



HOW THE SOIL IS FORMED

A COMMONPLACE SUBJECT, BUT ONE EXTREMELY FULL OF INTEREST IF IT IS STUDIED.

By Alfred Vivian, Ohio.

One could scarcely imagine a more uninteresting subject for discussion, nor think of anything less likely to prove of importance to the careless observer than that of the soil.

We are accustomed to think of the soil as merely "dirt", a thing to be shunned as far as possible, and kept hidden from sight.

Perhaps you will not think the soil worthy of interest and study, but did you ever stop to think that without the soil we could not be living in this world today?

The food which you eat could not have been produced if there were no soil, for the plants which make the food for animals, in their turn derive all their nourishment from the soil.

We are so familiar with the soil as it now exists that most of us do not stop to think that it was ever anything different, but it has really taken a long time for nature to form what we call the soil, and in doing so she has employed the most wonderful agencies.



Oxen Still in Use in Some Parts of the United States.

Some one has defined the soil as "that portion of the earth at or near the surface which consists largely of fine particles."

And again it has been described as that part of the earth into which the plants send their roots and from which they take much of their food.

Well, if the soil is the portion of the earth at the surface, what is below the soil? Most of you know that if you dig down deep into the soil you will come to solid rock.

Sometimes rock is reached a few inches below the surface, and again you must dig many feet before you come to it, but sooner or later you are sure to find a bed of stone.

We learn therefrom that this first interesting fact that underneath all soils are found solid rocks.

Now, if you were to examine a sample of soil with a strong magnifying glass or a microscope, you would find that it is largely made up of very fine particles of rock.

Mixed with these particles is a

much smaller quantity of black material which is called humus matter, or sometimes humus. A little closer examination will show that the organic matter is simply the remains of plants which have formerly grown upon the land, and which have partially decayed or rotted in the soil.

Take a small quantity of a black soil, heat it in the lid of a baking-powder can, and see if the odor that comes off is not very much like that you notice on heating bits of leaves in the same way.

We find then that the soil is composed of small particles of rock mixed with the remains of former plants, and that by far the larger part consists of these rock particles.

This suggests the thought that the soil has been formed from the solid rock such as are found beneath it, and this, indeed, is what the men who have studied the subject have found to be true.

Geology teaches us that at one time all the surface of the earth was solid rock. At that time there was nothing like what we now know as the soil.

These rocks contained all the constituents necessary to make a soil and all the substances which the plants use as food with the exception of the element nitrogen.

This plant food, however, was not in forms in which the plants could use it. Suppose you had a sack of wheat.

You know that there is plenty of food there to nourish you for some time, but it is not in a very good form to eat so long as it is in the whole wheat kernel.

One of the first things you would do would be to grind it to a flour. And that is one of the first things that nature does in preparing the food for plants; she grinds the rocks to flour.

In other words the first process in the formation of a soil is the pulverization of the rocks.

Nature uses several methods to bring about the grinding or pulverization of the rocks. The first of these is change of temperature, or heat and cold.

If you examine a piece of granite you will find that instead of being a simple rock it is composed of different minerals cemented together.

Now these minerals are differently affected by heat and cold. You know that most substances expand when heated. The amount of expansion varies for the different minerals in the granite and as a result the effect of change in temperature is to separate the minerals, thus breaking the rock into smaller pieces.

FOR BEGINNERS IN BEE CULTURE

By Mrs. A. Joseph, California.

A great many people would be glad to keep a few colonies of bees if they did not overestimate the difficulty. This difficulty may be overcome to some extent. Bees swarm because of lack of room. If instead of using a single hive you use one of double capacity, or one on top of the other, the swarming tendency will be very much curtailed; so the best way is to use hives of large size, or those of ordinary size one piled on top of the other; the bees and queens should be given plenty of room.

At the beginning of the season, one story of a hive will be enough. Just before fruit-blooms open up, another story should be added, containing empty combs or frames of comb foundation, more stories added as required.

