these elements with the possible exception of hydrogen and nitrogen In addition there will also be found the other elements which are represented by potash, soda, lime, magnesia, iron, manganese, chlorine, sulphur, phosphorous and silica, and thus it may be learned from analysis of any number of plants, that out of the seventy two chemical elements now known to us, only fourteen are of any value in the growth of vegetation.

It not infrequently happens that other elements than these will be found. Thus in seaweeds there are considerable quantities of iodine and bromine, and it is from such plants that these elements are obtained for medicinal and other purposes. Plants have also been known to take up copper and arsenic as well as other metals. So far as we know, none of these elements are of any possible value to the plant, at least experiment shows that they may be wholly excluded without injury, while some of them are absolutely poisonous except as introduced in extremely minute quantities. With respect to these and all other elements which may be presented to the feeding surfaces of the plant, perhaps it may be well to state a general law to which we shall have to refer later on—a law to which there seem to be few exceptions—that plants exercise a selective power and, in general terms, take up only those elements which are of value in promoting growth.

Referring once more to the resolution of the plant into gases and ash when burned, it may be well to point out here that this is also the final result of subjecting plants to the process of decay, but in the latter case the change takes place very slowly, and, owing to the peculiar conditions involved, numerous new chemical compounds are formd as an essential part of the decay, in turn to become resolved into their final elements. But so long as present, they possess a definite value in the growth of crops. Thus, where much vegetation is in process of decay, the peculiar products formed give to the soil an element of richness or fertility which has always been much prized by the agriculturist, since it is found that they not only provide elements of food in a form readily taken up and utilised, but they assist in a very important way, those chemical changes in the soil whereby new food is continually being made available. Vegetation in decay, which has accumulated for a long period, is known as muck and peat. In this we also have an explanation in part, of the value justly attached to decaying leaves as a fertilising material. But it is unnecessary to follow these considerations more in detail at present, as we shall have to refer to them more at length, at a later time.

Having thus ascertained what elements enter into the composition of the plant, the question is next naturally raised as to their various degrees of importance as expressed by their relative proportions. It is not at all easy at present, to assign definite nutritive value to each particular element, but there are certain well known facts which serve to guide us in the practical application. Thus we know that while certain elements are invariably present, others may be eliminated without producing any serious disturbance of functional activity, thereby showing their relatively low value in the plant economy. In some instances, one element may be made to partly or wholly replace another. Or again, while for the same species of plant grown under the same conditions, we find each element in the same or nearly the same quantity, and a similar constancy in the ratio of the various elements one to another, yet as between different kinds of plants, it will be found that not only does the same element vary, often very widely, but that the ratios of the elements are subject to marked differences. Similar differences, though in a much less marked degree, will be observed in plants of the same kind grown under different conditions, as we shall see later on. Facts of this kind are of the greatest value, since they give us a clear understanding of the principles which must underlie any intelligent process of cultivation.

It must be kept clearly in mind, however, that there are a few elements which are absolutely indispensable to the plant and must, therefore, be always present, since upon them depends the formation of their very structure. These element are oxygen, hydrogen, carbon and nitrogen.

Some of the more prominent facts just stated may be made more clear by an examination of the composition of a few plants as ascertained by an analysis of the ash, as in the following table.

PERCENTAGE COMPOSITION OF PLANTS.

	Water at 100°	Nitrogen	Ash	Potash	Soda	Lime	Magnesia	Iron oxide	Phosphoric acid	Sulphuric acid	Chlorine	Silica
Wood ashes	12 00	....	....	3.50	....	34 11	3 70	0 33	....	....	....	13.50
Oat straw	14.3	0.36	6.16	1.63	0.20	0 13	0.26	....	0.23	0.20	0.27	2.84
Corn stems	15.0	0.18	4.72	1.61	0.05	0 44	0.19	....	0.21	0.07	0.41	1.30
Buckwheat plant	16.0	1.30	5.47	2.32	0.11	0.95	....	....	0.35	0.27	0.23	0.29
Pea plant	16.0	1.01	1.31	0.69	0.18	1.59	0.37	....	0.37	0.27	0.01	0.01
Mushrooms, edible	88 8	0.17	1.00	0.51	0.02	0.01	0.03	....	0.09	0.06	0.05	0.01
Potato	75.0	0.33	0.97	0.58	0.06	0.03	0.05	....	0.09	0.06	0.03	0.02
Sugar beet	87.5	0.16	0.71	0.38	0.05	0.04	0.03	....	0.03	0.03	0.03	0.02
Alsike Clover	80 0	0.33	0.86	0.21	0.01	0.29	0.11	....	0.07	0.01	0.05	0.01

SOURCES OF PLANT FOOD.

The various elements of plant food are derived from two great sources, the air and the soil. From the air are obtained the two elements, oxygen and carbon with possibly also, a certain proportion of nitrogen. From the soil through the medium of the water which it contains, are derived all the other elements, so that with respect to their source, the elements of plant food may be grouped as follows:

1. From the air.
   Oxygen, carbon and nitrogen.
2. From the soil.
   Potash, soda, lime, magnesia, manganese, iron, chlorine, sulphur, phosphorous, silica, hydrogen, nitrogen, oxygen.

