from Live Stock Feeding

In order to utilize the corn crop, alfalfa, and sweet clover, a feed lot, silo and straw shed were built, and each year 2-year-old steers have been bought and fed the corn, alfalfa, and sweet clover. A straw shed, instead of a lumber shed, was built for the purpose of encouraging the use of such material as is at hand. (This shed has had a tar-



Double disk and soil pulverizer used to destroy all weeds before planting, May 5 to 20. Give the corn a chance to make good, and it will.

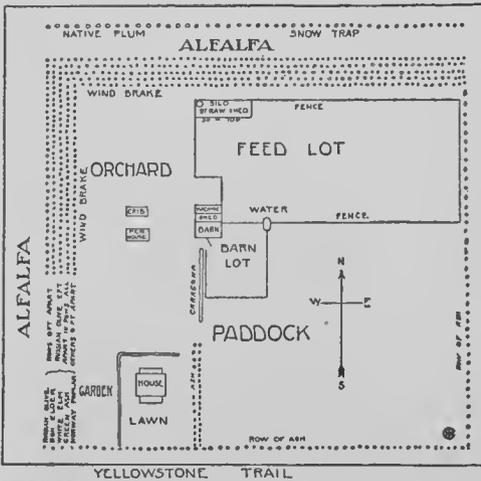
felt roof added.) The cattle are bought in the fall and run on the stubble and sweet clover until cold weather and are then fed all the silage and alfalfa or sweet clover hay they will eat. Such a ration does not fatten the young cattle very rapidly, but they make good growth. The addition of about half a full grain ration for the last 50 to 75 days of the feeding period, with the silage and alfalfa, puts the cattle in good condition. A gain of 300 pounds per head has been made from November to April by this method of feeding. The quality, or maturity, of the corn makes a big difference. The corn when badly damaged by early frosts, or dried up, would show practically no return whatever if not fed to stock.

The real object in the feeding has been to utilize the crops to the best advantage, and no effort has been made to produce big gains. The returns from the feeding have varied from \$10 to \$35 per acre of feed fed, depending on the price of cattle and quality of feeds available. On the whole, for the 16 years, results have been satisfactory, and we see no way to improve our method of handling this farm. The following summary shows the results of feeding during the winter of 1927-28:

Bought 10/5/27		Sold 4/30/28		Gain
60 head (laid down Aberdeen)	\$3,476.62	52 head (St. Paul)	\$5,805.82	\$2,329.20
Price per cwt. (St. Paul)	7.75	Sold per cwt.	11.50	3.75
Average weight, lbs.	718	Average weight, lbs.	1011	293
Price per head (Aberdeen)	57.94	Sold per head (St. Paul)	111.65	53.71

Note: Seven died immediately after reaching the farm (stockyard fever). One steer kept on farm.

The Farmstead—Aberdeen Farm Windbreak and Garden



A typical 10-acre IHC farmstead. A good windbreak is growing on all the farms.

No feature of this farm has been of greater value as a demonstration than the planting of a shelter belt. Five years after the sod was broken the trees stopped most of the drifting snow, and at 10 years, they were a perfect protection, and now add more than a thousand dollars to the value of the farm. This demonstrates conclusively that it is not necessary to live on a farm for a lifetime and not have the comforts and pleasures of a good grove, garden, orchard, and shelter.

While there is quite a variety of trees available, we selected the following for the reasons stated:

Russian olive. Grows like a willow, is hardy and a good snow catcher.

Box elder. Is a native, grows low and vigorous; when not trimmed high makes a good windbreak.

Green ash and elm. Are also native, and somewhat higher growing than the box elder.

Norway poplar. Is a favorite, grows tall and vigorous.

