

The more advanced farmers perceived the importance of keeping the land under crop; by growing turnips it was possible to obtain all the advantages, in the shape of the cultivation and the stirring of the soil, which result from a bare fallow; at the same time, food was provided for the stock, and a much better kind of dung was made than when the straw was merely trampled down to get it into a state fit to go back upon the land. The writings of Arthur Young, who was Secretary of the then Board of Agriculture, in the early years of the nineteenth century, were unceasingly directed against bare fallows; and his influence, combined with the numerous enclosures and the high prices prevailing during the Napoleonic wars, did much for the spread of turnip culture. The strong lands and the clays were still the difficulty; on them it was often a costly and even an impossible operation to secure a good plant of turnips, but it became more and more a mark of careless farming to rest content with a bare fallow. Mechi showed that the strongest Essex clays could be made to grow turnips, and with the spread of mangel cultivation it became possible to put even the most stubborn soils in the south and east of England under roots. The bare fallow still survived as an occasional operation once in seven or eight years, and many clay-land farmers maintained that it was a profitable operation, the benefit of which was felt for several years. Later, with the fall in corn prices and diminished rents, the acreage under bare fallow has again showed a tendency to increase. For instance, in Essex the bare fallow in 1866 amounted to 11.4 per cent. of the land under corn; in 1904 it was 16 per cent.; in Suffolk the bare fallow has actually increased, despite the diminution in the area of arable land, rising from 25,000 acres in 1866 to 30,400 acres in 1904.

BENEFICIAL EFFECTS OF BARE FALLOWS.

The bare fallow may exert a beneficial effect on the land in three ways:—

- (1) By cleaning the land of weeds;
- (2) By improving the texture of the soil; and
- (3) By increasing its fertility.

1. A bare fallow is generally taken after the stubble crop, the prime object being to get as many weed seeds as possible to germinate. A first plowing in autumn will be followed by a cross-plowing in the spring and two other plowings in the summer. Sometimes the first plowing is left until the spring corn has been sown, and is followed by two or even four plowings during the summer. The harrow is used after each plowing to collect the weeds, and many farmers roll the land to reduce the clods and promote the germination of the weeds. But on many soils it is desirable to avoid getting too fine a tilth, lest heavy rains cause the land to run together and the surface to set to a hard crust. To this danger the heavy loams and clays with an admixture of fine sand are more liable than the clays proper.

The continued cultivations and repeated draggings will rid the land of couch; at the same time annual weeds are germinated, and destroyed by the next plowing.