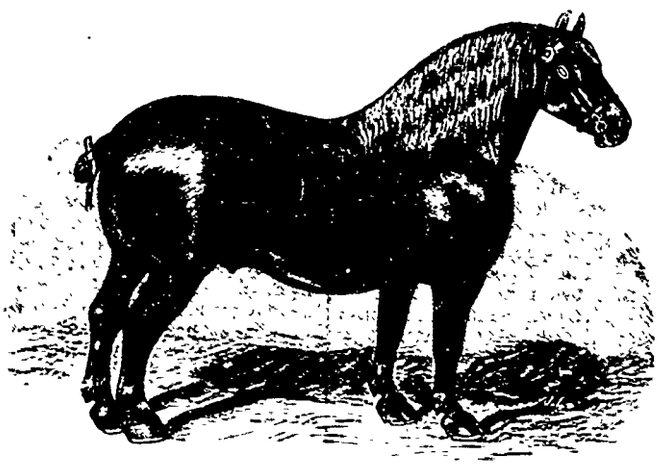
In aquatic plants, the food is obtained wholly by absorption from the surrounding water, but as such plants do not enter into agricultural processes, we need not give them further consideration

Our next considerations will have to deal with the character of the food elements and the ways in which they enter the plant.

The Dairy.

Notes on cheese boxes &c.

We want short, chatty letters from each Agricultural Society in the Province.



FIRST-PRIZE SUFFOLK STALLION AT ROYAL SHOW OF 1890.

Were you at the Dairymen's Convention at St-Thereso? If not you missed a great occasion. Short adresses, good papers and some plain talk about doing better and making more money.

Who invented the nickname of French Cheese for all the poor lots made in Canada? He ought to be caught and banished to Bristol: they want him, we don't. But if we don't banish the small factories and poor boxes the name will stick to us.

Prof. Robertson has been well received in England. He knows what he is talking about when he praises our butter and cheese, and the people there are beginning to know it too.

Now is the time when farmers should examine waggons, ploughs, harrows, seeders and all farm tools and repair them if necessary so all may be ready for work in the spring. Are the maple sugar pans and pails all in order, and has the seed, grain been bought or engaged?

Mr. Ayer has abused our boxes for two years, and now Prof. Robertson reports from England that the boxes are the worst fault with the cheese from this Province. Let each factory determine to have good box wood and close fitting well made, thoroughly nailed boxes, that will not break with a little rough handling.

We hear that the cheese factory owners or manufacturers try to get boxes for 9 or 10 cents, whereas a first class box with 11 nails at the rim-joint, 16 nails in the cover, and with tongue and grooved headings costs about 12½ cents.

On the other hand we hear that many of the cheese factories are trying to make their own boxes, and not being skilled at the work they make a very rough unsatisfactory box.

Unless the box fits the cheese close and is not higher than the cheese (or so that the lid touches the cheese), it will break on the first rough usage.

It is evident that we must use a better package for our butter as well as for our cheese. The lids and bottom hoop of our spruce 70 lbs. tub is not strong enough. The tub manufacturers must look sharply after this or they will be out of the business.

No creamery should think of buying a tub now without a broad strong bottom hoop, and the same kind of a hoop on the lid. The lid should be double, or at least thick enough to partly fit down inside the tub so as to hold firm in its place.

Australia and New Zealand are using a square tongue-and-grooved tub which any carpenter can make, and this package is in favor. Kegs will also be used.

Top cloths and salt are out of fashion, Parchment paper is the thing now, and all best creameries will use it: top, bottom and sides of each tub.

A. A. Ayer.

Notes from the Northfield, Vt., Farmer's Council.—Very few farmers know how to make good butter. It it just as easy to make 300 lbs. a year from a good cow, as 125.

Mr. Vail said that as soon as a member of farms in any district appeared to be run down, their occupants exclaimed. Let us put up a creamery, and the result was generally satisfactory.

Nothing like May and June grass for cows. The pastures in Vermont are not what they were; we are obliged to supplement them. Silage, though it does not analyse so high as some other foods, furnishes a succulent ration for the cow. Glucose, cornmeal, and cotton-cake have proved very good foods. Hay should be cut earlier, beginning by the 25th June.

Professor Cooke spoke of silage. Difficult to assign its proper place in rotations No more feeding value in the silo than is put into it. When ensilage was first brought forward, it was thought the corn got some magical value into it in the silo, which did not exist in it before ensilement. On the contrary, it loses value, in this fashion: the silage heats; nothing can heat without some part of it being burnt, and just as far as the fermentation goes is there a loss of feeding value.

Silage is no more digestible than was the corn before ensilement. The most digestible part of the corn is lost in the silo, though if well made, not much is lost; that is, if the silo is properly built, and the maize well packed, the digestibility is but slightly decreased.

The food-value of the dry-matter of silage, pound for pound, is no greater than dry corn-fodder. This is positive. Both in dairying and in fattening beasts, both are, practically, the same. (Dr. Hoskins would never make silage if he could keep the rats out of his corn fodder. *Ed.*)

Silage not a perfect food, neither is, as you know, corn-meal. Grain or cake must be added to it to make a balanced ration, as it is poor in nitrogen. It is not fitted for summer-dairying; the money it costs had better be laid out in another way. These are the defects of silage.

On the other hand, silage is a healthy