

It has been used successfully against Morphine and Strychnine salts and Phosphorus in the stomach, and locally for snake-poison.

Soap, as Castile Soap, dissolved in 4 times its bulk of hot water, to make "suds," and given by the cupful, is one of the most efficient antidotes against corrosive acids and metallic salts, especially Corrosive Sublimate, Potassium Dichromate, and Salts of Tin and Zinc. It is inferior to albumin against these, but is preferred to caustic alkalies against acids, as of itself it has no corrosive action. It should not be used against alkalies.

Sodium Chloride (Common Salt), in dilute solution, is the best antidote against the Silver salts, converting them into the insoluble chloride of silver. It may be given with albumin, which is also a very efficient antidote in this form of poisoning.

Sodium Thiosulphate in doses of 15 grains, in very dilute solution and frequently repeated, is a valuable antidote against Bleaching Powder (Calcium Hypochlorite), Labarraque's solution (Sodium Hypochlorite), and Javelle Water (Potassium Hypochlorite), which it reduces to chlorides, itself undergoing oxidation to the sulphate.

Starch, in paste, 1 to 15 of water, is the antidote for Iodine and Bromine, with which it forms compounds which are almost harmless. It has some value against Corrosive Acids, Corrosive Sublimate, and Zinc and Copper Sulphates, but it is not so efficient as Albumin, which is preferred for these poisons as well as for Iodine, since it has a greater affinity than starch has therefor.

Stomach Pump and **Stomach Siphon** are efficient, and do not weaken the patient as emetics do, but they are not always available, and cannot be used when there is corrosion of the stomach or esophagus, for fear of perforation. Washing of the stomach at regular intervals is a measure of great importance in the case of soluble poisons, some of which are excreted into the stomach [see *infra* under OPIUM]. These appliances are almost useless when the poison is in solid form and in large pieces (as meat, sausage, fish, cheese).

Sulphates of Magnesium and Sodium (Epsom and Glauber's salts), the soluble sulphates, are particularly efficient against Phenol and the salts of Barium and Lead.

Tannin (Tannic Acid), precipitates the Alkaloids and their salts, with which it forms compounds (tannates), which, though comparatively insoluble are not entirely inactive, and should be removed at once from the alimentary canal by emetics and drastic purgatives. It acts well against many metallic salts, though inferior to albumin for these, except against Tartar Emetic, which albumin does not affect, but tannin renders harmless. It is given in doses of gr. xv to xlv, in a 2 per cent. solution, every ½ hour; and if combined with about 10 per cent. of its weight of Iodine its antidotal effect on vegetable poisons is greatly increased. If not itself obtainable, decoctions or infusions of substances containing it may be used, as tea and coffee, nut-galls, kino, rhatany, catechu, and the barks of oak, willow and cinchona.

Turpentine, after long exposure to the air, therefore containing much oxygen is one of the antidotes against Phosphorus. It should be administered immediately after the ingestion of that poison, alone or in hot water, and in quantity 100 times that of the phosphorus supposed to be present.

Antidote Bag, designed by Martindale, of London, contains the following-named articles, labeled with directions for use, viz.—

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| Dialyzed Iron. | Spt. Ammonia Aromat. | Amyl Nitrite. |
| Syrup of Chloral. | Oil of Turpentine. | Zinc Sulphate. |
| Chloroform. | Acetic Acid. | Ipecacuanha. |
| Spt. Chloroformi. | Tincture of Digitalis. | Potassium Bromide. |
| Magnesia. | Tannic Acid. | Potassium Permanganate. |

Also a Hypodermic Syringe and Solutions or Pellets therefor of—

| | | |
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| Morphine Sulphate. | Apomorphine Hydrochloride. | Pilocarpine Nitrate. |
| Atropine Sulphate. | | Strychnine Nitrate. |