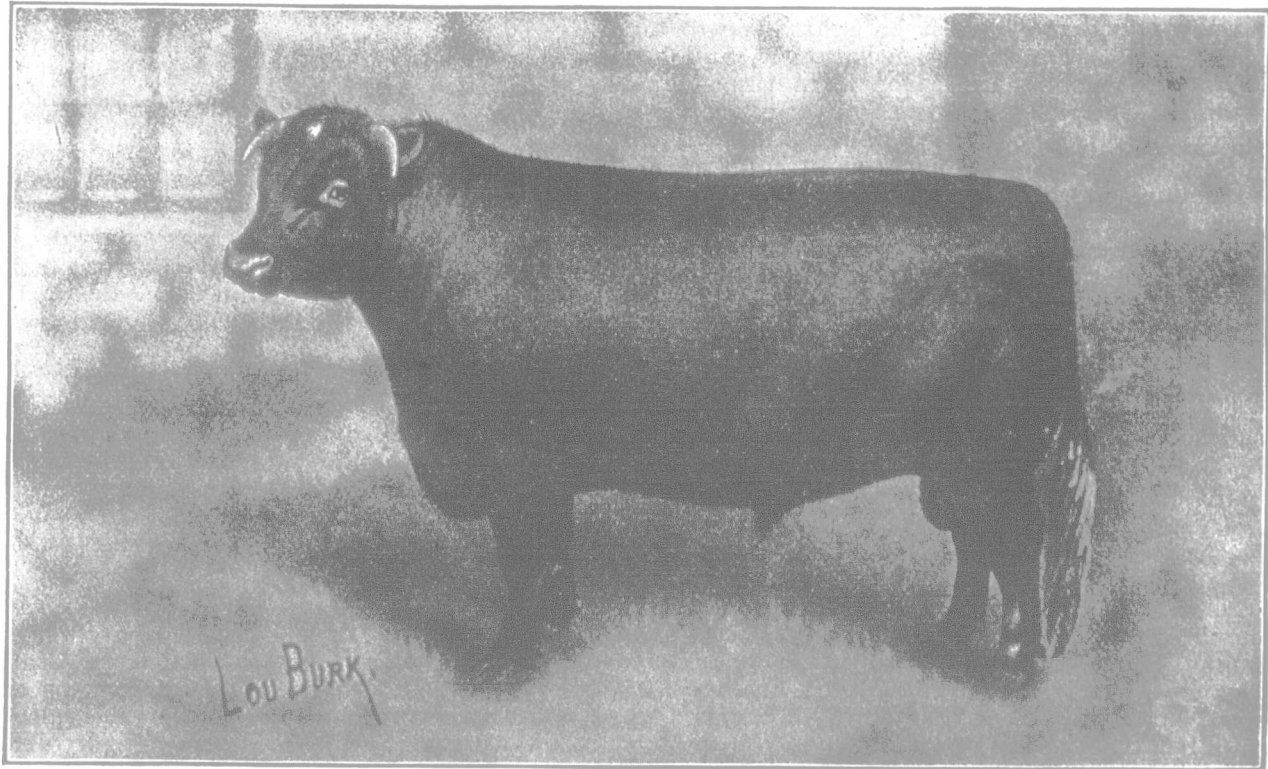
2. It may be said, however, that with reasonable farming, land should never get so foul as to require a bare fallow to clean it, and it is found among the clay-land farmers that their chief justification for a bare fallow lies in the great improvement in the texture of the soil that results. A clay soil is in the main composed of very fine particles, and the finer the particles are the "heavier" and more tenacious is the clay. Coarse-grained material like sand does not bind together when dry, but the more fine-grained it becomes the more sticky will it be when wet, and the firmer will it set when dry. To a certain extent these very fine particles in an ordinary clay soil are loosely bound together into little groups which behave like single larger particles. If, however, the clay is knocked about when it is wet the groups are broken up into their constituent fine particles, thus increasing both its holding power for water and its tendency to dry to a hard clod. This is seen to the fullest extent when clay is deliberately "puddled," in which state the particles making up the clay are all separate and able to move independently. Exposure to the weather, on the contrary, freezings and thawings, alternate dryings and wettings, unite the particles again and lighten the texture of the soil. With the best of management the texture of heavy clay lands tends to deteriorate under cultivation, and the rest it gets by lying under grass for a year or two, or from a summer's fallow

is necessary from time to time to get the soil back into a good working condition. The improvement persists for three or four years, and forms the main reason for making a bare fallow nowadays; for good crops, particularly of roots, depend more on the tilth of the seed bed than on any other single factor in farming.

3. Many have been the theories as to whether land gains or loses fertility through a summer's fallow. Thaer, who was an authority about the beginning of the eighteenth century, wrote: "There is no doubt that the fallow absorbs or attracts the fertilising properties of the atmosphere." Arthur Young, on the contrary, with his aversion for bare fallows, wrote about the same time: "The quantity of gas or vapor that is

From all these results it will be seen that a bare fallow can never be a directly profitable operation and has no justification on free-working land. But with strong clays in dry climates, as for example over much of the east and south-east of England, it may often be necessary to clean the land and restore its friable texture; on such soils also there is least likelihood of loss through the washing out of the reserves of nitrogen which have been rendered available by the process. Bare fallowing may in such a case be useful.—*The Farmer and Stockbreeder.*

Green corn morning and evening for the cow will aid in keeping the production of milk up to the mark.



