

fallow—if not, on land set apart for the purpose—followed again by tares sown at intervals of two weeks apart till his clover is fit for feeding to the lambs, which should be weaned by the first of August, when the ewes can run the stubble field. After the clover rape should be provided for the lambs, which should be finished by the middle of November, and the lambs be fed white turnips or swedes, as the case may be, with a little grain.

In feeding the above-mentioned crops I have no doubt the question will be asked, How will you do it? Answer—Use a portable fence, a portion of which is so constructed as to allow the lambs to have access to the portion of the field where the ewes are to be fed on the morning, where they can be fed a little grain if desirable; this is optional.

Give your sheep each day what they will eat after the rye is finished, and as the weather gets hot provide a field where they can run, having access to water and shade through the heat of the day, say from ten o'clock in the morning till four o'clock in the afternoon, when they return to their allowance of tares, oats, etc. By this means your land is regularly manured instead of the fence corners or the highways, and your sheep will be healthier and grow more wool of a better quality, and your lambs will take well to their winter feed on coming into the yard, if you keep them for fattening. A very small quantity of land will, under this system, keep twenty or thirty ewes and lambs through the summer and not interfere with your other stock, besides leaving on the land the manure, worth at least ten cents per week per ewe and lamb. The food consumed will by this plan be grown on land that otherwise would have lain idle for a great portion of the summer.

HOW AGRICULTURE IS ADVANCED BY SHEEP.

Richard Gibson, Delaware, tells what sheep have done:—"In England many thousands of acres of wild and barren wastes, like Lincoln Heath, which formerly was a huge rabbit warren and a home for vermin—so desolate and solitary was it that a column was erected and lighted up at night to guide any belated traveller—this heath land was let for 2s. 6d. per acre, or a couple of rabbits a year.

Where the column stood at Dunstan Pillar is now one of the best cultivated and most noted farms in Britain; from under its shadow Royal winners innumerable have been bred and fed, and the name of Cartwright is known in every British colony.

Again on the Wolds, those high table-lands running east and west across the county of Lincoln, are farms which formerly rented for five shillings (English) an acre, and now for \$7 to \$10.

Then take the county of Norfolk, the eastern portion of which is probably the poorest, naturally, of any part of England, having been nothing but a pure white, blowaway sand, piled up in little mounds. Those who have travelled between Detroit and Chicago by the Michigan Central Railway will remember Michigan city, which nearly resembles that portion of Norfolk of which I am speaking. We now find there large farms well tilled, and as prosperous a class of farmers as any in Britain.

I need not go to the counties in the south of England to illustrate my point, but would merely remark that I know of farms of from 1,000 to 2,000 acres that have not over from five to ten acres of permanent pasture immediately surrounding the dwelling, and on which only sufficient cows are kept to supply the family with milk and butter.

The question naturally will be asked, How to farm 1,000 acres successfully without cattle? The practical answer, as exhibited on the sheep farms of Britain, would be, Grow green crops and feed them off with sheep.

Let us look at the means adopted, not to keep up a naturally fertile soil, but to reclaim and bring into cultivation the waste places of the earth; and a word here of encouragement may not be thrown away, if we inquire, in passing, Who accomplished this work, and to whom we are indebted for this object lesson? Was it some rich landed proprietor? Or perhaps a syndicate of wealthy capitalists? Or a well-endowed agricultural college? No; it was wrought out by the tenant farmer, who, having obtained leases and a liberal tenant right, was content to risk his capital in the venture; and when I say on these same farms are to be found the wealthiest farmers in England, that it is on these farms the English malting barley is grown in its greatest perfection, and that it can only be grown on sheep farms successfully has been so often demonstrated that anyone conversant with the question would not try to make one believe it can be grown elsewhere as successfully.

The means at first adopted were large applications of artificial manures, generally bone dust, then by encouraging the growth of clover and other green crops, followed by turnips, all eaten on the land by sheep, so that by constant treading the soil became consolidated sufficiently, and by the return of all green crops it became rich enough to grow grain. Though these soils are now rich in plant food, they could not be kept up without sheep, and to-day without them they must go out of cultivation.

The rotation was the ordinary four-course—quarter roots, quarter barley, quarter clover, quarter wheat—the roots and clover consumed by sheep. Can we not apply this lesson to advantage in some portions of our Dominion?

