

## CHAPTER XXIII.

### CORROSIVE ACIDS.

#### OXALIC ACID.

THIS substance exists in combination with potash in sorrel, with lime in rhubarb; it is found also in a free state in the chick-pea. It is made by the action of nitric acid on sugar; or upon rice, gum, starch, etc. Chemically, it is composed of one atom of carbonic oxide, and one atom of carbonic acid, making its formula  $C_2O_3$ .

The crystals of oxalic acid are sometimes mistaken for those of Epsom salts. The crystals of the former are distinguished by having a sour taste, and by being clearer and more transparent than those of Epsom salts. The crystals of the latter have a bitter taste.

Oxalic acid is a deadly poison, acting with great rapidity, and causing death in from five minutes to half an hour.

*Tests.*—Chloride of calcium gives a white precipitate of oxalate of lime; sulphate of copper, a bluish-white precipitate of oxalate of copper; and nitrate of silver, a white precipitate of oxalate of silver (*Wood & Bache*).

Oxalic acid, when given in a concentrated form, produces pain in the throat, œsophagus, and stomach. The

vomiting is associated with violent retching. There are rapid prostration, syncope, and death.

If largely diluted, its corrosive action is decreased, and the symptoms are not so violent. There are less pain and vomiting, but stupor and prostration are more distinctly marked. Death may result from paralysis of the heart. Christosin states that the mucous membrane after death has a scalded appearance, that dark-colored spots are found scattered through the whole canal, and that the membrane is entirely destroyed in some parts, leaving the muscular coat bare.

*Treatment.*—Emetics should be given and followed immediately by the antidotes. Lime or magnesia should be administered in large quantities in water. The lime is usually employed in the form of the carbonate (common chalk). If this cannot be had, the ceiling of the room may be scraped with a shovel or other available instrument, and the substance thus obtained given in the manner prescribed. Lime and magnesia form insoluble salts by combining in the stomach with the oxalic acid.

#### SULPHURIC ACID.

There are three varieties of this acid, viz., the anhydrous,  $SO_3$ ; commercial,  $SO_3 + Ho$ ; and the fuming oil of Nordhausin,  $SO_3Ho + SO_3$ .

The commercial sulphuric acid, which is the variety generally employed for medicinal purposes, is made by burning sulphur and nitrate of potash together in a leaden chamber containing water. It is a powerful corrosive poison, destroying organic tissues when brought in contact with them. It has a powerful affinity for water, and its

caustic effect is due to the abstraction of that substance from the tissues. It makes a red stain on black cloth.

*Tests.*—Chloride of barium throws down a white precipitate.

In poisoning from sulphuric acid, the pain is most intense in the mouth, throat, œsophagus, and stomach. There are great pain on pressure, vomiting of black putrid matter, dyspnoea, small, feeble pulse, anxious expression of countenance, cold extremities, restlessness, and sometimes convulsions.

*Treatment.*—The poison may be neutralized by magnesia, or carbonate of soda, administered in solution, thick soap-suds, and mucilaginous drinks. Unless these remedies can be given directly after the poison has been swallowed, there is little chance of saving the life of the patient.

#### NITRIC ACID.

Nitric acid is made by the action of sulphuric acid on nitrate of potash. It is a powerful corrosive poison. In medicine it is employed as a tonic, astringent, and antispasmodic. The vapor of nitric acid is reputed a good disinfectant. Inhaling the vapor in a concentrated form has produced death. One to two drachms of the liquid have been known to destroy life.

*Tests.*—A solution of morphia added to nitric acid gives a red color, which afterward changes to a yellow. If the acid is boiled in water containing copper filings, red fumes of nitrous acid are given off. When applied to clothing it gives a yellow stain.

The symptoms of poisoning are violent pain, extending

from the mouth to the epigastrium, vomiting of yellowish and greenish-black material, and the emission of fetid gas, tympanitis, urgent dyspnoea, small, rapid pulse, and collapse. Constipation is usually present. The enamel of the teeth will be found partially destroyed; the tongue, throat, and fauces, of a yellowish-brown color, and very much swollen.

If poisoning have resulted from inhalations of the vapor, there will be great pain, difficulty in respiration, and the patient may die asphyxiated from effusion under and into the mucous membrane of the larynx.

After death, the mucous membrane of all parts of the alimentary canal which came in contact with the poison is deeply corroded; in some parts there are yellowish-brown stains, in other parts extensive redness. The mucous membrane is readily broken down; in many cases there is congestion of the lungs and larynx.

*Treatment.*—Magnesia, olive-oil, and mucilaginous drinks, should be given in large quantities.