General Antidotes have been devised for use when the nature of a poison is unknown, with the object of a "shot-gun prescription," intended to hit something. One of the best is *Jeannel's*, composed as follows,—Liquor Ferri Sulphatis (sp. gr 1.45) ℥ijss, Magnesium Oxide ℥ij, Carbo Animalis ℥j, Aqua ℥xx. These ingredients should be kept separate—the solution of the sulphate in one vessel, the others together. When needed, the former should be added to the latter and violently agitated. Dose, ℥jss to ℥iij. This is a perfect antidote for Arsenic, Zinc, and Digitalin. It delays the action of the salts of Copper, Morphine and Strychnine, and slightly influences compounds of Mercury. It is valueless for Cyanide of Mercury, Tartar Emetic, Hydrocyanic Acid, Phosphorus, or the caustic Alkalies. *Boucharde's Antidote* is described on a previous page, under IODINE. *Bellini* considers the Iodide of Starch a valuable antidote to alkaline Sulphides, earthy Sulphides, vegetable and caustic Alkalies, and Ammonia. In the first two cases he considers it superior to all other antidotes.

A fresh mixture of the Sulphides of Iron and Sodium with Magnesia, is said to be a perfect antidote for Copper salts, Corrosive Sublimate and Mercuric Cyanide. If the nature of the poison is entirely unknown, a harmless yet effectual antidote in most cases is one composed of equal parts of Magnesia, Wood Charcoal, and the Ferric Hydroxide, given freely in plenty of water.

Poisoning by

Acetanilide. ANTAGONISTS,—*Belladonna* or *Atropine*, to maintain the blood-pressure; *Strychnine*, for the respiration; *Oxygen* inhalations, to overcome cyanosis; *Heat*, externally applied. Stimulants and supporting measures. Death has occurred from a dose of 5 grains.

Acid, Acetic. ANTIDOTES,—*Magnesia* or Magnesium Carbonate, freely; Soap and water, Lime-water, Chalk, White-wash; also milk, oils and thick gruel may be given. ANTAGONISTS,—*Morphine*, gr. ½, to ward off shock.

Acid, Carbolic (Phenol). If the case is seen shortly after the ingestion of the poison *Apomorphine* may be administered hypodermically as an emetic; in any case the stomach should be washed out freely with alcohol and water. ANTIDOTES,—*Alcohol*, is a perfect antidote to the corrosive effects of phenol (Phelps). The routine practice in one emergency hospital is to wash out the stomach with alcohol and water, equal parts of each, and then to leave in the stomach about ℥viiij or ℥xx of the same mixture. This treatment has proved very efficient in a number of cases. Next in value is any soluble *Sulphate* to form the harmless phenolsulphonates; as Magnesium Sulphate ℥j or Sodium Sulphate ℥ss, dissolved in half a pint of water. Even if several hours have elapsed since the ingestion of the poison this treatment should be employed, as the antidotal action of the sulphates proceeds in the blood. In one case ℥ss of the 95 per cent. phenol was taken, and nearly ℥iij of Magnesium Sulphate was used, resulting in complete recovery from an apparently hopeless condition. *Liquor Calcis Saccharatus* is antidotal in the stomach, but is much less efficient than the sulphates. *Vinegar*, especially that made from cider, is antidotal, both locally and internally (Ames). *Soap* in strong watery mixture (suds) is said to have acted perfectly as an antidote in the stomach. *Oils* are contraindicated, as they promote the absorption of the poison. *Vegetable Demulcents* (but no oils or glycerin), to protect the mucous surface. *Sodium Carbonate*, in strong solution locally, for the effects of its local use in excess; this also as a wash for the mouth, if necessary. ANTAGONISTS,—*Atropine* is a very complete antagonist to the systemic symptoms, maintaining the heart and respiration until elimination occurs: gr. ½ hypodermically. *Amyl Nitrite*, by inhalation, *Alcoholic* stimulants freely. *Heat* to the extremities, also Faradism and friction thereof. *Venesection* in desperate cases (Murrell).

Acid, Carbonic (Carbon Dioxide). See under Illuminating Gas, below, for the treatment of poisoning by Carbonic Acid and Carbonic Oxide gases.

