place to place for the light work and the larger one.

Practically all the standard makes of the four-cycle engines are designed to take into the cylinder at each suction stroke the largest possible quantity of the explosive mixture that can be taken in by suction. Then this charge of fuel, as it is often called, is subjected to a compression somewhere between 40 and 90 pounds per square inch by the returning piston. On exploding this compressed charge gives forth a working force of nearly four times as great as the pressure of the gas at the point of exploding. Hence two engines of like bore and stroke running at the same speed would each consume very much the same quantity of explosive fuel if working under full load. But an engine having only, say 40 pounds compression pressure develops only half as much power as one under 80 pounds, so that the former would be wasting half its fuel or in other words would require twice as much fuel per horse power as the latter engine.

DIFFERENCE IN ECONOMY OF FUEL

It is surprising what a difference there is in engines in this respect and the economy in fuel should be looked into carefully. Tests demonstrate that low compression engines are "gasoline wasters." High compression engines about 85 pounds to the square inch give the best results. The smaller the horse power of the engine the more it will use relatively, and the best engine on the market will not get much, if any, under a gallon a horse power for 10 hours run under full load, despite the claims of manufacturers.

If there is a difference in engines in this respect there is of course a cause for it, and if so, what is it? To an economical engine a good compression, a good mixing and a good sparker, properly timed are absolutely essential. The first we have discussed. We shall now briefly deal with the remaining two. The nearer the mixture of air and gasoline approaches to a perfect gas, the higher the efficiency of the engine. It is generally considered that a proper mixture consists of one part gasoline to seven parts of air. Choose an engine with the mixer located near the head and requiring no regulation of the air. An engine drawing its charge through a long pipe is a hard starter, especially in cold weather. A small glass reservoir on the mixer saves much annoyance as one is able to see if the pump is acting, the tank empty or water in the gasoline. Next comes the method of ignition, the hot tube and the electric spark. The former is all but obsolete, the latter is divided into two kinds, jump and touch spark. Generally speaking jump spark has been adopted for high speed engines, the touch for slower speed power purpose engines. The jump spark has the advantage of no mechanical moving parts and is subjected to a little wider variation of the ignition point and is usually run with dry cell batteries. The touch spark is mechanically operated. The spark is produced by snapping a pair of contact points. As these points are separated after completing electric circuit there is produced a bright spark.

TIMING THE SPARK

The power of the ignition greatly influences the consumption of fuel which may be reduced from 25 to 30 per cent. in a given horse power by using the proper quality of apparatus. There should be some simple method of timing the spark. This is a very essential feature as the explosion should take place just before the piston reaches the farthest point back. The greater the speed of an engine, the more advance on the spark. This should be regulated so as to throw it past the centre for starting.

Avoid high speed engines for power purposes; the race horse is alright on the track but cuts a poor figure at the plow.

Photographs and articles are always welcomed for publication in these columns.

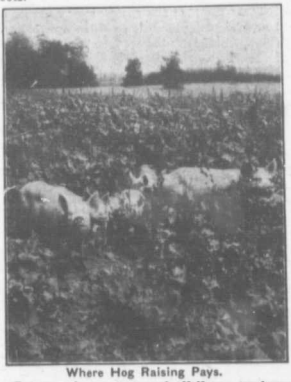
Possibilities of Dairying in Northern Alberta

G. H. Hutton, B.S.A., Supt. Northern Alberta Experimental Farm

To deal with the crops which can be successfully raised in Alberta, in any detail, would require a great deal of time. The crops which the soil of Alberta can produce are such that any dairyman using them would be justified in hoping for and expecting the best possible returns from his investment.

Travel where you will you can see the natural grasses growing in abundance, and not only natural grasses grow wild but various legumes such as pea vine and vetch, indicating under conditions of the prairie that this soil will produce these fodders in such varieties as to make a balanced ration such as a good dairy cow appreciates.

What has been attempted by man in the way of growing cereals and legumes has been so far uniformly successful, especially when he has paid attention to the demand of the legume for bacteria to fix for it free nitrogen or the air about its roots.



Where Hog Raising Pays.

Farmers who use rape and alfalfa as supplementary feed for hogs, are rarely heard to say that hog raising does not pay. Mr. H. R. Nixon, of Brant Co., Ont., who owns the lot illustrated, always provides a pasture run of rape, as well as one of alfalfa, for his hogs. He claims that he can put finished bacon on the market at a cost of less than four cents a pound live weight. Photo by our special representative.