A large entrance should be provided at the bottom of each story so as to keep the bees inside the hive, for if the bees cluster out in front they will be sure to swarm; so there should be enough room to keep the bees inside the hive and at work.

In this way you avoid climbing trees, or cutting their limbs off or making that horrid noise of pounding the pan.

In this manner the attention the bees require could be given by the farmer's wife or the son or daughter and if he will let them have the money made from the bees, they will get so interested in them that they will learn to handle a large number of bees in a short time and will be able to lay aside a little ready money.

Of course there is an occasional season when bees will hardly make their own living. Then they should be fed to keep them from starving, but there may be only one poor season in four or five. In the good seasons they will more than pay for their keep.

A good, but simple hive may be constructed easily. There should be two rows of holes, one six inches above the other, so that when shelter is not provided, and it snows the lower holes are usually covered with snow or ice, the upper ones remaining open to admit fresh air, which is very important. Then after a long journey, bees alighting at the upper holes have a shorter distance to travel to reach their store of sweets.

The hive is 12x12x15 inches inside measurement and when filled with honey will hold sufficient to keep a large colony of bees during any season not fruitful of flowers.

For holding the comb, small round sticks are used, the same as in the old hives, the cover is removable and the edges beveled to hold in position a small upper hive or upper stories to be added as needed.

Beginners should not purchase large colonies of bees. Begin moderately and go slow.

Colonies placed in an open situation and somewhat shaded by trees or vines will be much more conveniently handled than when placed in an ordinary shed or out-of-door bee-houses.

The swarming bag is one of the best things in bee culture. It is about six feet in length and one foot in diameter and formed of alternate lengths of calico and mosquito-netting. Each length of about one foot has a ring of wire or hoop to hold the bag distended.

When the bees are about to swarm, and are inclined to come outside the hive, the bag is fastened onto the front of the hive and the other end fastened to a stake. When the queen enters the bag she bounds to the upper end and is quickly surrounded by her followers and the swarm is then captured with ease.

Beginners are very often impatient for increase. If you increase your bees too rapidly you will get less honey unless you have a first-class strain of bees. Even then if the season is a poor one or the locality in which you live is overstocked, the amount of honey may not be as large as you would expect.

Young calves need whole milk for the first few days. The calf should always have the first or colostrum milk of the cow and be allowed to nurse the cow until the eighth or ninth milking, when the milk is suitable for human food. Feed (with small amounts) to avoid over-feeding. Teach the calf to drink and feed whole milk for at least three weeks, changing to a skim milk diet gradually.

The amount of milk fed should be carefully regulated. A good plan with the normal calf is to give 4 pounds (2 quarts) of whole milk three times per day, fed sweet and at blood temperature. In the state of nature the calf gets milk containing about 3 per cent fat. Our domesticated cows have been bred in some instances to give nearly twice this amount. Milk that is too rich may cause serious trouble from scours, and in feeding such milk care should be exercised to give limited amounts at the proper temperature. The feeding of whole milk should be continued for about three or four weeks, when the number of meals may be reduced to two per day. From one half to a pint of skim-milk may now be substituted for an equal quantity of whole milk. The amount of skim milk may be gradually increased and the amount of whole milk correspondingly decreased until, at the end of a week or 10 days, the calf is getting all skim milk.

Skim milk is a cheap feed for calves but should be fed carefully in limited quantities and only while it is warm and sweet. Skim milk may form the principal diet of the calf for eight months or a year. Factory skim milk should always be pasteurized to avoid the spread of tuberculosis. The best skim milk is that which is fresh from the separator and still warm. Experiments show that it is only one-fourth as expensive to raise a calf on skim milk as whole milk. Two pounds of grain with the proper amount of skim milk equals one pound of butter fat. Buttermilk or whey may profitably be fed to calves.