[TO BE CONTINUED.]

FARM.

Agents Wanted.

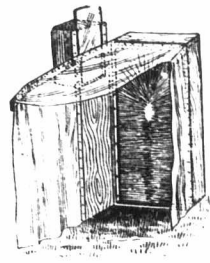
We want good, active agents to work for us in every county in Canada. To suitable persons we will give permanent employment and good salaries. We ask each of our readers to take an interest in the *ADVOCATE*; send us at least one new name, more if possible. If you cannot canvass for us, and know of a suitable person who can, send us that person's name and address. We are anxious to double the present circulation of the *ADVOCATE*. The more assistance you give us in the way of sending new subscribers, the better paper you will receive. Now is the time! Help us to make the *ADVOCATE* the best agricultural paper in America. We will do our utmost, but we want and must have your help.

The Guthrie Horn Fly Trap.

Insect foes have become the most formidable enemies that agriculturists have to contend with. Among the latest, and certainly not the least destructive of these, is the Horn Fly, which has worried cattle so terribly throughout the two past seasons. It is one of the worst insect pests that has turned up yet. It has been relentless in its attacks, never letting up day or night, following its victims into the stables, and allowing them no peace at pasture or in the stall. Already pages have been written upon their history and habits. Herdsmen have almost given up in despair, as these vicious pests have so materially diminished the milk yields of dairy cattle, and have prevented feeding cattle from putting on flesh, while they have affected the well-doing of herds generally. Fortunately for all concerned, inventive genius has been busy at work, and we believe has come to the rescue in the form of a trap that will do good execution in keeping these bloodthirsty foes at bay, and lessening their numbers most effectually. We have not had a chance of testing the trap in fly time, but can judge pretty closely after passing a cow through it that it will accomplish the work that is allotted to it.

Mr. R. H. Guthrie, Paris Station, Ont., is the fortunate inventor, and if ever an invention was put out in the nick of time it is his Horn Fly trap.

The accompanying cut gives but a faint idea how the machine effects its purpose. The dark shaded panel shows the passage way, armed with brushes through which the animal passes. Those who have witnessed a cow rush against a straw stack, or plunge through a thicket to rid herself of flies, can imagine the relief that animals experience by passing through this machine.



The trap is intended to be placed at a gate or stable door, where the cattle may pass singly through it. It is about six feet six inches high, and about forty inches wide, and is, therefore, of sufficient size for the largest animal to pass through. There are two side pieces, both of which fold up with a cover between them, which prevents the escape of the flies. The left hand one is supplied with curtains, which readily enclose the flies as they are brushed from the cattle.

The brushes for sweeping the flies off are formed of broom corn, and the passage way is so entirely closed with this material that it is well nigh impossible for a single fly to stick to its victim or follow the animal through the trap.

The folding doors, which require an attendant to work them, close readily behind the animal that has passed through the machine, and enclose the flies, which ascend into the trap proper provided for them at the top. This trap is in two compartments, the bottom one being left open while operating the machine, while the top one keeps the flies safe until the entire herd is passed through. It can then be removed and the captives destroyed. It required about twenty minutes to pass through a herd of twenty animals.

Mr. Guthrie has made an especial study of the Horn Fly and its habits while perfecting his machine, and has found:

First. That it is very difficult to drive the flies from one animal to another, even when they are standing side by side.

Second. That after having rid his cattle of flies by passing them through the trap, few come to his cattle from his neighbor's stock pasturing in an adjoining field.

Third. After his neighbor's cattle were removed from this field, his own cattle appeared to get a fresh stock of flies, proving that the flies do not seek fresh victims while the old ones are available.

Fourth. He does not believe the fly confines itself to the fresh droppings as a medium for hatching its eggs.

Fifth. That it follows its victims by scent, and will attack the horse when cattle are not near at hand.

We have received a number of testimonials from reliable men who have seen the machine operated, and all testify to the good work it performs. Further information may be obtained by addressing Mr. Guthrie, at Paris Station, who would gladly answer any enquiries.

Popular Geology—No. 2.

BY J. H. PANTON, M. A., F. G. S.

