THE FARMER'S ADVOCATE.

curred in that every effort should be made to teach calves to masticate their food as thoroughly as possible, and if they could be taught to do so, or if thorough mastication came natural to them, it was better to feed all the grain unground, it being then better digested than when ground grain was swallowed without sufficient mastication.

At the next meeting of the Council, Mr. John O'Brien will read a paper on "Winter Care of Manure."

The Farm.

How to Judge Soils.

In recent issues we explained how to judge soils so far as their physical properties are concerned, pointing out the effects of variable quantities of humus, c'ay, sand, and lime. We showed how the humus, or the vegetable portion. which contains the nitrogen and builds up the protein constituents of plants, can be judged by the dark color which it imparts to the soil, the more decomposed vegetable matter the darker the color. The other constituents which form the great bulk of the soil are clay and sand; although what is ordinarily termed sand also embraces minute fragments of various rocks.

The next point to be considered with reference to pure clay and sand is that they in themselves are not plant food. Pure sand is known as silica, and plants can flourish without it. Clay is a chemical union of sand and alumina, and does not find its way into the plant at all.

Now, the best way to get at the quality of a soil is first to find out what constituents are necessary for the growth of the plant, and then to analyze the different rocks from which the soil has Leen derived, to see if they contain all the mineral constituents necessary to build up the plant structures. This plan answers very well where the soil is made from the underlying rock, but most soils also contain substances which have been washed upon them by the waters of many ages, and this makes the judging of such soils very difficult by farmers who do not under stand geology, mineralogy, chemistry, and physics. Even those who have a knowledge of these sciences cannot always tell by examining the soil whether it is fertile or not, but they may often arrive at practical conclusions, and they know how to test the soil in order to find out what constituents it is most deficient in. By making these tests, the cheapest way of keeping up the fertility and productiveness can be ascertained. The part of the soil which has been derived from the rocks is called the inorganic or mineral portion, in order to distinguish it from the organic or vegetable portion. The inorganic constituents of soils are the following: alumina, 'ime, phosphoric acid, sulphuric acid, potash, oxide of iron, magnesia, silica, soda, and chlorine. All these substances, except the last three, are essential to the growth of the plant, and the productiveness of a soil is based upon the substance which exists in the minutest quantity, so that if this be applied, the productiveness of the soil may be increased just as effectually as if an application of them all had been made. Soda and chlorine in chemical combination form common salt, which the plant can get along without, as it can also do without silica. There are also

soils, but they are too unimportant to be considered here.

Soils may be classified in various ways, but no classification has been found to be of much practical use to ordinary farmers. However, we shall do the best we can to make the subject plain. A loam is a soil which contains 40 to 60 percent of sand; if it contains 80 to 100 percent of sand, it is called a sandy soil, and if it contains 1 to 20 percent of sand, it is called a clay soil. The sand may be separated from the clay by putting a sample of the soil into a bottle or other suitable vessel, and after pouring in a quantity of water, the vessel is shaken. In a short time the sand and heavier particles of rock willsink to the bottom, and the floating clay may be poured into another vessel. If all the clay is not now removed, the process may be repeated. After settling, the water may be poured off, and when dry the percentages of clay and sand can be easily measured. The organic matter may be burnt out by heating the soil.

This process is very simple, but it must not be forgotten that the soil would be utterly barren if it contained nothing but pure sand and clay; it is the rocky fragments which the soil contains that makes it fertile in mineral constituents, and it is important to know where these minute particles of rock came from. As many farmers know the geological names of the stones found in their neighborhood, we will mention the leading ones here and give their chemical analysis, so that they may be able to form a good idea as to the fertility of their soil in certain constituents of plant food. This they can do by comparing the analysis of the stones with that of the plants:-

