

addition of a little muriatic acid, a very distinct crystallisation of sal-ammoniac was obtained: the crystals had always a brown or yellow colour.

Ammonia may likewise be always be always detected in snow-water. Crystals of sal-ammoniac were obtained by evaporating in a vessel with muriatic acid several pounds of snow, gathered from the surface of the ground in March, when the snow had a depth of ten inches. Ammonia was set free from these crystals by the addition of hydrate of lime. The inferior layers of snow which rested upon the ground contained a quantity decidedly greater than those which formed the surface.

It is worthy of observation that the ammonia contained in rain and snow water possesses an offensive smell of perspiration and animal excrements,—a fact which leaves no doubt respecting its origin.

Häneland has proved that all the springs in Greifswalde, Wick, Eldena, and Kostenhagen, contain carbonate and nitrate of ammonia. Ammoniacal salts have been discovered in many mineral springs in Kissingen and other places. The ammonia of these salts can only arise from the atmosphere.

Any one may satisfy himself of the presence of ammonia in rain by simply adding a little sulphuric or muriatic acid to a quantity of rain-water, and evaporating this nearly to dryness in a clean porcelain basin. The ammonia remains in the residue, in combination with the acid employed; and may be detected either by the addition of a little chloride of platinum, or more simply by a little powdered lime, which separates the ammonia, and thus renders its peculiar pungent smell sensible. The sensation which is perceived upon moistening the hand with rain-water, so different from that produced by pure distilled water, and to which the term *softness* is vulgarly applied, is also due to the carbonate of ammonia contained in the former.

The ammonia which is removed from the atmosphere by rain and other causes, is as constantly replaced by the putrefaction of animal and vegetable matters. A certain portion of that which falls with the rain evaporates again with the water, but another portion is, we suppose, taken up by the roots of plants, and entering into new combinations in the different organs of assimilation, produces albumen, gluten, quinine, morphia, cyanogen, and a number of other compounds containing nitrogen. The chemical characters of ammonia render it capable of entering into such combinations, and of undergoing numerous transformations. We have now only to consider whether it really is taken up in the form of ammonia by the roots of plants, and in that form applied by their organs to the production of the azotised matters contained in them. This question is susceptible of easy solution by well-known facts.

In the year 1831, I was engaged with Dr. Wilbrand, professor of botany in the university of Gießen, in an investigation respecting the quantity of sugar contained in different varieties of maple-trees, which grew upon soils which were not manured. We obtained crystallized sugar from all, by simply evaporating their juices, without the addition of any foreign substance; and we unexpectedly made the observation, that a great quantity of ammonia was emitted from this juice when mixed with lime, and also from the sugar itself during its refinement. The vessels which hung upon the trees in order to collect the juice were watched with greater attention, on account of the suspicion that some evil-disposed person had introduced urine into them, but still a large quantity of ammonia was again found in the form of neutral salts. The juice had no colour, and had no reaction on that of vegetables. Similar observations were made upon the juice of the birch tree; the specimens subjected to experiment were taken from a wood several miles distant from any house, and yet the clarified juice, evaporated with lime, emitted a strong odour of ammonia.

In the manufactories of beet root sugar, many thousand cubic feet of juice are purified with lime, in order to free it from vegetable albumen and gluten, and it is afterwards evaporated for crystallization. Every person who has entered such a manufactory must have been astonished at the great quantity of ammonia which is volatilised along with the steam. This ammonia must be contained in the form of an ammoniacal salt, because the neutral juice possesses the same characters as the solution of such a salt in water; it acquires, namely, an acid reaction during evaporation; in consequence of the neutral salt being converted by loss of ammonia into an acid salt. The free acid which is thus formed is a source of loss to the manufacturers of sugar from beet-root, by changing a part of the sugar into uncrystallizable grape sugar and syrup.

The products of the distillation of flowers, herbs, and roots, with water, and all extracts of plants made for medicinal purposes, contain ammonia. The unripe, transparent, and gelatinous pulp of the almond and peach emit much ammonia when treated with alkalis. (Robiquet.) The juice of the fresh tobacco leaf contains ammoniacal salts. The water which exudes from a cut vine, when evaporated with a few drops of muriatic acid, also yields a gummy deliquescent mass, which evolves much ammonia on the addition of lime. Ammonium exists in every part of plants, in the roots (as in beet root), in the stem (of the maple-tree), and in all blossoms and fruit in an unripe condition.

The juices of the maple and birch contain both sugar and ammonia, and therefore afford all the conditions necessary for the formation of the azotised components of the branches, blossoms, and leaves, as well as of those which contain no azote or nitrogen. In proportion as the development of those parts advances, the ammonia diminishes in quantity, and when they are fully formed, the tree yields no more juice.

The employment of animal manure in the cultivation of grain, and the vegetables which serve for fodder to cattle, is the most convincing proof that the nitrogen of vegetables is derived from ammonia. The quantity of gluten in wheat, rye, and barley, is very different; these kinds of grain, also, even when ripe, contain this compound of nitrogen in very different proportions. Proust found French wheat to contain 12.5 per cent. of gluten; Vogel found that the Bavarian contained 24 per cent.; Davy obtained 19 per cent. from winter, and 24 from summer wheat; from Sicilian 21, and from Barbary wheat 19 per cent. The meal of Alsace wheat contains, according to Boussingault, 17.3 per cent. of gluten; that of wheat grown in the "Jardin des Plantes" 26.7, and that of winter wheat, 3.33 per cent. Such great differences must be owing to some cause, and this we find in the different methods of cultivation. An increase of animal manure gives rise not only to an increase in the number of seeds, but also to a most remarkable difference in the proportion of the substances containing nitrogen, such as the gluten which they contain.

(To be continued.)

NEWS.

THE FRENCH IN AFRICA.—Prince de Joinville still continues his aggressions upon Morocco. The bombardment of Tangiers amounted to but little, as but trifling damage was done, and the city by no means destroyed. There appears to have been more glorying than generalship. The Prince has since attacked Mogador, a small city, which he is said to have destroyed. The attack was made on the 15th August, and the island taken possession of—70 of the French killed and wounded. The inhabitants acted with great bravery. Such is the account—the official report of Prince de Joinville not having been received.

A great battle has also taken place between the French and the Moors on land, at Islay, on the 14th, in which Marshall Bugeaud achieved quite a victory. The English are looking with great uneasiness at these movements, so much so, that the affair at Tahiti has fallen into comparative insignificance.

THE FRENCH AT TAHITI.—The French have made a movement towards meeting the demands of England respecting the outrages committed at Tahiti. Capt Brpat, who has command of the French forces, has dismissed the infamous D'Aubigny, under whose orders the insults to the Queen and Mr. Pritchard were given. Thus there is a prospect that a reparation will be made without a war. France is said to have proposed that Tahiti shall be left an independent power, under the government of Pomare, with English and French consuls. If so, and a proper apology be made, the difficulty will be settled.

The weather in England has been highly favorable to the farmer. The crops are over an average.

Her Majesty and Prince Albert were to embark on the 10th instant for Scotland, on a visit to the Duke of Athol, over whose magnificent estates his Royal Highness will enjoy the sports of the field.

An agent of the Texian Government, while collecting recruits and arms in London, was arrested, and informed that his movements were contrary to law.

It is said that the riots at Philadelphia caused Father Mathew to abandon his Temperance mission to the United States.

MR. O'CONNELL.—The case of O'Connell is now before the