Acid, Hydrocyanic (Prussic). Forty minims of the official diluted acid have proved a fatal dose. ANTIDOTES,—if time to do anything, *Cobaltous Nitrate* has proved

a perfect antidote in over 40 cases (Antal). *Ammonia*, diluted, by inhalation, or *Chlorine Water* by spray, for the vapor. Per- and Proto-salts of Iron with Magnesia. Calcium or Sodium Chloride, gr. xxx-xl, in water. *Sodium Thiosulphate* is said to be an efficient antidote. Emetics or the stomach-pump. ANTAGONISTS,—*Stimulants*, as Brandy, Chloric Ether, *Ammonia*, ad libitum. Alternate hot and cold Douche, from a height. *Artificial Respiration*, the faradic current (mild) to chest walls and over cardiac region. *Atropine*, has antagonistic action, but is too slowly diffused to be of any value. *Ammonia* by inhalation, by the stomach, and by intra-venous injection, with cold affusion to the spine, and artificial respiration, are the measures most likely to avail in cases where there is time to do anything.

Acid, Oxalic, also the Acid Oxalates, as Potassium Oxalate, known as "Salts of Lemon," or of "Sorrel," used for removing ink-stains. ANTIDOTES,—*Calcium Carbonate* or *Hydroxide* (as lime-water, chalk, whiting, wall-plaster, in water), or Magnesia. Avoid Potassium and Sodium Carbonates and Bicarbonates. Bland mucilaginous drinks and poultices to the abdomen.

Acids. ANTIDOTES,—*Alkalies* for the least irritant acids, *Magnesia*, Magnesium Oxide, slaked Lime, Chalk; plaster from wall with water, milk, oil, white of egg, bland mucilaginous drinks and poultices (R). ANTAGONISTS,—See under Acids, Mineral, below.

Acids, Mineral. ANTIDOTES,—*Alkalies*, as Sodium Carbonate or Bicarbonate, Magnesia, or Chalk, Soap, Whiting, Wall-plaster, in water. *Albumin*, Flour, Milk, Starch, Olive Oil, to protect the mucous membrane. Avoid water in Sulphuric Acid cases. ANTAGONISTS,—*Opium*, *Ammonia* (intra-venously), Alcohol, as stimulants, to combat the depression of the vital powers.

Aconite. ANTIDOTES,—*Tannic Acid*, or Animal Charcoal, powdered, in water. Emetics or the stomach-pump. Castor Oil, or other purgatives. Bland fluids, and poultices for abdominal irritation. ANTAGONISTS,—*Atropine*, Caffeine, Morphine, Ether, *Ammonia*, Amyl Nitrite, antagonize its effects on the heart and respiration. *Atropine* seems to be the antagonist from which most good is to be expected (Cushny). *Digitalis* antagonizes its action on the heart and its relaxation of cardiac inhibition (Fothergill). In Aconite-poisoning the stomach should be evacuated, warmth applied to the extremities, stimulants administered, artificial respiration if necessary, and the recumbent posture strictly maintained. *Caffeine* may be administered hypodermically, and strong Coffee by the mouth.

Alcohol. ANTIDOTES,—*Emetics* or the stomach-pump, if much alcohol recently swallowed. ANTAGONISTS,—*Caffeine* is powerfully antagonistic in doses of gr. j-ij every hour to 3 hours (Hall). *Hydrated Chloral* in dose of 30 grains repeated in 2 hours if necessary, is very efficient to secure sleep, or 30 grains each of Chloral and *Potassium Bromide* for the same purpose. Chloral is said to be dangerous to the heart in old alcoholics, but the experience of physicians of inebriate asylums does not corroborate this statement. Nutritious, digestible diet in liquid form and small quantity frequently repeated, is an essential feature of the treatment. *Ammonium Chloride*, ʒss in ½ pint of water at one draught, or the *Liquor Ammonii Acetatis*, in doses of ʒj, are said to have marvellous power in straightening up a drunken subject, restoring the faculties, and antagonizing stupor. *Ammonia* by inhalation cautiously. Cold affusion to the head. Warmth to the extremities. Faradism of the muscles of respiration. Artificial Respiration. [Compare the articles on Alcoholism and Delirium Tremens.]

Alkalies. ANTIDOTES,—*Acids*, diluted, especially the vegetable acids, as Vinegar, Lemon-juice, etc. *Albumin*, Milk Gelatin. *Oils* to protect the mucous surfaces. [Compare *Ammonia* below.] ANTAGONISTS,—*Opium* for the shock and vital depression; also Caffeine, Alcohol, and other stimulants.