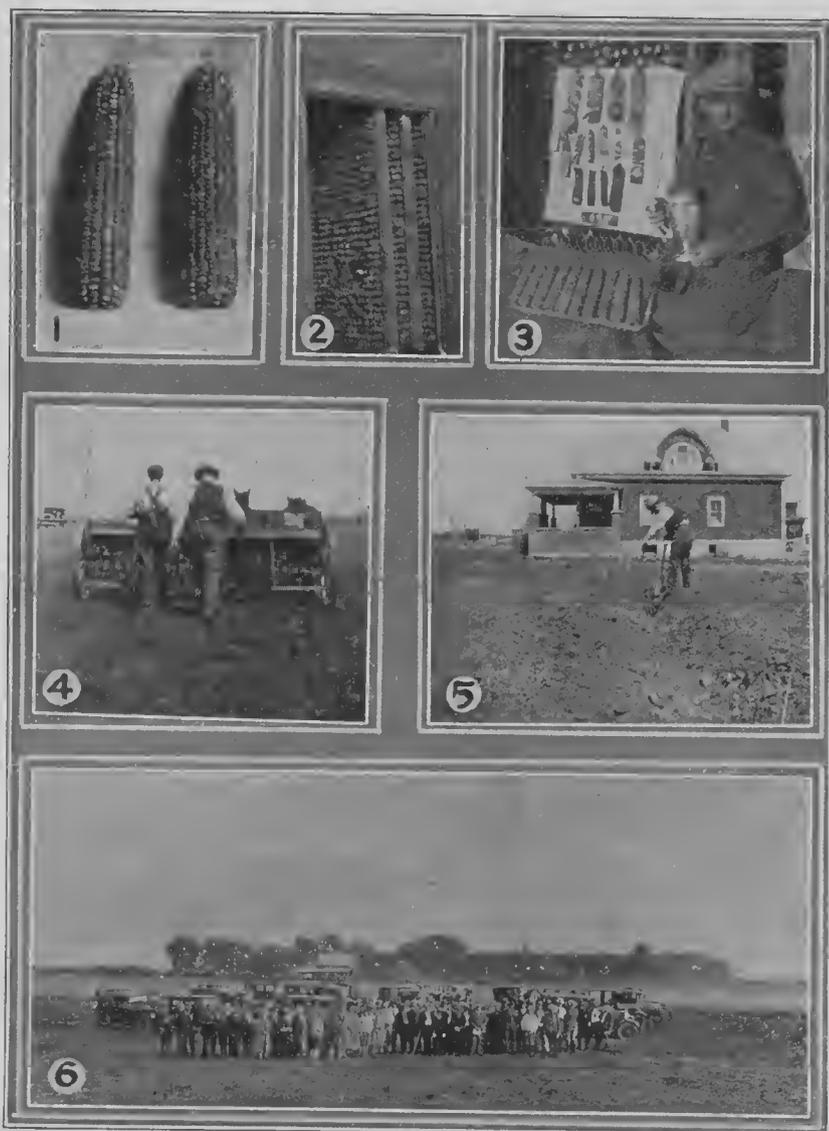
(At 15 years many of the poplars have died, but the ash and elm have filled the space, making a splendid windbreak.)

These varieties of trees are planted around the farmstead, one row of each, with the Russian olive outside to stop the snow, and the other trees inside to raise the winds over the buildings and lots. A hedge of caragana between the house and barns, and one of lilac along the garden, add greatly to the beauty of the yards. The caragana makes a very hardy and beautiful hedge.

Preparation and planting. As the land was broken from native sod only the year previously (1913), we plowed deep, disked and worked down to a good seed bed. This was done as early as possible in the spring. One and two-year-old trees were planted. The Russian olives are set two feet apart in the row, and the other trees four feet apart. The rows are eight feet apart. The trees were all cut back to from four to six inches of top and the same of root. This was done while in the bundle. A transplanter was used for setting them, and as the soil and weather conditions were favorable, an excellent stand and growth were secured the first year. Planting in a furrow is equally satisfactory, but not so rapid as using a transplanter. The trees were cultivated the same as corn, and kept free from weeds for the first two years. In five years from planting they stopped all snow, and at 15 years are 20 to 50 feet high, and form a perfect shelter. No snow reaches the feed lots and yards, except what falls in them, and this causes little or no trouble.



Straw shed 80 feet long, IHC Farm, Aberdeen, S. D.



1, 2, 3. Seed corn and trophies, Aberdeen Farm. 4, Seeding alfalfa, Minot (N. D.) territory. Firm seed bed. 5, Planting fruit trees, Gull Lake Farm. 6, Farm managers' tour, Larimore Farm

THE LARIMORE DEMONSTRATION FARM

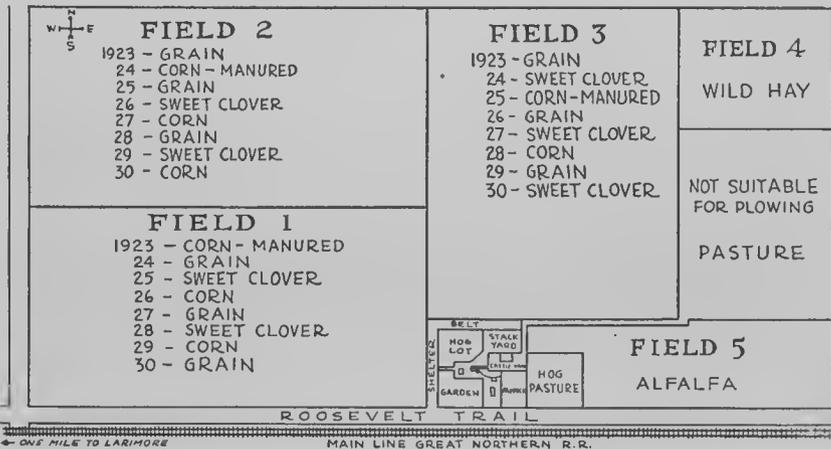
(Located 1½ miles east of Larimore, N. D.)

At the close of the 10 years (1913 to 1922) on the Grand Forks, N. D., farm, as a satisfactory renewal of the lease could not be made, a proposition offered by the Elk Valley Farming Company, for using a half-section of their farm, was accepted. This land is rather light, being on one of the "beaches" through the valley, and as it had been almost continually grain-farmed, was not in a very high state of production.

