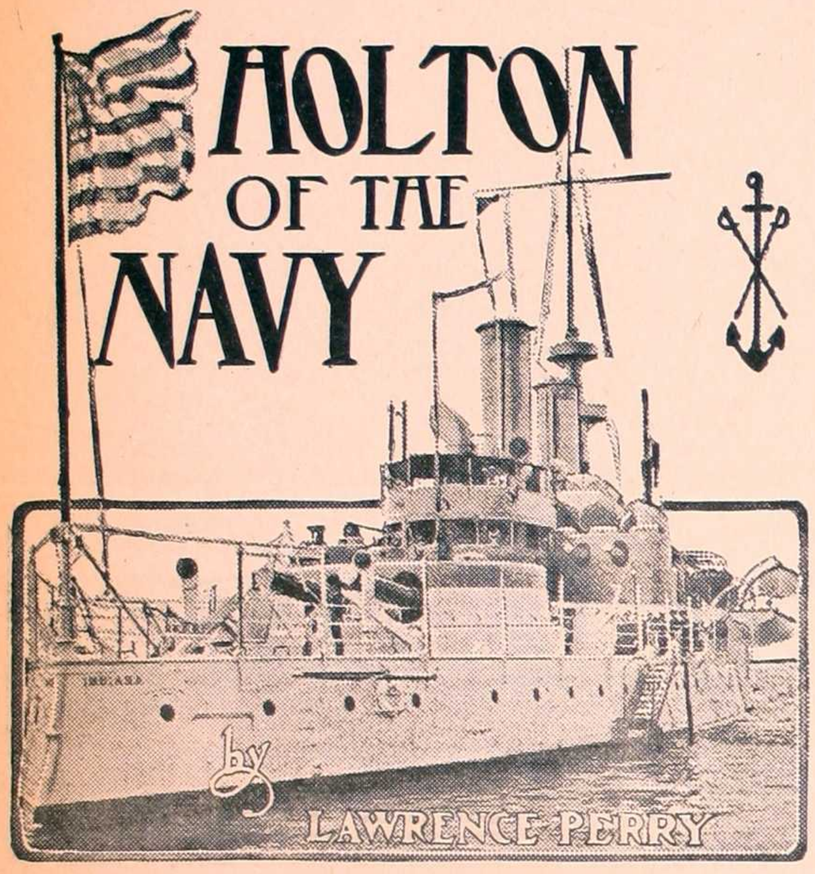

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Crisp and Readable Romance of the Spanish-American War

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Home Course In Modern Agriculture

V.—Leguminous Crops and Rotations

By C. V. GREGORY,

Agricultural Division, Iowa State College

AMONG the important classes of crops grown on the farm are the legumes. The soil is to the farmer what a stock of goods is to a merchant. He cannot keep drawing on it forever without putting something back. Ordinary crops take plant food from the store in the soil. This must be replaced in some way. Legumes, on the other hand, leave the soil richer rather than poorer.

If you will examine the roots of a clover plant carefully you will notice numerous little swellings about the size of pin heads or a little larger. These are called nodules and are the home of certain bacteria. These bacteria are minute one celled plants, so small that thousands of them can hang on the point of a pin. We shall study some of the different classes of bacteria in detail later. The ones that live on the roots of legumes have the power of changing the nitrogen of the air into a form in which it can be used by the plants.

When clover stubble is plowed under the nitrogen which is contained in the stems and roots is added to the soil and can be used by the following crop. Where the soil is badly lacking in nitrogen and humus it sometimes pays to plow under the entire crop of clover.

The nitrogen which leguminous plants add to the soil is by no means the only benefit which comes from their use. Nearly all of them have a long taproot, which forces its way down into the soil far below the depth reached by the roots of ordinary crops. Alfalfa roots sometimes go down as deep as thirty feet or more. Much of the plant food used by the crop is brought up from this lower layer of soil, and some of it is left in the upper soil when the roots and stubble decay. The passage of the long roots through the soil also loosens it, and when they decay add to the humus supply. Thus the physical condition of the soil is so improved that the more tender roots of such crops as corn can penetrate it readily. Because of these facts corn, potatoes and almost any other crop will grow faster and give a considerably larger yield on a field which has grown a legume the year previous.

The principal legumes are alfalfa, clover, cowpeas and soy beans. Alfalfa is grown most successfully west of the Missouri river, although by no means confined entirely to that locality. It requires some care to get a good stand of alfalfa. It does best on a soil that is somewhat sandy and should never be sown on a soil where the water table is liable to stand for any length of time within three feet from the surface. "Wet feet" will kill alfalfa quicker than anything else.

As a general rule the best time to sow alfalfa is early in the fall. The ground should be put in the best possible tilth, and if manured before sowing the seed the chances of success are considerably increased. The seed should be sown at the rate of about fifteen pounds per acre. A light harrowing will cover it sufficiently. If the young plants weather the first winter successfully, the critical time is past. The advantages of alfalfa over clover are its higher feeding value and greater yields. It can often be cut three or four times in a season, with a yield of from one to two tons per cutting. Alfalfa must always be cut as soon as about one-tenth of the plants are in bloom; otherwise the vitality is weakened and the yield of the succeeding crops reduced.