Grain for calves should be fed first while the calf is quite small with a little bran to add the calf in learning to eat. High priced concentrates are unnecessary and give no better results than corn meal, oats and bran, ground barley, etc., when fed in proper combinations. At four to six weeks a calf has good teeth and can grind his own feed. A variety of feeds is advantageous and best results will usually be secured from mixtures.

The following list may serve as a guide to the calf feeder in making

selections or combinations to suit his conditions:

1. Corn meal gradually changed in four to six weeks to shelled corn with or without bran.
2. Whole oats and bran.
3. Whole oats and corn chop, the latter gradually replaced by shelled corn in four to six weeks.
4. Ground barley with bran or shelled corn.
5. Shelled corn and ground kafir corn or sorghum.
6. Whole oats, ground barley and bran.
7. A mixture of 20 pounds of corn meal, 20 pounds of oat meal, 20

Feed the Calf in a Comfortable Stanchion.

pounds of oil meal, 10 pounds of blood meal and 5 pounds of bone meal, changed to corn, oats and bran when calves are three months old.

8. A mixture of 5 pounds whole oats, 3 pounds bran, 1 pound corn meal and 1 pound of linseed meal.

The calf may be taught to eat grain by rubbing a little on its mouth when it is through drinking milk. From this it will soon learn to eat from the feed box.

The roughage for calves should first be fed at two or three weeks of age when the calf begins to eat grain. Good clean hay, either timothy, blue grass, clover or alfalfa may be used. Corn silage is an excellent calf feed when fed in moderate amounts. Good pasture is an essential after four to six months of age, and if the calf is turned out for only a few hours each day at first, scours will be avoided.

When it comes to a question of deciding whether you shall send the boy to agricultural college or buy another blooded bull, give the boy the benefit of the doubt.

FEEDING THE DAIRY CALF

THE FUTURE POSSIBILITIES OF THE NEWBORN CALF RESTS UPON ITS FEED, CARE AND MANAGEMENT.

By D. H. Otis, Wisconsin.

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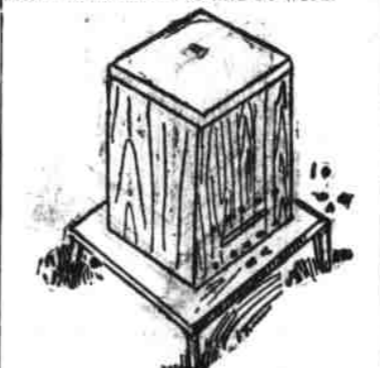
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Colonies worked this way may store from \$0 to \$200 pounds of fine honey.

Some colonies handled in this way may swarm, but they will not be very many. In such cases put over the entrance an alley trap. This will allow the worker bees to pass in and



A PROFITABLE PECOS VALLEY, TEXAS, APIARY.

PROPERLY PACKED BUTTER

By W. H. Underwood.

When a farmer's wife or daughter has a sufficient quantity of milk to be able to sell some butter, she ought by all means to find out just what sort of butter people will pay the highest price for and how the same is packed for sale, and comply with these conditions. If they do so they will get all it is worth.

On a Saturday not long since while I was waiting in the store several persons brought in butter, and with the exception of that from two customers (myself and one other), it was all made in large rolls, small rolls packed in jars, crocks and pans. Some was made in round prints and wrapped in oil paper, and some of the large rolls were also wrapped in oil paper.

The clerk weighed a basket of eight-pound prints, and they tipped the scales at six and one-half pounds only. I asked him what he paid and he said 18 cents.

I tasted the butter. It was good and the merchant would have been glad to pay 25 cents, the same as I

got, but he said he could not sell it for more than 18 cents because it had a mussy-looking appearance.

If each one of those people would pay for a brick-shaped mold; 50 cents for a roll of parchment paper and one-half inch wide, four sheets and one-half inches long, dip these into cold water and wrap each pound neatly, pack them neatly in a clean box lined with white paper, I assure you that they can then get 25 cents per pound for their butter and the gain in price will give them a good many dollars to put into their pockets.