"The "Larimore farm," now the Elk Valley Farming Company, was one of the great bonanza farms of the Red River valley; some 30,000 acres of excellent land is included in the farm. Thirty years ago this land was all farmed as a unit. In 1893, representatives of the foreign nations exhibiting at the Chicago Exposition, made a tour of the United States, and were shown a typical harvesting scene on this farm—65 binders in one field cutting over 100 acres per hour. This farm is now divided into small farms, and handled under expert management.

The half-section used as our demonstration farm had never had a fence post on it. All buildings, yards, and fencings have been put on since leasing, as well as a shelter-belt around the farmstead, which now forms a perfect protection.

As this soil is rather light, sandy, inclined to drift badly, it was somewhat of a question as to whether the three-year rotation—grain, sweet clover, and corn—and the return of all manure, would be effective in building it up satisfactorily. There has been a very satisfactory improvement in growth and yield of crops. Even on the most sandy knolls, where practically no crop grew the first year, good crops are now produced. This is particularly noticeable in the corn and small grain. The sweet clover made a big growth, even on the very light spots, from the first. A greater improvement might have been made by plowing under the sweet clover, but we have preferred to cut the



IHC Demonstration Farm, Larimore, N. D.

clover for hay or seed, or pasture it, manure the lighter parts and follow with corn.

We have had no difficulty in getting a stand of clover, even on the light spots, where the grain blew out. In 1926 all small grain was reseeded because of soil drifting, apart of it a second time, the sweet clover being reseeded also, and an excellent stand secured.

Handling Light Soil

The area of "light land" in the Northwest is undoubtedly increasing. The working and "fineing" of the soil, wearing out of fiber, etc., are increasing the tendency to "blow." How to handle such soils is a problem that is not solved. The variation in tendency to blow makes any general rule inapplicable in all cases.

Adding as much fiber as possible, and not leaving the raw land exposed any longer than necessary, are two means of overcoming this difficulty. We grow sweet clover, add manure for fiber, and use the field cultivator for working such land in the fall. The field cultivator leaves the land rough and all stubble on top. In the spring, we plow, pack, and seed, as nearly as possible all at the same time. Soil, when turned up, does not blow for some time, and unless conditions are unusually bad the crop gets started and helps to prevent blowing. Fall plowing, even when the soil is well filled with sweet clover roots, will blow when conditions are bad, but undoubtedly much less than if such roots are not present. There is much light land that should be seeded to sweet clover and brome or rye grass, and used for pasture. The grasses add more fiber than the clovers. Summer-fallowing such land is a problem. Using wings on every third or fourth shank of the field



Modern equipment is needed on farms as well as on railroads and in industries.

cultivator to ridge the land; sowing strips of barley or oats early enough in the fall to insure a sufficient growth before frost to catch the drift; summer-fallowing alternate strips of the field, etc., are resorted to. However, on the Larimore farm we have not been troubled to this extent.

The Oak Lake farm (Manitoba) is similar to the Larimore farm as to blowing, and we have followed much the same methods, and in addition have spread straw on the worst blow spots. We use a straw-spreading attachment on a manure spreader. The fields are watched and when a blow spot develops, the straw spreader is started and straw is spread over and around the blow spots. Pulling a disk set straight, or a Campbell packer, behind the spreader, prevents the straw from drifting into piles. Such treatment will stop blowing and save a crop. (Space does not permit a full discussion of this problem.)

Good Corn—Saving Seed

Eighty acres of corn on this farm has each year produced a satisfactory supply of feed, and we have not failed to save some seed. This is planted on sweet clover land, May 5 to 20, and given good, clean cultivation in both directions, as we use a checkrow planter.

There has not been a year that there was not a good quality of mature corn suitable for seed before heavy frost. The usual cool, damp weather during the fall after the corn is gathered interferes with rapid and thorough drying out of the seed. There is no place that corn dries more satisfactorily than when hanging in the husks on the stalk during good fall weather, but it is not safe to leave it out as hard freezes, before it is dry, kill the germ.

Small amounts of seed can be saved on farms by stringing and hanging in the attic or other suitable place, but to save 500 bushels or more is a different proposition. We have a well-built room, provided with a small hot water plant, such as is used in small garages, that keeps the temperature up, with ventilators at the roof, which has proven quite successful. The corn is all put on racks, made by fastening square-mesh wire on each side of 2 x 4 frames, made 4 x 8 feet. (These are fully described in our corn book.)

We grow our early strain of Minnesota 13 for the main crop, and Dakota White or Gehu flint for hogging off.

Small Grain

It has not been our policy to eliminate small grain entirely, but judging by the outcome of wheat, oats and barley during the past six years, it is a good thing we were not depending altogether on those crops. In 1926 all the wheat blew out and the land was seeded to oats. Yields of wheat have varied, due to rust, blowing, etc., from nine to 20 bushels. Last year (1928) produced our best crop—a yield of 20 bushels per acre, grading No. 1 Dark Northern, with a small per cent of dockage, and 13.7 per cent protein. Oats and barley have varied about the same as wheat—from 20 to 50 bushels. We grow Marquis wheat, and Kherson oats. These varieties are early, give the sweet clover a better chance to grow in the fall, and make more pasture.