Alkaloids. ANTIDOTES,—*Tannin* holds high rank, forming tannates, which are comparatively insoluble. *Potassium Permanganate* is capable of destroying many and probably all alkaloids, acting rapidly on morphine and cocaine, slowly on strychnine

(W). *Albumin* to form albuminates. Iodine. Charcoal. Emetics and cathartics afterwards. ANTAGONISTS,—differ for each. [See their several titles in this section.]

Alum. ANTIDOTES,—*Carbonates* of Ammonium, Potassium, etc. Other treatment as for corrosive salts. [See Metallic Salts, in this section.]

Ammonia. *Sources of Danger*, the use of Smelling Salts or Spirit of Hartshorn in excess, and the strong solution of *Ammonia* kept by housekeepers for laundry purposes. ANTIDOTES,—Vinegar, Lemon- or Orange-juice, any *Vegetable Acid*, followed by demulcents to protect the mucous surfaces. When inhaled, give vapor of *Acetic* or *Hydrochloric Acid* or Chlorine-water by inhalation, the two latter forming the chloride. ANTAGONISTS,—*Aconite*, *Veratrum*, *Digitalis*, as cardiac sedatives.

Amyl Nitrite. ANTAGONISTS,—*Ergotin*, *Atropine*, *Strychnine*, also Brucine, *Digitalis*, *Picrotoxin*, and all other agents which increase the functional activity of the spinal cord and sympathetic, are antagonistic, though not always available by reason of their slower rate of diffusion. *Stimulants*, artificial respiration, the alternate cold and hot douche, with cold to the head, and *Ergotin* or *Atropine* hypodermically, are the best measures to be used in cases of poisoning by the Nitrites.

Anesthetics (Ether, Chloroform, etc., by inhalation). ANTAGONISTS,—*Atropine*, hypodermically, is of great value in combating the cardiac and respiratory failure of ether (Amidon); and is equally efficient in chloroform poisoning, as I have found by experience (Potter). *Strychnine*, hypodermically, has done good service in chloroform narcosis and has many advocates; it is the most valuable antagonist in chloroform poisoning (Vance). *Oxygen* by inhalation is the best antagonist to chloroform (Sayre). In danger from Chloroform inhalation prompt measures must be taken. The tongue should be pulled out with forceps and kept out. The doors and windows should be thrown open so as to produce a current of fresh air, but care must be taken that the body is not cooled thereby. The face and chest should be slapped with a wet towel, and *Artificial Respiration* should be commenced at once and kept up for some time, not faster than 20 to the minute. A succession of quick, sharp blows on the chest, over the cardiac region, will sometimes provoke the heart to renewed action after it has apparently failed. *Venesection* is wrongly neglected in such cases; it relieves the right cardiac engorgement; supplemented by *Galvanism* to stimulate the heart into action (Sponner). *Amyl Nitrite* by inhalation, has been used, but is dangerous as it lowers the blood pressure and depresses the heart and respiration (Vance). *Adrenalin* hypodermically for the vaso-motor paralysis (Takamine). *Faradism* of the muscles of respiration. *Heat* to the body and limbs, *Ice* in the rectum. *Ammonia*, 10 minims of the Aqua in 40 of water, intravenously,—unsuccessful (Bartholow). Invert the patient, draw the tongue well forward with forceps, compress and relax the chest, maintain the inverted position until the pulse and respiration are good (Nélaton). [Compare the article on Anesthesia.]

Antimony (Tartar Emetic, etc.). ANTIDOTES,—*Tannin*, or any substance containing it, is the antidote, forming the insoluble tannate. *Albumin* or Milk. *Carbonates* of Magnesium and Sodium. *Magnesia*, in milk, especially for the chloride of antimony. *Alkalies* and Salts of Lead decompose tartar emetic. Emesis by tickling the fauces. Demulcent drinks freely, to protect the mucous membranes. Water, warm, in large draughts; or lavage of the stomach with water first, then with a solution of Tannin. ANTAGONISTS,—*Opium*, Alcohol, Ether, and other antispasmodics.