There are several varieties of clover, of which medium red is the most widely known. Clover seed are usually sown with small grain in the spring. A surer way of obtaining a stand is to sow after the oats have been disked in and cover with a harrow; otherwise the seed are put in so deeply that many of the little plants never reach the surface.

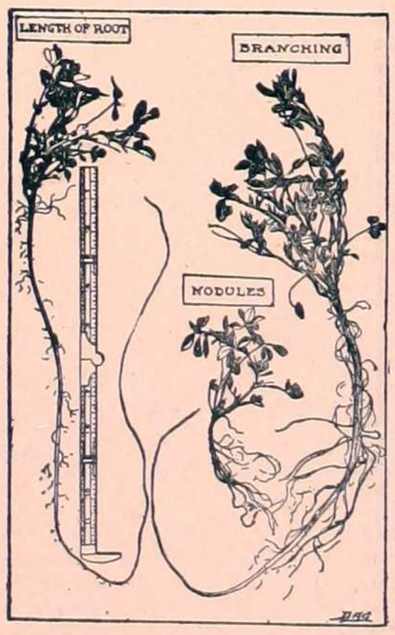

FIG. X — EIGHT-MONTHS-OLD ALFALFA PLANTS.
[Note the long taproots and the nodules.]

One of the principal reasons for failure with clover is poor seed. A sample should always be tested before sowing. This can be easily done by putting a hundred seeds between a couple of moist blotters and keeping in a warm place for a few days. The number that germinate can be used as a guide as to the amount of seed to use per acre.

One reason why clover and alfalfa are not more popular with farmers is the difficulty of curing the hay. If it is left in the swath until dry enough to put in the mow, the leaves, which are the most valuable part, will become so brittle that many of them will be lost. A better way is to go over the field with a side delivery rake as soon as the leaves have wilted a little and throw the hay together in loose windrows. Handled in this way, it dries evenly, and the leaves will not fall off so easily. Hay cured in this way is also less liable to be dusty than when cured by direct exposure to the sun. Once in awhile, even with the best of care, some of the hay will be caught in a rain. A hard rain on clover or alfalfa hay washes out much of the nutriment which it contains. Such hay is hardly worth putting in the barn, but may be made good use of for bedding. In this way it is mixed with the manure, and the plant food which it contains is returned to the soil.

Cowpeas and soy beans are to the southern part of the United States what clover and alfalfa are to the northern sections. They are grown more as hay and forage than for the grain. These legumes are also used in some sections of the corn belt as catch crops. If sown on early fall plowing, they prevent the soil from washing and thus losing much of its available plant food. They may be pastured off later or disked up in the spring. They are often sown in cornfields during the last cultivation to keep the weeds down and to add nitrogen to the soil.

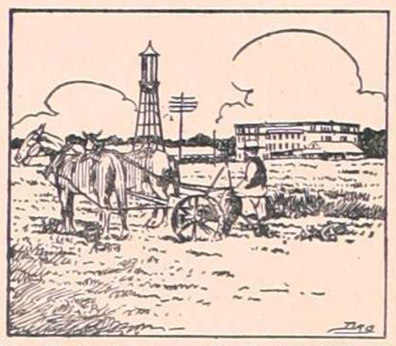

FIG. XI—CUTTING A HEAVY GROWTH OF ALFALFA.

Because of the fact that other crops make so much better growth after the field has grown a legume for a year or so it is important that a crop of clover or some other legume be grown occasionally. If a plan of rotation is arranged so that the fields are regularly changed from one crop to another, so much the better. It has been found that when any crop is grown year after year on the same land the yields will grow less. The particular kinds of food that a certain crop requires grows scarcer, and weeds and insects become more numerous. If another kind of plant is substituted, other elements of plant food will be drawn upon, the insects will be starved out and the changed methods of soil treatment will discourage the weeds.

Plants vary greatly in their ability to get food from the soil. Such crops as rye and buckwheat are strong feeders and are able to obtain food from a soil on which more tender plants would starve. Some plants use much more humus than others. Crops like corn that are cultivated frequently deplete the humus supply rapidly, since the constant stirring of the soil hastens decay. Oats, on the other hand, take comparatively little humus from the soil.

These differences may be largely equalized by a consistent system of rotation. In planning rotations the aim should be to so distribute the crops that they will be best adapted to the condition in which the soil was left by the preceding crop. The starting point of every rotation should be clover or some other legume. The length of time that a field should be left in to such a crop depends largely on local conditions. In the east, where alfalfa seed is high and the difficulties of obtaining a stand great, it is usually wise not to plow up the crop for three or four years. Red clover lives only two years; hence if not plowed up the second year the land must be reseeded. In most cases two years is as long as the land should be left to any one crop.

Since clover is grown with small grain the first year, this means only one year in which it will be the sole crop. If the second crop of clover is to be plowed under, as is the case when the soil is considerably lacking in humus, this work had better be done in the fall, so that the mass of green clover may have time to decay before the following crop is planted. If the soil has been properly cared for, however, this green manuring will be unnecessary. As a general rule it is more profitable to feed the hay or grass to stock and return the manure to the land. In this way from 80 to 90 per cent as much plant food is added as would have been if the crop had been plowed under, and at the same time the stock has had the benefit of the extra feed. When only the stubble is to be turned under, the plowing may be done either in late fall or early spring.