Alfalfa and Sweet Clover

Thirty acres of alfalfa seeded in 1923 produced very satisfactorily until 1928, when due to making a late third cutting and the very severe winter of 1927-28, badly winter-killed. The field was cultivated and seeded to oats and this, cut when just beginning to turn, for feed, made an excellent yield. The field will be reseeded to alfalfa this year.

Sweet clover is seeded in the rotation with small grain and has never failed. There is a big growth in the stubble that makes excellent fall pasture, and a part of the 80 acres is pastured, part cut for hay, and part for seed, the second year.

Our system of farming would not be a success without sweet clover, and we do not see how this farm could have been built up as it has been without following such a plan.

Live Stock

Cattle and hogs have been the basis of our success. Sheep or other stock might have done as well. From 10 brood sows, we raise 60 to 80 pigs, farrowed in March or April. We are arranging better facilities for handling the pigs, and will have them farrowed earlier, as the early pigs do better. They are larger when the corn is ready; do not seem to be affected by the hot weather as do the later pigs, and are ready for market earlier.

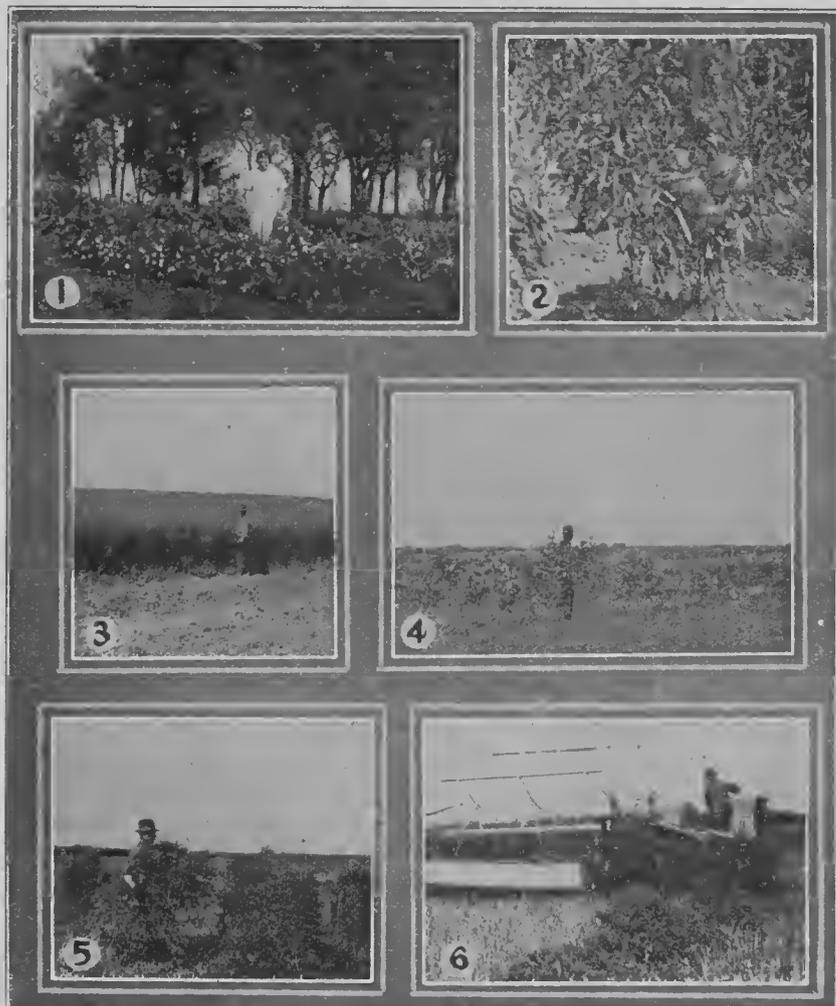
We have a plan of hogging off about 20 acres of crop—five acres of hulless barley and 15 of flint corn. Alfalfa and other pasture are made available as early as possible, and the pigs turned into the hulless barley when it is about ripe. This holds them until the corn is mature. They are usually ready for market by the time this corn is consumed; only the smaller ones need feeding for any length of time after the corn is gone, or snowed under. The income from hogs varies with the number of pigs raised, and the price at selling time. The 1927 income from hogs was \$1,094.87, and the 1928 income was practically the same.

Cattle Make Money

To utilize surplus feed, we have made it a practice to buy additional cattle; either steers, young cows, or heifers. In February, 1927, 34 head of thin heifers were bought in the South St. Paul stockyards, weighing 536 pounds per head and costing \$35.84 each in the yards at Larimore. They were fed silage and hay, run on sweet clover pasture until snow came, and fed corn silage and alfalfa or sweet clover hay after being taken from the pasture, until sold, November 29. They were not fed any grain. When sold at Larimore, 31 head weighed 29,110 pounds, and sold at 8 cents; three head weighed 2,590 pounds and sold at 7 cents. The average gain in the 309 days was 396 pounds per head, and they sold for \$1,294.50, or \$38 per head more than they cost.