Antipyrine. See under Acetanilide, for the treatment of poisoning by Antipyrine, Acetphenetidin, Kairin, and similar compounds.

Arsenic (Arsenic Trioxide). Two grains have been fatal. *Common Sources of Danger*: arsenical wall-papers, Arsenic mistaken for "salts" or for "magnesia," adulterated confectionery, also Paris Green (Cupric Aceto-Arsenite) taken with suicidal intent. ANTIDOTES,—*Ferric Hydroxide*, freshly prepared by precipitating a solution of Ferric Chloride with Sodium Carbonate or *Ammonia*,—or the official *Ferri Hydroxidum cum Magnesii Oxido*, in the proportion of gr. viij for each grain of the poison. *Dialyzed Iron*, is quite efficient as an antidote, is more easily obtained than the hydrated

oxide, and has rendered good service in many cases of poisoning from inhaling arsenical fumes. *Ferri Subcarbonas* is equally good, ℥ij followed by Castor Oil (Leale); or Hydrated Magnesia, or Magnesia and Sugar (Carl). *Magnesium Bicarbonate* or other alkalies (R). *Charcoal*, ℥ss or more (R). Saccharated Ferric Oxide. Basic Ferric Acetate. *Apomorphine*, hypodermically, or Zinc Sulphate, as an emetic (avoid tartar emetic). Emesis by feather-tickling. Oil and Lime-water mixed, before and after emesis (Taylor). Milk or other bland fluids to wash stomach. Castor Oil after emesis. Magnesia and Linseed tea. Poultices and fomentations over abdomen. *Potassium Iodide* afterwards to promote elimination. ANTAGONISTS,—None.

Barium Salts. ANTIDOTES,—*Sulphate* of Magnesium or Sodium (Epsom and Glauber's salts), of Calcium or Potassium. Diluted Sulphuric Acid.

Bee and Insect Venom. ANTIDOTES,—*Aqua Ammonia*, Sodium Bicarbonate or Chloride, or pure Phenol, applied to the wound; or ℥xv of a 2 per cent. solution of the first hypodermically, with *Liquor Ammonii Acetatis* internally. [Compare the article on Stings.]

Belladonna and Atropine. ANTIDOTES,—*Tannin*, Zinc Sulphate or Apomorphine, as emetics, or the Stomach-pump. Purgation. *Magnesium Bicarbonate*, and other alkalies (R). *Charcoal*, ℥ss or more is necessary (R). ANTAGONISTS,—*Morphine* is the physiological antagonist to the effects of Atropine on the cerebrum, pupils, heart, respiration, arterial tension and kidneys; *Aconite*, *Physostigmine*, *Pilocarpine* and *Quinine* are each antagonistic to some of its effects, *Muscarine* to most of them. Brandy or strong Coffee. Capsicum. Faradism of respiratory muscles. Flagellation. Cold to the head. *Ammonia*, the vapor inhaled into air-passages (R). Frequent catheterization is important (Kemp). Hypodermoclysis to promote elimination (Id).

Bromides. ANTIDOTES,—*Nitrous Ether* is incompatible with Ammonium Bromide, Acids and Metallic Salts are so with all the bromides. Poisoning thereby is always chronic, never acute, hence antidotes can not be employed. ANTAGONISTS,—*Morphine* is the most efficient, especially for the mental symptoms. *Digitalis*, Ergot, Belladonna, and other vaso-motor stimulants, antagonize many of the effects of the bromides. *Cocaine* is useful in chronic depressant poisoning thereby, and Alcohol with Opium as a nervous stimulant.

Bromine. ANTIDOTES,—*Albumin*, Starch, Gelatin, Sodium and Potassium Carbonates and Bicarbonates. Against the irritant vapor, *Ammonia* vapor by inhalation, or steam inhalations. ANTAGONISTS,—*Opium* and Alcohol as stimulants, if much depression ensues.

Calcium Chloride. ANTIDOTES,—*Albumin*, Mucilaginous drinks, or Oils, Milk Flour and water. Avoid acids. ANTAGONISTS,—*Opium*, Alcohol, for vita depression.

