For the Colonial Farmer.

ELEMENTS OF AGRICULTURAL CHEMISTRY AND GEOLOGY.

COMPOUNDS OF INORGANIC ELEMENTS.

[Continued from Number 18.]

5.—*Ammonia.*—With the exception of atmospheric air, the substances which we have hitherto noticed can furnish no nitrogen to plants; this they in great part derive from the compound now to be considered. Ammonia is a compound of nitrogen and hydrogen (N. H. 3.) Though composed of two gasses destitute of taste and smell, and itself a gaseous substance, it has a burning taste and pungent smell. Anomia is absorbed by water to the amout of 670 times its own bulk; when thus dissolved in water, it constitutes the common spirit of hartshorn, whose taste and smell are those of the Ammonia which it contains. It also combines with acids forming salts; the most common of which are, Sal Ammoniac, which is a cumbination of Ammonia with Muratic Acid, and Smelling Salts, in which it is combined with Carbonic Acid. The properties of Ammonia which, are of most consequence to vegetation are,

1st.—Its being produced in the decay of all animal and many vegetable substances. The strong smell of stables and urine, and other animal matters in a putrid state, is principally owing to the escape of carbonate of ammonia; hence the wastefullness of allowing rich manures to remain exposed to the air, until this valuable ingredient becomes almost entirely dissipated.

2.—Its great soulubility in water. The Ammonia which the careless farmer allows to escape from his stable and dung heap, is not lost, but only added to the general stock of nutriment for vegetation, Every shower washes from the air a quantity of Ammonia, and to this the rain water owes both its softness and its superior power of nourishing plants, compared with pure water. The moisture of the soil also serves to retain, and convey to the roots of plants, the Ammonia produced by the decay of manures which may be buried in it.

3.—The ease with which it may be decomposed, and separated from other substances, when combined with them. In the former respect, it cannot be doubted that it may, like water, when introduced into the vessels of plants, be readily divided into its constituted elements, and applied to the purposes of nourishment. And of the latter the readiness with which its compounds undergo changes when exposed to the action of other bodies furnishes conclusive evidence. When lime is added to animal manures, a strong smell of carbonate of Ammonia is instantly exhaled, and hence the injurious effect of lime when applied to such substances. When lime is buried in the soil, however, this decomposing power may serve to set free ammonia, in circumstances favourable to its being absorbed by plants.

When common gypsum comes into contact with Carbonate of Ammonia, a *double* decomposition takes place, so that

Carbonate of Ammonia and Sulphate of Lime	are changed into	Sulphate of Ammonia and Carbonate of Lime.

Now Carbonate of Ammonia, as before stated, evaporates rapidly when exposed to the air; whereas the Sulphate of Ammonia is not thus volatile; and the circumstance of a volatile Salt of Ammonia, being thus changed by the agency of gypsum, into one that is fixed, is of great assistance to the Farmer. Thus when gypsum is strewed on the floor of a stable, the Carbonate of Ammonia, which is formed in such places, instead of being permitted to escape into the air becomes converted into the Sulphate, and remains united with the gypsum, every pound of gypsum thus saturated with Ammonia, is able to supply all the Nitrogen required by 12 pounds of wheat. Of all the manures produced on a Farm, urine is undoubtedly the most valuable; but a great part of its utility depends upon the quantity of Nitrogen which it contains, and if it be allowed to dry up alone, much of this escapes as Carbonate of Ammonia, this loss also may be prevented by Gypsum. A part of the influence of Gypsum, when strewed upon fields, may also be explained by this property; for the gypsum lying on the soil, not only *fixes* and prevents from escaping the Ammonia which may rise from the ground, but attracts it from the air; and thus from the very winds that blow over it gathers valuable nourishment for the growing crops.

4.—Ammonia is largely absorbed by various substances. Powdered charcoal absorbs 90 times its bulk of Ammonia, and decayed wood 72 times its bulk; hence these substances when plentifully contained in a soil, are capable of collecting and retaining, for the use of plants, an abundant store of Nitrogen In a manner somewhat similar, burned clay, coal ashes, and the red Oxide of Iron (red ochre) absorb Ammonia from the air. The effects of burned clay as a manure, and the fertility of those bright red soils which are colored by oxide of Iron, are partly to be ascribed to this cause.

By referring to the little table of the composition of wheat oats, &c. formerly given, it will be seen that nitrogen constitutes but a small portion of these and other vegetable substances. From this however we must not conclude that nitrogen is of little importance; all these parts of plants which afford the most valuable articles of food to animals contain nitrogen; and the production of such nutritious substances is the principal object of Agriculture. Thus wheat contains more nitrogen than oats, and these more than potatoes; and the nutritive properties of these three substances, are in proportion to the quantity of nitrogen which they contain; so also, in some degree, are their values in the market. It must always be an object with a Farmer to produce the most nutrative and valuable crops; and since these are the crops which contain the most nitrogen, it must be of importance that he should supply as much as possible of this element to his fields, It is also known, that not only does the quantity of nitrogen vary in different plants, but also that it varies in plants of the same kind, in proportion to the quantity supplied by art. Thus if one half a field of wheat be manured with substances containing ammonia (urine for example) not only will that half bear the most abundant crop, but the wheat which it produces, will be more nourishing, will make better flour and better bread than that of the other half. Nitrogen then being of so great importance, and Ammonia being one of the principal substances, accessible to the farmer which can yield it to plants its utility and the attention which it deserves are evident.

6. *Nitric Acid*—Is a compound of nitrogen and oxygen (N. O. 5) and when dissolved in water is the substance commonly known as aquafortis. It combines with a great number of substances, and it is in these states of combination that it is usually found in Nature; common saltpetre is composed of nitric acid and potash. When applied to plants, nitric acid and its compounds act by supplying nitrogen, and perhaps also oxygen. In some plants, such as tobacco, which contains much nitrate of potash, it remains in an unaltered ferm.

In warm climates, decaying animal matters often produce nitric acid instead of ammonia,—this, however, does not so often occur in temperate regions. In them, however, it may be obtained in a different way. If heaps of earth, mixed with decaying matters, be left for some time exposed to the air, and if the earth be afterwards washed with water, a quantity of nitrate of lime, potash, &c. will