Fifteen calves dropped by these cows and heifers, and fed through the winter, sold May 1, 1929, for \$81 per head, weighing 790 pounds each.

A few good grade Holsteins are being added to each farm, and materially increase the farm income. A production record of each cow is kept.



1, 2, What is home without a garden? (Oak Lake). 3, 5, 6, Yellow-blossom sweet clover on old, thin, sandy land—weed fighter, fertilizer and feed. 4, Young shelter belt—clean cultivation.

SUMMARY

Divide the Farm Into Regular Fields Suggested Rotations

1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Grain	Summer-fallow	Repeat (For Dry Regions) Poor Rotation, Exhausts Fiber			
Grain	Stubble in Grain	Summer-fallow	Repeat (For Semi-Dry Areas) Poor Rotation		
Grain	Spring Plow Oats or Barley, Sweet Clover	Sweet Clover Pasture, Hay or Seed	Cultivated Crop, or Summer-fallow	Repeat GULL LAKE "Safe Farming" Rotation	
Grain, Sweet Clover	Sweet Clover Pasture or Hay	Manure, Corn	Repeat ABERDEEN, LARIMORE, OAK LAKE "Improvement" Rotation		
Grain, Sweet Clover	CutHayCrop, Summer-fallow	Grain	Repeat, Good Grain Farming Rotation in regions of sufficient rainfall		
Summer-fallow	Grain	Grain in rows cultivated	Grain, Seed Alfalfa and Grass	Hay	Hay, Break and Repeat

(All manure should be added to stubble before cultivated crop or fallow.)

A rotation should accomplish the following benefits:

First. The fertility and physical condition of the soil are maintained by growing sweet clover and putting the manure back on the land; yields will be increased.

Second. The land does not dry out, or blow so badly.

Third. Weeds—wild oats, mustard, quack grass and thistles—plant diseases, insect pests, etc., are more easily controlled.

Fourth. A variety of feeds is available for live stock, so that none need be bought. In some sections a year's supply of feeds should be kept ahead for bad years.

Fifth. The work does not all come at one time, and there is profitable work to be done the year 'round.

Sixth. It insures against crop failures; conditions that are unfavorable to one crop may be favorable to another. Live stock never fail if feed is available for them. There is always something to sell and eat—poultry, cream, butter, sheep, hogs, or cattle.

Live Stock Successful

We can say that the success of our farms has been due to the addition of live stock—cattle and hogs. Sheep, poultry, and even horses and mules may be raised or fed to advantage on every farm. We may

also say that our success with live stock is due to growing the proper feed and providing shelter for the stock. We have always bought good breeding stock so as to improve the quality of our animals.

Feed Crops

The weakest point in handling live stock in the Northwest is the failure to grow proper feeds, and enough of them. Wherever the small grains can be grown successfully, feed crops—corn, alfalfa, sweet clover or other clovers, grasses, millet, sunflowers, oats in rows and cultivated, etc.—can be grown: The cultivated crops are used to replace the expensive summer-fallow. Sweet clover will grow anywhere, furnish feed, improve the land for other crops, and help control weeds.

While the number of live stock in the Northwest is comparatively small, there is a loss of millions because of poor feeding, poor shelter, and scrub stuff. Growing enough good feed is the first essential in successful live stock handling.

Get Pure Breeds or High Grades

Pure-bred stock is not absolutely essential, but if grades are used as a beginning, only pure-bred, high quality males should be used, and the young females kept as breeders, so as to improve the stock. It does not pay the beginner to attempt cross breeding. Select a standard breed and stay with it, or go out altogether and start another. Changing breeds or mixing breeds, and using mixed-bred or scrub males, together with poor feeding and shelter, is a most discouraging, money-losing proposition. This applies to all kinds of stock or poultry on the farm.

Begin Modestly—Grow In

Abrupt changes should be avoided. A few head of cows, hogs, or sheep to begin with, and increasing the number as they prove profitable and can be handled, is the most successful method of changing. It takes time to make the necessary adjustment. Beginning modestly, and **growing in**, rather than **going in**, proves most satisfactory.

A Straw Shed

Our first straw shed was 80 feet long and 30 feet wide, and would hold 100 head of farm cattle. Four rows of cedar posts were set in the ground two feet, 10 feet apart each way. The tops of the two middle rows were 10 feet above ground, and the outside rows eight feet above ground. Cottonwood poles for stringers were nailed along the top of the rows of posts, and poles laid on to hold up the straw roof. Woven wire and poles around the outside, and a fence of wire or poles, four feet out from the shed, held the straw for the sides and ends. Two-thirds of the ends were boarded up to make possible sliding doors and windows. This shed did not cost \$100 for material, all of which was bought. It was used 10 years and the posts then taken up, moved to a