TABLE	SHOWING RC			THE CKS:		NA	SIS	of		
.n	Basa	6.9	6.2	ŝ	0.3	8.3	1.2	3.6	4	E

					RUU	KS	:					
	Basalt.		°/_	16.2	13.	10.3	6.3	1.2	3.6	23 4	111	
	Melaphyr.		°/° 59.2	15.1	14.7	4.6	1.5	1.7	3.0	1.6	ŝ	
	.stiguA		°/° 49°	9	15.	12,	17	i				
-	.sbnsldnroH		\$5°~	14	18,	12.5	12.					
	.stylisbrT		°/。 64.2	17.	6.7	ŝ	ં	4.4	5.1	1.0 .	55	
	Porphysia.		°/° 75:2	10.9	3.2	1.	4.	3.1	4.0	1.		
	Micaschist.		°/° 79.5	13.4	3.9	ł.,	1.0	4.7	4.	œ		
	.88isnD		°/° 67.3	16.1	4.5	3.9	1.5	5.1	3.0	4.	.78	
		Aranite.		°/ 68.6	14.4	5.0	3.9	4.	2.8	3.4	1.1	28
	Dolerite.		°/。 48.2	10.2	13.6	14.6	7.4	3.7	1.0	1.9	.03	
	snotssmir (ntrinuli2).		°/°		2.3	90.1	1.3				8.	
NAMES	OF	CHEMICAL	CONSTITUENTS	Süica	Alumina	Iron (ferrous oxide)	Lime	Magnesia	Potash	soda	Vater	hosphoric Acid

sent, and sometimes the potash is replaced by soda. There are also felspars containing large proportions of lime as well as soda. Gneiss merely differs from granite in its laminated structure. As will be seen in the tab'e, the percentage of one of the most important constituents, phosphoric acid, is very small, which is the cause of phosphate ferti izers, often giving marvellous results. Limestone (carbonate of lime) a'so varies materially in its chemical composition; several qualities have no phosphoric acid at all, and some contain a good deal of silica. The form in the above tab e is the carbonate of lime (90.1 per cent.)

JAN., 1888

The soils formed from rocks, when there is no admixture with other soils, are called sedentary, or weathered soils. The crumbling of the rocks is produced by the action of the weather (water, gases, frost, etc.), and being sedentary or remaining still, the soil partakes of the nature of the underlying rocks. There is also another class of soils called alluvial, which are often found in the valleys, and are built up by washings, by water or ice, from higher lands. These soi's are, therefore, of a mixed character, and their composition and fertility naturally depend upon the various rocks from which they have been derived.

From the foregoing investigations soi's have received the following classifications:-

CLASSIFICATION OF SOILS. -SEDENTARY SOILS :

- A. From crystalline rocks:
- 1. Felspar soils (composed of granite, porphyry, trachyte, etc)
- 2, Augite and hornblende soils (composed of basalt, dolerite, melaphyr, etc.)
- 3. Mica and quartz soils (composed of micaschist, gneiss, quartz-rock, etc.)
- B. From aqueous rocks: . Sandstone soils.
- . Shale soils.
- Limestone soils (composed of limestone, chaik, dolomite, etc.)
- ALLUVIAL SOILS: . Gravelly or mixed soils.
- Sandy soils.
- Clay soils. Loam soils

The above rocks are from European sources, and the same rocks in different countries present slight variations in their composition. Granite is a crystalline mixture of fe'spar, with quartz and mica, and varies materially in composition; minute quantities of other substances in most all sometimes large percentages of potash are pre- item in farm economy.

Lime or calcareous soils. . Marl soils (lime and clay mixed.)

vegetable soi's, or in soils containing a percentage of decomposed vegetable matthere is a practical way of testing its conn. A moist specimen of the soil is taken, a piece of blue litmus paper is brought into act with it. If the blue paper turns to a ish tinge, the soil is acid, and the acidity ld be corrected by the application of alkafertilizers. Such soils require lime or marl re profitable productions can be expected.

sting soils by chemical analysis is a slow and nsive process, and very seldom practical reare attained. The quantity of certain conents may be small enough to escape the skill e analyst, and yet large enough to produce actory crops. Another method, which is ng popularity, is to let the crop make the sis. If the normal percentages of the us mineral constituents of the plant be n, then by analyzing the plant the soil is to be deficient in those constituents which elow the normal standard.

A great deal is said about the dairy cow, but we seldom hear anything about the dairy hog. The hog is getting to be such an important adjunct to the dairyman that the feeding of swine from the refuse of the dairy is a most important