Camphor. ANTIDOTES,—*Water* to precipitate it from the alcoholic solution. *Alkalies* and earthy salts precipitate even the small quantity which is soluble in water. Emetics to remove as much as possible. ANTAGONISTS,—*Aconite* and other arterial sedatives. *Amyl Nitrite* or Nitroglycerin. Alcohol. Coffee. Cold. Opium and Bromides for the convulsions.

Cannabis Indica. ANTIDOTES,—*Emetics* to remove as much as possible. ANTAGONISTS,—*Alcohol*, as stimulant. *Strychnine* as respiratory stimulant. *Faradism* of muscles of respiration. *Lemon-juice* is said to antagonize its effects, which last over 24 hours from a large dose.

Cantharis. Avoid Oils, fats and milk, which promote its absorption. ANTIDOTES,—*Emetics*. Demulcents, as linseed tea, gruel, barley-water, freely. Water in large quantities, to flush the kidneys. Oleaginous injections into the bladder to allay irritation. There is no chemical antidote. ANTAGONISTS,—None, but *Opium* may be given for the gastro-enteritis.

Carbonic Oxide. See under Illuminating-gas, for the treatment of poisoning by Carbonic Oxide and Carbonic Acid gases.

Chloral, Hydrated. ANTIDOTES,—*Liquor Potassii Hydroxidi*, in hourly doses of ℥ij well diluted, which will decompose 20 grains of chloral each time in the blood (Dougall). *Emetics*, or the stomach-pump, if patient is seen shortly after ingestion of the poison. Reliance must be placed on antagonists rather than on antidotes. ANTAGONISTS,—*Strychnine* is the most efficient; in a case in which ℥j of hydrated chloral was taken, recovery occurred after the use of nearly a grain of Strychnine hypodermically in broken doses (Colenso). Heat to the body and limbs is a most efficient antagonist. *Atropine* antagonizes its cardiac, respiratory and spinal depression, and should be used hypodermically, in small doses (gr. $\frac{1}{100}$), frequently repeated, until its effects are apparent. *Morphine* administered with chloral antagonizes its tendency to produce cardiac failure, while synergistic to the hypnotic action of the drug. *Cocaine* is of value for the cardiac and respiratory depression. Alcoholic stimulation. *Amyl Nitrite* by inhalation. Frictions. Coffee, black, a pint injected into the rectum, as for narcotic poisoning. *Artificial respiration*.

Chlorine. ANTIDOTES,—*Albumin* for chlorine preparations in the stomach, also *Aqua Ammonia* in small quantity, well diluted. *Ammonia* vapor, inhaled against chlorine inhalations, forming ammonium chloride. Ammonium Sulphide has similar reaction, but should be used in great moderation. Fresh air. Steam inhalations. Emesis with warm water, then white of egg or milk, flour, or lime-water. ANTAGONISTS,—*Chloroform* by inhalation, to ease the irritant cough.

Chloroform (swallowed). Recovery has occurred after the ingestion of one, two and even three ounces of chloroform (H. C. Wood). ANTIDOTES,—*Sodium Carbonate* in plenty of water. Emetics. Treatment as for irritant poisoning. ANTAGONISTS,—*Atropine* or *Strychnine*, hypodermically. *Adrenalin* hypodermically for the vaso-motor paralysis. *Artificial Respiration* as soon as possible. *Oxygen* or *Amyl Nitrite*, by inhalation. Coffee, black, a pint into the rectum. Heat to the body and especially to the cardiac region. Rouse by slapping with wet towel. Mustard to calves of legs and over the heart. Relapse may occur, hence the patient should not be left for some time after apparent restoration. [Compare Anesthetics in this section.]

Cocaine. ANTIDOTES,—See under Alkaloids. ANTAGONISTS,—*Chloral* is the most direct antagonist, so also are Chloroform and Ether. *Morphine* is directly antagonistic at almost all points of action. *Amyl Nitrite* combats the earliest symptoms of cardiac depression, then *Alcohol* and *Opium* as cardiac stimulants. *Artificial Respiration*, may be required. *Adrenalin* hypodermically, for the vaso-motor paralysis.