Cereal crops, particularly oats and barley, have always been remarkably successful in this Northern part of the Province. These two grains themselves would supply the dairyman with the grain foods necessary for the successful operation of his dairy. Even last year when the unusual climatic conditions cut the maturing season for the oats and barley rather short, there were in this Northern part of the Province many farmers who had oats weighing 40 to 45 lbs. to the bushel and barley germinated as high as 84 per cent. and weighing standard and over. Of course, we do not deny that where grain was sown late it was caught with the frost and much light grain, and grain lacking in vitality was the result, but my point is that even under the most unusual circumstances prevailing through the country in 1907, there was abundant grain for feeding dairy stock and of a quality calculated to produce the best results. On the Experimental Farm barley yielded as high as 72 bushels an acre in 1907, and showed a germination of 84 per cent. Oats gave 110 bushels an acre, but were not as high in vitality. These facts should prove the possibilities of Alberta as a dairy country from the grain growing standpoint. That the necessary cereals can be produced is an assured fact.

The alfalfa and red clover sown on the Experimental Farm in June of last year wintered well. The first cutting of alfalfa was made in July. Where it was inoculated the yield was 4,160 lbs. while where it was not innoculated it yielded only 1,960 The second cutting was ready about Sept. 1st, and on the inoculated area it gave a yield approximately equal to that of the first cutting. Red clover is now in bloom again, having yielded at the first cutting without inoculation one ton to the acre. Everywhere over the field large rank bunches of clover could be seen and here the life giving nodules are found, showing that on the old land where manure has been applied the clover will accomplish its own salvation in time. Having then such a happy combination of leguminous crops and large yields of cereals per acre, the possibilities of this important branch of agriculture in this Province seem almost unlimited.

The climate is not as severe as many people imagine, and I believe that the constitution necessary for a productive diary animal will stand the winter without difficulty. There are already in the Province a number of dairy cattle—Jerseys, Holsteins, and Ayrshires. During the severe winter of 1906 and 1907, representatives of these breeds of cattle were taken from point to point through the Province in connection with the Stock Judging Schools put on by the Provincial Department of Agriculture. These animals without exception came through in fine condition, and their milk yields, considering the fact that they were continually changed as to stabling and surroundings, were large. Many cattle winter outside, having the run of a straw stack and access to water, and come through the winters in fine condition, without other food or shelter. The rumors sometimes circulated outside this Province that dairy cattle are not vigorous enough to stand the climate are not well founded.

BUTTER THE PRINCIPAL DAIRY PRODUCT

The usual manner in which dairy produce is marketed is in the form of butter. It is handled largely by the Provincial Department of Agriculture with Mr. Marker as Dairy Commissioner. Butter is selling at prices satisfactory alike to patrons and consumers. Private butter and cheese factories are springing up in some sections of the Province. One that came to my notice, paid during this season 20c a lb. for butter fat, clear of manufacturing and hauling. These prices I believe, should stimulate farmers to produce quantities of cream, since the skim-milk fed on the farm in conjunction with the abundant native and cultivated grasses and fodders should prove a most valuable by-product. Dairymen in a butter-making district should be enabled to put large quantities of beef on the market annually.

CHEESE INDUSTRY UNDEVELOPED

The cheese feature of the industry has not as yet been very largely developed, but there is no reason why it should not be a prominent feature in the dairy business in this country since at present quite a large quantity of cheese is imported while the conditions here should warrant its manufacture within the Province. We have the best of climatic conditions, cool nights, fresh air, and there is an abundance of pure water everywhere. Aside from the manufacture of butter and cheese, there is a grand opening in many of the towns of the Province for dairymen, who will supply good clean rich milk to those towns. In some instances it is almost impossible to secure milk at any price, while at the same time near these towns there is abundant land available for pasturage at moderate prices. To anyone who has seen the rapid growth of towns in the West the dairy business of these towns will commend itself as a good business proposition. Another feature which should be of interest to some dairymen of the East is the opening in this Province for the establishing of a number of first class pure bred dairy herds. There are a few—we need more.

It is a regrettable fact that there are a large number of cows being milked in this Province, which are giving their owners no profit at all, and