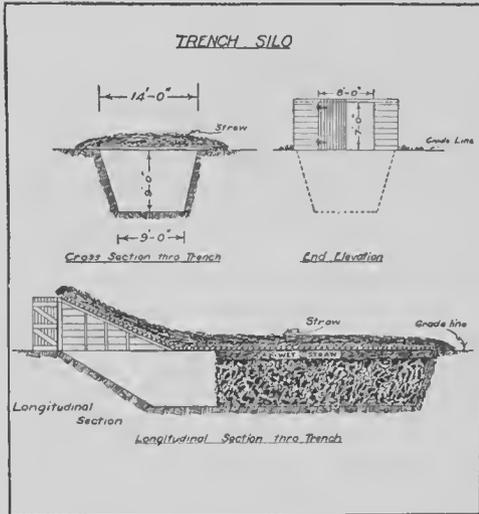
new farm, and built into a similar shed. Our cattle were just as comfortable in this shed during the coldest weather as they would have been in an expensive barn. Our straw shed at Oak Lake is 30 x 60, built of poles, and cost less than \$50, as material was handy.



Note the sliding doors and the window on the end of the straw shed.

The Trench, Pit and Stave Silo

The trench silo is simply a hole seraped or dug into a bank or on level ground, usually 8 feet wide and 4 to 7 feet deep, depending on whether it is on level ground or in a bank, and as long as necessary to hold the silage needed. It may be made wider and deeper. The deeper, in proportion to the width, the better it keeps the silage, as less is exposed, and it packs better. One in southern Manitoba was made 10



Plan for making a trench silo.

feet wide, 7 feet deep, and 40 feet long, dug into a bank, so that feeding could be done from the level. The silo was filled with finely chopped corn, tramped with a team of horses, and the top wetted down well and covered with wet straw from a stack bottom. This was tramped tight on the silage, and green hay put on top of the wet straw. Poles were laid across the top of the silo and well covered with straw. The silage was as good and kept as well as in the most expensive silo.

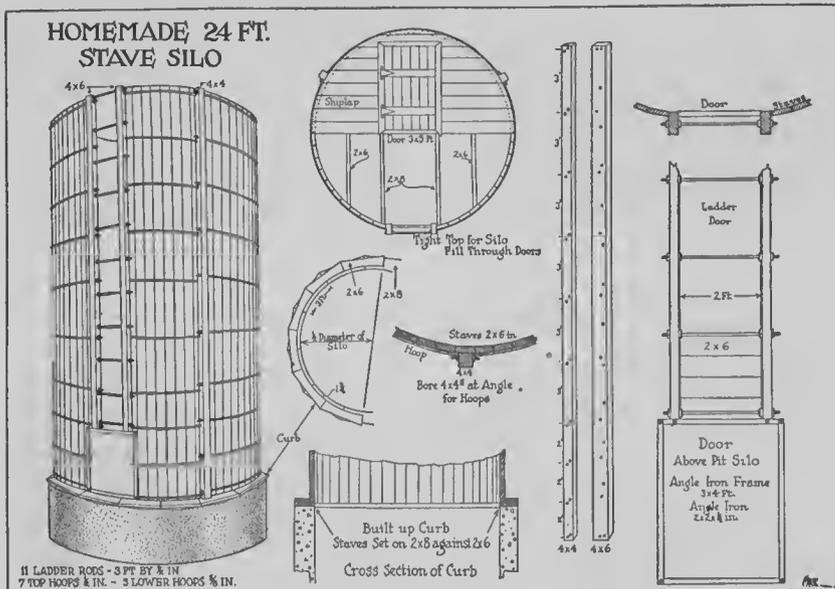
The pit silo is a round hole dug 10 to 30 feet deep and the walls plastered with cement. We built one

on each of our farms, 12 feet across and 20 feet deep. We later put 2 x 6 stave silos above the pits—half of the silo in and half out the ground. The pit silos have advantages over above-ground silos, because they do not cost much; anyone can build them, and they will not freeze or blow down. Silage can be kept in them from year to year. It does not require expensive machinery to fill a pit or trench silo. No farm with 10 head or more of cattle can afford to be without a silo.

Our pit silos have been refilled from two to five times each year. We fill with green mature corn when at the proper stage, or immediately after frost. When this is fed out, at any time during the winter, we refill, running the dry fodder through the cutter into the silo and adding enough water to thoroughly wet it down. We feed all our corn as silage, refilling the silo as often as necessary. Within a few days after refilling the silage is practically the same as from corn put in in the fall.

Our 2 x 6 stave silos are made from lumber just as it comes from the yard. We had hoops made at a blacksmith shop and put the silos up ourselves. They are successful and inexpensive.

(Note: Booklets giving full information as to the building of the trench, pit, and homemade stave silo can be obtained by writing to the International Harvester Company of Canada, Ltd., Hamilton, Ontario.)



Plans for building a homemade stave silo.

