cold and wetness, but such ill treatment is never wise nor profitable. Man himself has the physical power to sustain great privations. This fact does not, however, justify the deliberate infliction of any sufferings upon him. During the storms of winter, poor brutes often suffer badly from cruel neglect.

Humanity and self-interest co-operate in prompting us to take excellent care of all live stock in cold weather. They should be regularly fed, if fed at all; for regularity in the daily consumption of food renders it twice as serviceable as it would be if consumed at very unequal intervals, and in unlike quantities. The colder the weather, or rather, the colder the atmosphere that surrounds animals, the more forage they need, and the richer it should be in soluble carbon and hydrogen in an excess of the combined oxygen. For if carbon already has so much oxygen combined with it that it will not burn, or if hydrogen be in a similar condition, then neither can add any warmth to the cooling body of a domestic animal. All such aliment is as worthless as a gallon of pure vinegar poured into the stomach of a poor, freezing ox to warm him, and make healthy blood. Oil cake and corn meal are the true types of the kind of aliment needed by stock in winter. The reason why carbon and hydrogen in the form of oil in seeds, as in maize, flaxseed, &c., is worth nearly two and a half times more as aliment than carbon and hydrogen in the form of starch or sugar, is because one is fitted to evolve heat in the animal economy, and the other is not. Hence, it is a great improvement to cooked potatoes or rice to be eaten by persons, both of which are exceedingly rich in starch, to add an ounce of butter to eight of this farinaceous aliment. Plants rich in sugar, like beets, and maize before its seeds are formed, and many other grasses, are highly nutritive and calorific, as winter feed for neat stock. To form healthy blood and a plenty of it in winter, the food of domestic animals should be at once sufficiently soluble in the organs of digestion, and abound in both heat-generating and muscle-forming constituents. Such food yields the best blood and the cheapest possible meat, milk and wool.

CHEMISTRY OF SOILS.

The chemistry of soils is a subject of great importance to the practical agriculturist, and which more than almost any other at the present time, demands a careful and laborious investigation.

Though there are may things in the phenomena of vegetation, the sources of the nutrition of plants, and the dependence of all upon unknown atmospheric influences, which, as yet, are beyond our knowledge and clear comprehension, yet enough has already been discovered by science to afford the intelligent farmer material aid in his labor, and stimulate him to observe with care and attention the various phenomena presented to his view. It has been ascertained that certain ingredients are present in every fertile soil, the absence of any one of which, or its isomeric equivalent, diminishes the yield of harvest. When we analyse the ash of different species of plants, we find various elements present in various proportions, and the same elements are constant in the same plant. Without these elements the seed cannot be ripened or the plant attain its perfect developement and growth. For example, we find in all cereal or grain crops that phosphorus or its compounds is present in the ash; and in every soil where these crops are grown in perfection, we also find that a compound of phosphorus is present.

How little of the elements of a fertile soil is sufficient for the complete growth of the different organs of a plant, we do not know, and upon this point we need exact experiments. We know what ingredients are present in fertile soils — in what proportion they must be combined, we know not.

Submitting the ashes of the most opposite kinds of plants to analysis, we present the following substances:

Acids.	*Metallic Oxides.*
Carbonic Acid,	Potassa,
Silicic Acid, (Silica),	Soda,
Phosphoric Acid,	Lime,
Sulphuric Acid,	Magnesia,
Nitric Acid.	Alumina,
	Ses-qui oxide of iron,
	Oxide Manganese.

Also, chloride of sodium or common salt, chloride of potassium; and in marine plants, iodide of sodium and iodide of magnesium. What office these various acids and oxides perform in the nutrition and growth of plants, we do not know, and perhaps may never know; but we do know that for any given crop, if the elements of its ashes are wanting in the soil, we need not hope for seed in harvest. With these elements present, every plant may be regarded as a laboratory or factory, engaged in the solution and suitable arrangement of materials from without. No one of these materials can be produced by the plant, consequently they come from without. If then these materials are not at hand, the plant withers and dies, precisely as a lamp goes out when the supply of oil is exhausted. An interesting illustration is afforded by the cultivation and growth of the sugar cane. From an analysis made by Dr. Stenhouse, and published