CHAPTER V.

Of the Constituents of Plants.

With the aid of the "illustrations" accompanying this report, I have in the preceding chapters presented such an outline as will, I hope, assist in some degree in advancing our knowledge of the geology of this State.

The principal object in this has been to indicate the means by which soils have been, and continue to be formed, and supplied with the mineral or inorganic elements necessary to the growth of plants.

We have next to investigate the sources and characters of the matters of which plants are composed.

1. The organic elements of plants are the following, viz:

CARBON,	OXYGEN,
NITROGEN,	HYDROGEN.

All of which exist in the atmosphere.

The condition in which they occur is as follows:

1. *Atmospheric air, composed of nitrogen and oxygen.*
2. *Carbonic acid, composed of carbon and oxygen.*
3. *Ammonia, composed of nitrogen and hydrogen.*
4. *Nitric acid, composed of nitrogen and oxygen.*
5. *Sulphuretted hydrogen.*
6. *Carburetted hydrogen.*

The five last named constitute less than 1 per cent. of the air, but yet there is sufficient of carbonic acid, ammonia, and nitric acid, to supply the carbon and nitrogen essential to the vegetable kingdom.

7. *Water*, composed of oxygen and hydrogen, exists in the soil, and as a vapor in the air in variable quantities.

Of the four primary elements above named, with the aid of small proportions of mineral matters, is constituted the whole of what is called the *vegetable kingdom.*

The first plants that grew derived them wholly from the atmosphere, and although it will ever continue to be the principal source, yet a large proportion is furnished by the remains of vegetable and animal matters in the soil.

It is believed that the carbon of plants is wholly obtained from carbonic acid absorbed by their leaves and roots, and the nitrogen mainly from ammonia.

The following table gives the average proportion of carbon and nitrogen in one hundred parts of the crops therein named, and also the quantity of ammonia equivalent to the nitrogen they contain. The plants being dried at 212°.