Have a Silo—Fill It

Have the best affordable. The concrete, tile, brick and stone silos are more durable, but will not keep the silage any better than a properly constructed and used trench or pit silo. There are many crops that can be put in the silo. Corn, where it can be grown successfully, is the best crop for silage. Sunflowers, sweet clover, small grains, or any other crops may be siloed. It is generally conceded that any crop put in the silo should be practically mature to make the best silage. Green crops, such as fodder corn that does not mature, make sour silage. Corn, when put in green, but nearly ripe—ears in hard roasting to glazed stage—makes the best silage. We let our corn stand until it reaches this stage or is killed by frost. We would prefer to have it siloed before frost, but if frost comes early we start the corn harvester the next day, and we have cut night and day, after a heavy frost, to get the corn down. Very green corn makes sweeter silage if allowed to partly dry before siloing. If too dry to pack well in the silo, water must be added to replace what is lost by drying. There is more danger in not adding enough water than in getting on too much. The silage should be practically saturated. In refilling, or filling the first time with dry fodder and water, great care should be taken to add plenty of water and tramp the silage thoroughly. This is very essential, particularly in trench or shallow pit silos.



Marking out curb for pit silo.



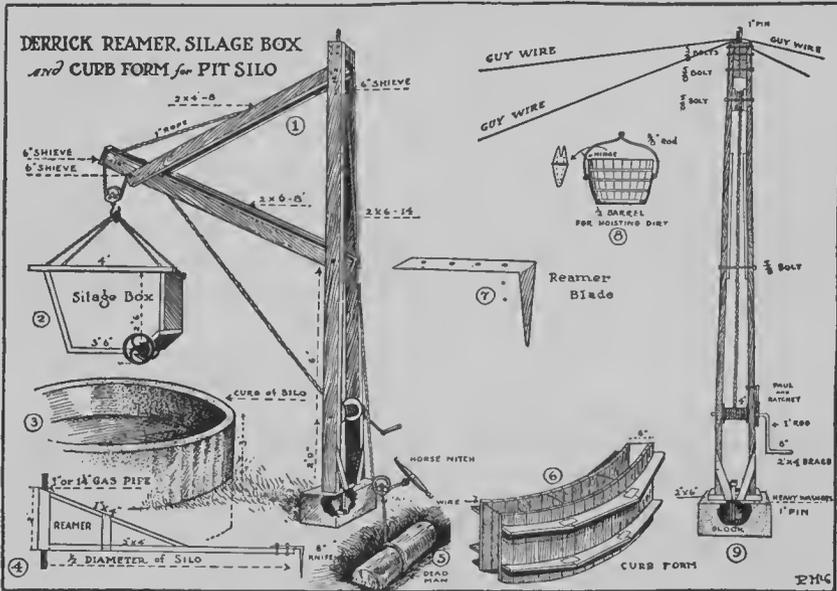
Reaming walls for plastering.



Plastering dirt with cement mortar.



Curb, derriek and silage box.



Plans for building derrick, reamer, silage box and curb form for pit silo.

Corn. Acclimated, home-grown seed, planted early, preferably check-rowed, three grains per hill, $3\frac{1}{2}$ feet apart each way, on manured fall-plowed sweet clover stubble, cultivated frequently to destroy all weeds and conserve the moisture, has proven successful. Variety name does not mean much. Our Minnesota No. 13 corn, grown at Grand Forks for 16 years, is nearly two weeks earlier than the Minnesota No. 13 grown in southern Minnesota. Minnesota No. 23, Rustler, Northwestern Dent, Falkner, North Dakota White Flint, Gehu and others are good varieties to begin with. Corn must become acclimated to the region. It is desirable to grow seed or buy from some neighbor.

Alfalfa. Hardy varieties, such as Grimm, properly seeded and cared for, will produce more and better hay than any other crop and can be grown everywhere in the Northwest. Alfalfa is in a class by



The corn binder cuts and binds the corn—a big labor saver.



The silage cutter handles either green or dry fodder.

itself as to value as feed for cattle, hogs, sheep, and poultry. It will grow wherever small grains can be successfully grown.

Sweet Clovers and Other Clovers. White or yellow biennial sweet clover—we prefer the yellow for hay and pasture—is being grown successfully in all parts of the Northwest. It will produce more pasture and hay under more adverse conditions than any other crop that can be grown. It prepares the land for alfalfa—inoculates the land—and other crops grow better following it, as it adds nitrogen and organic matter and loosens up the hard subsoil. The acreage of sweet clover is increasing more rapidly than any other crop being grown for pasture and soil building. Red clover, alsike, etc., have their place and are of great value for hay and soil building.

Field Peas, Vetches, Soy Beans and Other Annual Legumes are of value and may be used successfully on some farms.

Grasses. Timothy, western wheat grass, brome grass, red top, fescue, etc., make good hay and pasture under conditions favorable to their growth.

Small Grains for Hay and Pasture. The value of oats, barley, rye, millet, and wheat as hay and pasture is not appreciated. In some regions these crops are relied upon entirely for hay and extensively used for pasture. Oats in single, double or triple drills, with 18 to 24 inches between, and cultivated, take the place of corn or other cultivated crops for replacing summer-fallow, and produce heavy grain or feed crops. One and a half bushels of oats and 20 pounds of Siberian millet, sceded together and cut when the tops of the oat heads begin to ripen, make an excellent hay and a heavy yield.