GOLDEN CAROL.

One of the two-year-old shorthorn bulls in J. A. Cochrane's sale, Sherbrooke, P.Q., Sept. 7th, 1906.

Another Method of Sowing Clover.

When at the Regina show recently the writer's attention was drawn to some exhibits of green clover and alfalfa in sheaf form, many of the plants of which would run over two and a half or three feet in length. Investigation found that these legumes were grown by Mr. P. M. Bredt who had put up the exhibit winning first prize including the fall wheats, Velvet Chaff and Alberta Red, which, he stated, succeeded about once out of four times, his experience extending over ten years. With regard to red clover and alfalfa he sows as follows, in the spring say of 1904 he would sow eight pounds of timothy to the acre along with the wheat, in the spring (1905), as early as possible he harrows the timothy land very heavily and broadcasts over it eighteen pounds of alfalfa, or twelve of red clover, as the case may be, and manages by this method to get a very good catch and good crops of clover and alfalfa hay. This method he had tried in Germany and found successful. Mr. Bredt had, as the boys say "the goods to show". Fall rye does well with him every year and at the show he exhibited some fine specimen sheaves.

Grain Competition.

The judging in the growing grain competition, in charge of the Saltcoats Agricultural Society, resulted as follows: 1. Wm. Eakin, Eakindale; 2. W. Cowan, Pokeby; 3. R. D. Kirkhan, Graham; 4. T. C. Love, Rothbury. There were twelve entries.

At Sintaluta, H. O. Partridge was the winner.

Grain Intended for Seed Should be Ripe.

The average farmer endeavors to cut his wheat early enough to avoid frosts, excessive shelling and that he may not have his grain, as the saying is, come in all at once and crowd him.

It has, however, been the custom to recommend, which the experiment recited below shows to be correct, that grain intended for seed should be well ripened.

Prof. Kedzie, of the Michigan Agricultural Experiment Station, harvested wheat at different stages, recorded the yield per acre, and tested the vitality of the grains by determining the length to which the plumule (the sprout which

hourly exhaling from a fallow field after rain or every fresh plowing is improvidently lost, and argues a want of economy that is truly reprehensible." But experience was against Arthur Young; the practical farmer knew that cultivation by itself made the land better able to support a crop; this was the basis of Jethro Tull's horse-hoeing husbandry and of the Lois-Weedon system of alternate husbandry. Anybody, again, who visits an experimental farm, where the plots are separated by paths, will recognise the "fallow effect" in the increased vigor of the outside rows bordering the bare soil. An explanation, however, was not possible until the discovery of nitrifications some twenty years ago, and the investigations which have been made into the conditions favoring the process.

All soils contain considerable residues of nitrogenous material which cannot reach the plant until they have been oxidised by various bacteria in the soil and so converted into nitrates. A summer's fallow provides just the conditions favorable to nitrification—warmth, aeration, the stirring of the soil, and the greater amount of moisture, which results from the absence of a crop to dry the soil.

The gain of water by fallowing, and the accumulation of nitrates are then discussed, following which comes

CLOVER CROP V. BARE FALLOW.

Another of the Rothamsted experiments illustrates how much may be gained by a clover crop in place of a bare fallow. One of the fields is farmed under a four-course rotation—swedes, barley, clover or fallow, wheat; one half of the plots growing clover and the other fallowed before the wheat. The better the clover the better the ensuing wheat, and if we compare the succeeding crops after a good clover year its benefits are very marked:—

	Clover Hay.	Wheat.	Swedes.	Barley
	Cwt.	Bushels.	Tons.	Bushels.
Clover plot ..	76.7	39.5	19.4	30.3
Fallow plot ..	—	32.5	10.0	28.3

Although nearly four tons of clover hay were removed, the residues, roots and stubble, were sufficient to increase the wheat crop by 21 per cent.; the root crop which came next by 2 per cent., although the same manure was put on both crops; and finally the barley, three years after, by 28 per cent.