It will not take ten minutes longer on churning day to do this, and the knowledge of putting a first class article on the market in first class condition will repay in itself.

It is not best to use the oiled paper. It is impossible to handle the butter without tearing it and it makes the butter look anyway but well.

VALUE OF HEIFER BEEF.

Professor Kennedy, of the Iowa College, while in England a few years ago, expressed great surprise at discovering that butchers pay a higher price for heifer beef than for steer beef of the same age and condition of flesh.

Henry Wallace says this was also a surprise to him the first time he went abroad. He found that the butchers were willing to give a premium on heifers over steers and we found that in one or two districts of England butchers would buy only heifers if they could get them.

The reasons given by the butchers are that the grain of the flesh is finer, the bone smaller and therefore the heifer cuts up better than the steer of the same age and furnishes a better capacity for beef. "We remember when a boy at home" says Mr. Wallace, "when a beef was to be killed in the fall of the year, mother always insisted on killing a heifer, giving the exact reasons stated by Fred Kennedy as given by the butchers at Liverpool—that the meat of the heifer was finer in the grain and better and there was less waste."

There is absolutely no sense or reason for the discrimination made against heifer beef in the United States. With cow beef it is somewhat different, for the reason that a cow that has produced a number of calves will not dress as large a per cent of beef and the animal being older will not have the same tenderness nor fine quality.

A half a cent a pound, however, should be ample to cover this shrinkage, whereas a heifer is really entitled to a premium over the steer of from a quarter to half a cent.

It is not always wise to

WINTER OATS IN THE SOUTH.

Last fall I tried test plots of the following varieties of winter oats: Bancroft, Applier and Rust Proof oats. They were sown August 26 with a liberal application of a good grade phosphate. They were sown in the standing corn. After the corn was cut the balance of the field was sown to Virginia Gray oats with a light application of phosphate. The test plots were put in with a grain drill, neither of the three varieties named stood the winter so well as the Virginia Gray oats. In fact, only a few bunches of each of the new varieties stood the winter. The Virginia Gray oats were sown about October 1, which was very late for sowing oats.

A. J. Legg, W. Va.

HANDY TO HAVE AROUND.

A Pennsylvania farmer says he has a horse which has a mania for pawing up potatoes, and he is going to employ him for that purpose. The farmer



decides that the horse will follow a row and paw up every tuber as cleanly as if turned up by a potato digger.

When a number of horses are kept in the same barn the stables of the barn should be low enough to allow them to see each other as all horses love company.

RAISE WORMY APPLES---EXPECT LOSS

By J. E. Buck, Virginia.

With the possible exception of the San Jose scale the codling moth is the most destructive insect with which our orchardists have to contend.

These worm pests, which leave the apples in late summer and fall, hide and spin cocoons under bark scales, in rubbish about trees, in decayed places on the tree, and about apple bins and storage houses. In these cocoons they pass the winter.

In the spring, as the days begin to get warm, the worm changes to a "pupa" inside the cocoon and soon the pupa changes to a moth, which splits the case and crawls out.

It seems quite generally true that the temperature conditions governing

the blooming of apple trees also occasion the appearance of the moth in the spring. This habit of the moth furnishes the very best opportunity of combating it. After the petals fall from the bloom, for a period of a week or ten days, the calyx cavity remains more or less open, and the young apples more or less upright.

As 75 per cent or more of these first worms enter the young apples at the calyx, or "blossom end," this furnishes an excellent opportunity for filling the calyx cups with poisonous spray, so that when the young worms endeavor to eat their way into the apple they are killed by the poison.

The first application of spray should be made inside of a week after the petals fall from the bloom. Everything should be gotten in readiness for this first spraying, for it is certainly the most important of all the sprayings, it being possible to kill 95 per cent of the worms by one thorough application of arsenate of lead at this time. A second application of spray should be made two to three weeks later, to supplement the first.

