

state, and there the carbon evaporated and altogether disappeared; but leaves the porous substance in question. It will be natural for the inquiring mind to ask, what are these ashes composed of; in answer to this, I will state, that their base, is of the mineral kingdom; they consist of lime and potass, the basis of the former is calcium, and the latter potassium. These metals were discovered by Sir Humphrey Davy 35 years ago, by the aid of a powerful galvanic battery, he subjected each of these materials to its powerful decomposing influence, and from each he obtained a white metal in colour and lustre, similar to that of silver; but having a stronger affinity for oxygen than any other metal we are acquainted with, it attracted that substance from the atmosphere, and became lime and potass as before. This substance as we have seen, forms a very material constituent of the vegetable kingdom, and any vegetable of which this forms a part cannot be produced in its absence, no more than a stone or brick house can be built, without mortar or cement; and this undoubtedly is the case in the absence of any substance which we have seen that the vegetables are composed of.

We have now decomposed the vegetable and shown what its constituents are. We will now endeavour to show, how nature constructs a plant or stalk of wheat; and from where and how it obtains the materials for its construction.

When the seed of wheat is committed to the soil in the usual way, the water therein is absorbed by it, and causes it to germinate, or in other words to acquire vegetable life; it sends down its roots to the earth to obtain its necessary food; and it sends upwards its blade to inhale the atmosphere, that portion of its nutriment which is proper to be drawn from that element. The whole thus far is produced from the substance in the seed; hence one of the reasons why seed should be of a superior quality. Here we may notice, the great similarity between animals and vegetables, in the first dawn of their existence; we see the various classes of the mammalia tribe of animals, all nourish their young by the milk drawn from the teat of the mother, until they have maturity and strength, sufficient to provide for themselves; similar to this is the parent seed of wheat or other grain, if of good quality it contains sufficient quantity, of all the constituents, necessary to construct both root and leaf: then it is possessed, of the organs necessary to extract from the atmosphere with its leaf or blade, and from the earth with its roots, all the materials necessary for its construction.

You will easily see the great necessity, that the farmer should know all these articles; he requires also to know if these are in the soil where the seed is sown. Carbonic acid, as we have seen, forms a large portion of the whole plant; the skeleton of the stock is composed of it, and it also enters largely into the other parts. The next question is from where, or from what it is obtained. Leibig, one of the most popular writers on Agricultural Chemistry in Europe, informs us that the atmosphere contains only a thousandth part of carbonic acid: yet small as this quantity appears, it is quite sufficient to supply the whole of the present generation of living beings, with carbon for a thousand years; even if it were not renewed. The plants as shewn by this author, have the power of extracting this substance from the atmosphere by their leaves; and the decomposition of vegetable substance produces it and it is imbibed by the water, is taken up by the tubes of the roots, and conveyed to every part of the plant. But while this is going on, all the other ingredients are taking their place, in a similar manner. Water is composed of hydrogen and oxygen; these are also components of the plants. You all know that animals, both of the human and inferior classes, will digest or change the food taken

into their stomachs, for the nourishment of the body; this the chemical laboratory, which nature has given to the animal, each constituted suitable to prepare the various kinds of food, which the different kinds of animals consume. In like manner the plant is formed with apparatus, to analyse substances which contain its food. The water, as before said, contains two of the constituents in question, viz. hydrogen and oxygen. These substances taken up through the roots and analysed by the chemical power of the plant oxygen and hydrogen is produced, which enters its composition. Nitrogen is furnished in two ways; it is present in the form of carbonate of ammonia in rain water, and is absorbed by the plant, through this medium. Here we may readily account for the vivid colours, and beautiful lustre, of the fields in summer, when a shower of rain succeeds a long drought; the plant at this time must surely be much revived, as it is now partaking of a repast, composed of all its constituents, which the previous drought had in part deprived it of. The oxygen, hydrogen and nitrogen, as we have seen, is produced by rain water, this water after falling to the ground solved the carbonic acid and the salts of the ashes which were in the soil; these were taken up by the roots, and hence the splendid revival and beauty of vegetation when a summer shower succeeds a protracted drought. I have said that nitrogen is produced from two sources—only one of which I have yet described. It is contained, in the excrements of animals and the human body, in proportion as they have consumed more animal or vegetables that contain this substance. There is also a much greater portion in the urine, than the excrements, it exists in the composition of urine in the form of carbonate of ammonia, or salamoniac; its presence is easily detected, by the pungent smell which it produces. It is also produced by the decay of animals of every description. These are some of the sources from which it is obtained. It enters largely into the grain of wheat in the form of gluten, this substance is composed of nitrogen; and enters into the composition of all grain that produces bread stuff. Wheat contains from 15 to 20 per cent of it. Barley 10, and oats 5. The reason that wheat is superior to any other for bread is that it contains a larger portion of gluten. It is also a constituent of the animal structure, and of course enters into its composition.

At some future period, I intend to treat on manures, that is to say, Black mud, Lime, Barn Manure, Powderate, Urate, as well as the mineral salts which enter into the composition of vegetables.

MR. WADSWORTH'S ADDRESS.

Before the New-York State Agricultural Society, Jan. 18, 1813.

GENTLEMEN:—In complying with the request of the Executive Committee of the Society, to address you upon its progress and prospects, I find the embarrassment, which, under any circumstances would on my part attend the performance of this duty, greatly enhanced by the recollection that the task which now devolves upon me, was, on the occasion of our recent annual Fair, so happily and eloquently performed by the late distinguished chief magistrate of our state. I cannot but regard that event as one of the auspicious incidents in the history of our society. I trust that the appeal which we then listened to in behalf of the dignity and utility of our avocation, breathing as it did throughout, a high patriotism, and a deep solicitude for the objects which this society is intended to promote, was not lost upon any who had the happiness to hear it. I believe that few of us left the capital on that occasion, without a higher sense of the importance of self cultivation as well as agricultural progress, and a renewed determination to improve not only the firm but the farmer.

The annual Fair of the Society, was indeed, in all its main incidents, deemed by its friends eminently successful. The large collection of those animals, the domestication of which seems so intimately connected with the prosperity of the human race, marked the progress of agricultural improvement, and the great con-