Sunflowers. Where corn can be grown with any success we see no place for sunflowers. That they make good silage and can be grown where the seasons are too cold for corn, is the claim made for them. Small grain following sunflowers always yields less than when following corn. Corn land is as good as summer-fallow for grain.

Sudan Grass and Sorghum. These crops require a rather long, warm season. We find them of no advantage over corn or the small grains for feed.

Root Crops. Beets and turnips are easily grown and of great value as feeds. The labor in handling is their chief drawback. Silage replaces them to a large extent and is more easily and more cheaply produced.

Cattle. Grade cows on the Grand Forks farm fed the surplus feeds grown in our rotation, pastured on waste land and wintered in straw sheds, have brought a substantial income each year. Crop rotation, such as we follow, is not practical without cattle. On all the farms we have bought light feeders to utilize our corn, alfalfa and sweet clover to advantage. We are adding some milk bred cows on each farm to increase our winter income.

Hogs. Our 10 to 12 brood sows on each farm are our best money-making project. Litters farrowed in March or April, pastured on barley

and alfalfa, and later on nearly ripe barley, are ready to turn the flint eorn to good aecount by August 15. We have averaged eight pigs to the litter without a real hog house. The pigs are all ready for market before extreme cold weather sets in. Returns have run to \$40 per aere for erops hogged off, or \$1,000 to \$1,500 per year for each farm.

Poultry. A good floek on each farm furnishes all the eggs and meat wanted and a nice little inecome from the sale of surplus.

Garden. An aere devoted to potatoes, sweet eorn, tomatoes, earrots, parsnips, onions, rutabagas, etc., is the most valuable aere on the farm. The farm should first of all furnish the family a living. This is assured if a good garden is provided. Rhubarb, asparagus, strawberries, small bush fruits, plums and other hardy fruits can be grown with a little effort.

Small Grain. It has not been our plan to eliminate wheat, but rather to make it more profitable and to get away from depending on it entirely as a cash erop. The average yield in the older spring wheat regions would not be profitable at any reasonable price. The cost of production is as important as the selling price and is within the power of the farmer to eontrol, while he cannot eontrol the selling price, which is set by the world supply and demand. The average yield of the Red River valley during the past few years has not been half of our average of 24 bushels of hard spring wheat, per aere, grown in rotation with eorn and sweet clover. Double disking the eorn land puts it in shape for seeding. The sweet clover is seeded at the same time as the grain. The next year it is pastured and eut for hay or left for seed. Usually there is good pasture after the grain is eut. We get three erops for plowing onee, have a cash erop and feed erops for live stoek, and are more eertain of having returns for the year's work. We see no way of changing our farming system to make these farms more successful. Weeds are being eontrolled, the land improved in physical eondition, and the fertility eonserved by erop rotation and the use of manure.

Manure and Weeds. Putting from 10 to 12 loads of manure on an aere, either direct from the barns or after it had lain in the sheds or yards over summer, has given splendid results. We manure lightly, eover more land and can go over the fields more frequently. Heavy applications of fresh manure require much moisture in rotting and may cause "burning" of the erops. Weeds, as well as erops, grow more vigorously on manured land, but usually what little weed seed there is in the manure would not be noticeeable on the older farm land and the manure is of such value to the erop that this fault may be disregarded. When possible we haul the manure direct from the barns and sheds to the field that is to be put into eorn. Good eultivation of the eorn leaves this land in shape to produce wheat. Wild oats, mustard, fan or French weed, etc., have been eradicated, and sow thistle and quack or quiteh grass prevented from getting started in our fields. We try to grow the erops properly and this takes care of the weeds.

MAKE USE OF YOUR BANKER; HE IS ANXIOUS TO HELP YOU

The banker is interested in the prosperity of the community. He wants us to succeed because we are part of the community. He wants to help us, and the best way he can help us is to help us to help ourselves.

Advice and counsel. We should discuss our business problems with him. His experience, his good judgment in financial matters, may keep us from making a mistake. Whenever we are thinking of going in debt or of making an investment in land, improvements or securities, the advice of our banker will be of great help to us.

Checking up on ourselves. We may be losing money and not know it. We should make out a financial statement once or twice a year that will show the value of what we own, the amount we owe and how much we are actually worth. Such a statement will show the condition of our business and will be a great help in establishing credit or in securing a loan. Our banker will help us in making out this statement and will point out to us where we are making money and where we are not.

Loans. Borrowing is often good business management, but we should never borrow for the purpose of making some unwise investment, and we should never borrow more than we need.

Before asking for a loan we should talk it over with our banker, telling him what we plan to do with the money and asking his advice. If he thinks it would be unwise for us to borrow the money, he will tell us why; if he knows the loan will be for our best interests and that we can pay it back, he will be glad to let us have it.

We should preserve our credit by paying the interest promptly and having the money ready when the note is due. If we are compelled to renew the note in whole or in part we should have an understanding about it before the note falls due.

We should make our word as good as our bond, be always on the job and not let someone else run our business part of the time.

The farmer should know his banker better than he knows anybody else.