Either Paris green or arsenate of lead can be applied in Bordeaux mixture. The arsenate of lead can be applied simply in water, without any danger to fruit or foliage. Paris green can also be applied in water, but unless used in Bordeaux, 2 pounds of lime should be slaked and added to each 50 gallons of spray to prevent possible damage to fruit and foliage.

Six to eight ounces of Paris green should be used to each 50 gallons of spray. In using arsenate of lead 2 pounds to 50 gallons of spray, in mist sprays, has given us the best results. In mist sprays about 3 gallons were applied on each tree (nine-year-old trees of fair size). Some trees were ten to twelve years old. One and one-fourth pounds of arsenate of lead gave splendid results in drench sprays with high pressure. In drench sprays 1 to 2 gallons were sprayed on each tree, which would make about

the same amount of poison as in the mist spray.

Arsenate of lead has proven superior to Paris green in all the tests. It costs more, but the extra saving of fruit will make up the difference in cost. Both Paris green and arsenate of lead, when thoroughly applied, will produce a high per cent of clean fruit.

Results of careful tests show that over 99 per cent of worm-free fruit is possible on the picked apples by spraying with arsenate of lead, and over 98 1/2 per cent, counting all the apples that drop during the summer. The mist sprays with Paris green, 6

ounces to 50 gallons, produced as high as 98 1/2 per cent of clean fruit on the picked apples, and 95 per cent, counting the dropped apples.

In using either poison the utmost care should be taken to have the exact amount desired. Either poison should be thoroughly mixed in a little water before putting in the spray barrel or tank. A good brand of arsenate of lead should be used, and there are many good brands.

OATS STRAW FOR SHEEP.

It is an excellent plan for every farmer to get up every fall a quantity of oats straw to help out in carrying the sheep through the winter. Wheat straw will answer the purpose but it is not so good as oats straw.

Of course straw is not an ideal feed for sheep. It contains a little nutriment, but not much and a great deal of food fiber, but clean oat straw fed sparingly in connection with roots or other succulent feed helps out wonderfully.

Placed in the rack with clover hay it will be eagerly eaten up every day and it undoubtedly saves some grain.

Where a farmer has plenty of grain and little roughage oat straw will help a little but the ration admirably

is fed in large quantities it will almost certainly produce stomach trouble and this should always be avoided.

Only one report is able to tell the exact cost when the cream is right for churning. It then has a clean, sour taste and makes fine butter fresh from the woods.

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MANURE AS GOOD AS A BANK

One of the experiment stations—Pennsylvania—made a valuable experiment with manure. It was found that manure when spread on the field as fast as made suffered little loss of its fertilizing constituents though less than two-fifths of the dry matter of the feed and bedding was recovered in the manure.

Manure that was thrown out and kept in a covered shed lost one-third of its nitrogen, one-fifth of its potash and one-seventh of its phosphoric acid.

Only one-third of the dry matter of food and litter was recovered in the manure. The potash and phosphoric acid probably escaped by seepage of the liquid manure into the clay bottom.

The nitrogen was volatilized and escaped into the air in the form of carbonate of ammonia.

The money value of the fertilizing constituents lost in the covered shed as compared with manure left to be tramped down was equivalent to 2.50 for each steer fed for six months.

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a tight floor and abundant bedding Pennsylvania—made a valuable experiment with manure. It was found that manure when spread on the field as fast as made suffered little loss of its fertilizing constituents though less than two-fifths of the dry matter of the feed and bedding was recovered in the manure.

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THE JAPANESE RADISH.

The Sakurajima radish, which comes from Japan, is becoming quite popular in this country, and is now raised in thousands of gardens. It will thrive in almost any good soil that will grow other radishes. The seeds, which may be obtained from any dealer, should be sown thinly and covered lightly.