#### MURIATIC ACID.

This acid is made by the action of sulphuric acid on chloride of sodium. It is sometimes called *spirit of salt*. Cases of poisoning by it are rare.

*Tests.*—If the acid is boiled with black oxide of manganese, chlorine is evolved, which is recognized by its odor and its bleaching properties. If a rod is dipped in the acid and held near ammonia, a white vapor of the hydrochlorate of ammonia is formed. Nitrate of silver throws down a white precipitate of chloride of silver.

The symptoms following large doses resemble those

produced by the other corrosive acids. They are, however, developed more slowly; life is not so soon destroyed, and white vapors may be emitted from the mouth.

#### CARBOLIC ACID,

Sometimes called oxide of phenyl, or phenylic acid, is much employed at the present day as a disinfectant. It is obtained by the distillation of coal-tar. Very few cases of poisoning by it have yet occurred.

A concentrated solution taken internally excites violent gastro-enteritis, and destroys life in a few hours.

After death, the mucous membrane of the throat and stomach is intensely congested, and in small sections softened and corroded.

The treatment consists in evacuating the stomach, and giving large quantities of magnesia, mucilaginous drinks, etc.

## CHAPTER XXIV.

### CORROSIVE ALKALIES.

#### SALTS OF POTASH.

CARBONATE of potash (pearlash) acts as a corrosive poison when administered in a concentrated form. It gives a yellowish-white precipitate with nitrate of silver. The symptoms following its administration are intense pain in the throat and stomach, pain on pressure over the abdomen, vomiting of dark materials, which consist of mucus, blood, and shreds of the lining membrane. Diarrhœa occurs in all cases. On examination, the mouth and throat are found of a dark-red color, and very much swollen. This condition seriously interferes with deglutition. The pulse is small, rapid, and weak, and the countenance anxious.

After death the mucous membrane of the throat and stomach is of a dark-brown color, softened, and in some portions destroyed.

*Treatment.*—Taylor advises the use of citric or acetic acid, lemon or orange juice. Oil in large quantities, and mucilaginous drinks, are efficient remedies.

*Hydrated oxide of potassium*, or caustic potash, is distinguished from the carbonate by giving a brown precipitate with nitrate of silver.

The symptoms produced by poisoning with this drug are

similar to those which occur after administration of the carbonate, and a like treatment is necessary.

Binoxalate of potash, sometimes called essential salt of lemon, is an active poison, resembling oxalic acid in its effects on the system. It is sometimes mistaken for cream of tartar. The latter, however, is not precipitated from its solution by the sulphate of lime, while the former is. Ink-stains are removed by the binoxalate, which furnishes another distinguishing point.

The symptoms of poisoning are violent vomiting and purging, pain in the stomach, difficult deglutition, and sighing respiration, small, rapid pulse, cold extremities, great prostration, and muscular spasms.

*Treatment* consists in the administration of lime, magnesia, and mucilaginous drinks.

#### NITRATE OF POTASH,

Usually known as *saltpetre*, is employed medicinally as an antiseptic, diuretic, refrigerant, diaphoretic, and sedative. In doses of from three drachms to an ounce it acts as a corrosive poison.

In these doses it causes vomiting and purging of blood and mucus, violent pain in the abdomen; there are feeble pulse, rapid prostration, insensibility, and death.

*Treatment*.—The stomach should be emptied by emetics, and mucilaginous drinks should be freely administered; opium should be given to relieve pain.

There is no antidote for the poison. The salts of soda correspond with the salts of potash in their peculiar poisonous action, and in the treatment.

#### AMMONIA.

Strong solutions of ammonia, carbonate and muriate of ammonia, act as corrosive poisons. The vapor of ammonia, when inhaled in large quantities, excites inflammation of the mouth, fauces, and air-passages, and may produce asphyxia. Solutions of the carbonate (*sal-volatile*), or of gaseous ammonia, produce violent inflammation in the œsophagus and stomach, and corrode the mucous membrane. The carbonate is said to be more violent in its action than the other preparations.

These substances are recognized by their peculiar penetrating odor.

The symptoms of poisoning are nausea, and vomiting of mucus, mixed with blood and shreds of mucous membrane, pain in the throat and epigastrium. Perforations of the stomach sometimes take place, and are followed by peritonitis. There is great difficulty in swallowing and breathing. The mouth is tender and swollen, the face is anxious, the pulse rapid and feeble, and the extremities cold.

After death the blood is found more fluid than in other cases of poisoning; there are extravasations of blood in the stomach and intestines, and congestion, softening, and erosion of the mucous membrane.

*Treatment*.—Vinegar, acetic acid, diluted milk, and mucilaginous drinks, are usually given; opium is necessary to relieve pain.