The composition of the most common minerals in rocks may be considered as follows:—

1. Quartz: This consists of silica; that is a substance containing Oxygen and Silicon, and occurs in a variety of forms, such as: Rock Crystal, Amethyst, Rose Quartz, Smoky Quartz, Chalcedony, Cornelian, Agate, Jasper, Bloodstone and Flint. Sand is largely made up of minute particles of Quartz.

2. Feldspar is one of the most important minerals, being composed of Silicate of Alumina (clay), and a Silicate of Potash, Soda or Lime, and thus supplies when decomposed very useful ingredients to the soil—clay on the one hand, and potash, soda or lime on the other. There are several varieties, viz.: Orthoclase, composed chiefly of clay and potash; Albite, clay and soda; Anorthite, clay and lime; and Labradorite, clay, soda and lime.

The first is most common, and occurs in many of our hard boulders in the field as a salmon-colored rock.

3. Mica consists of silica, alumina, potash, magnesia and some iron.

4. Hornblende supplies silica, alumina, magnesia and lime. Asbestos is a variety of this.

5. Pyroxene is much the same as Hornblende.

6. Talc is silica, magnesia and water. Soapstone, Steatite, French Chalk (used by tailors), and Meerschaum are varieties of Talc.

7. Serpentine is another mineral made up of silica, magnesia and water.

8. Chlorite contains silica, alumina, magnesia, iron and water.

9. Calcite, Chalk, Marble and Limestone have much the same composition, i. e., carbonic acid and lime.

10. Dolomite contains carbonic acid, magnesia and lime.

11. Gypsum is composed of sulphuric acid and lime. Selenite, a transparent variety, Fibrous and Satin Gypsum and Alabaster are other forms of the same.

12. Apatite supplies phosphoric acid and lime.

13. Rock Salt, and (14) Iron embrace most of the minerals connected with the formation of soil, which results from their decomposition. In this list we find nearly all the elements that enter into the composition of plants. How the rocks containing these substances are decomposed will receive future consideration. We shall now direct our attention to a further study of the great divisions of rocks.

Igneous rocks, sometimes spoken of as eruptive and unstratified, owe their appearance to the influence of heat.

Characters: Usually hard, and more or less crystalline, not in layers and without fossils (that is, the traces of animal or plant life).

Occurrence: 1. In irregular masses of all ages.

2. Beds over-flowing other deposits.

3. In the form of tortuous veins (granite).

4. Broad and simple veins known as dikes, which are sometimes over-topped with step-like masses described as trap.

Constituents: 1. Granite consists of quartz, mica, feldspar mingled together. Syenite is a variety with quartz, feldspar and hornblende, often occurring as dikes.

2. Serpentine.

3. Trap, containing much feldspar and some iron. It may present a rough form of crystallization known as basalt.

4. Trachyte, also rich in feldspar; it is more or less porous, rough and usually light gray—pumice is a variety.

5. Obsidian is glass-like lava.

6. Lava, the rock material poured out of volcanoes.

Localities: Lake Superior, Highlands of Scotland, Palisades of the Hudson, Fingal's Seat (Basalt), Montreal Mountain (Trap), and all deposits from volcanoes. The "Devil's Slide," at the entrance to Yellowstone Park, affords an excellent example of dikes. Here two walls 200 feet high, 50 feet thick, with a space of 150 feet between them, slope up the side of Mount Cinnabar 2,000 feet. Each of these walls is a very characteristic dike.

The study of Igneous rocks gives us a clue to the origin of the earth, and the condition of the earth's interior at the present time. One of the most favorably received theories regarding the earth's origin was originated by a scientist named La Place, and may be summed up as follows:

1. A period when the earth was a mass of incandescent vapor. 2. The earth a chaos of melted rock. 3. A thin crust forms, and many compounds in vapor before this, owing to the great heat of the glowing ball of fire, now descend. This would be a time of marvellous electrical phenomena. 4. The water now descends and is able to remain upon the gradually cooling surface, but there would be many upheavals and fissures made in the newly formed crust. 5. Continents begin to emerge and become a source of material for redistribution through the agency of water. 6. Final arrangement of the great land divisions of the globe. Each of these stages in the history of the earth would extend over a vast period of time.

That the earth has been, and is now, in a heated condition, can be shown by reference to the following facts:

1. The presence of boiling springs and geysers in various parts of the world: Iceland, New Zealand and the Rocky Mountains.