Colchicum. ANTIDOTES,—*Tannic* or *Gallic Acid*, followed by emetics and cathartics. Demulcent drinks, warm. ANTAGONISTS,—Alcoholic stimulants. *Morphine*, hypodermically for the cardiac depression. Treatment is the same as that for Aconite poisoning.

Conium. ANTIDOTES,—*Tannic* or *Gallic Acid*, followed by emetics and cathartics. ANTAGONISTS,—*Nux Vomica* and its alkaloids, also *Picrotoxin* and other tetanizers. Alcohol. Muscular Movement. Heat applied externally, as soon as the stomach has been evacuated.

Copper Salts. ANTIDOTES,—*Albumin*, Soap, Gluten, Milk, Sugar, Magnesia. *Potassium Ferrocyanide*, is the most efficient antidote, but Magnesia or Albumin may be used. In the absence of eggs, give a thin paste of flour and water. Any antidote should be followed by prompt evacuation of the stomach, and *Potassium Iodide* to saturation of the system. ANTAGONISTS,—*Opium* and Demulcents for the gastro-enteritis.

Corrosive Sublimate (Corrosive Mercuric Chloride). ANTIDOTES,—Albumin, Gluten, Magnesia, Milk, Lime-water. *Albumin*, in some form, is the most efficient; the white of one egg to each 4 grains of the poison, forms the albuminate, which must be at once evacuated by emesis or the stomach-pump, it being soluble in an excess of albumin, also in the alkaline contents of the intestines. *Potassium Iodide* for after-treatment, converts the poison into soluble combinations and promotes their elimination. *Charcoal*, ℥ss or more necessary (R). *Hydrated Protosulphide of Iron*, if given within

20 minutes, is said to be an efficient antidote. ANTAGONISTS,—See under Mercury. FATAL DOSE,—gr. iij have proved fatal.

Creosote. ANTIDOTES,—*Mucilage*, Oils, are the most easily obtained. ANTAGONISTS,—*Ammonia*, for depression. Treatment is the same as for Phenol, which see under Acid Carbolic, *ante*.

Curare. ANTIDOTES,—Ligate above the wound, if any; incise the part freely and suck it strongly. Evacuation of the bladder repeatedly, to prevent reabsorption. *Causitic Alkalies* destroy the poison. ANTAGONISTS,—*Artificial Respiration* is the most efficient antagonist, maintaining life until elimination occurs. *Strychnine*, though from a member of the same family of plants, is antagonistic as to its action upon the heart and respiration. So also is *Atropine*.

Cyanide of Potassium. ANTIDOTE,—*Ferrous Sulphate* to form Prussian Blue (Ferric Ferrocyanide), followed by evacuation of the stomach. *Ferrous Sulphate* is a theoretical antidote, but is said to be practically worthless. *Cobaltous Nitrate*, is a perfect antidote (Antal). Sodium Thiosulphate. ANTAGONISTS,—*Ammonia*, intravenously. *Digitalin*, *Strychnine*, Alcohol. *Artificial Respiration*, general friction and galvanism. [Compare Acid, Hydrocyanic.]

Digitalis. ANTIDOTE,—*Tannic Acid*, to form the tannate, which, however, is not inert, so that the stomach should be immediately evacuated. ANTAGONISTS,—*Aconite* for the effects of large doses, *Opium* for those due to its continued use. *Saponin* and *Senegin* are its most complete physiological antagonists. Alcohol, Galvanism, Horizontal posture. The treatment is similar to that for *Aconite*.

Ergot. ANTIDOTE,—*Tannic Acid*, followed by an emetic. ANTAGONISTS,—*Amyl Nitrite*, *Aconite*, *Veratrum Viride*, Tobacco and *Lobelia*, antagonize its action on the circulation.

Fish-poison. ANTIDOTES,—Emetics and Cathartics. ANTAGONISTS,—*Potassium Chlorate* freely, *Liquor Ammonii Acetatis*, *Opium*, *Capsicum*, *Chloroform*.

Formaldehyde. *Ammonia* is the antidote, forming Urotropin. Administer the vapor produced by heating a 25 per cent. aqueous solution of ammonia.

Fungi, Poisonous. ANTAGONIST,—*Atropine*, is practically specific as an antagonist in many cases of fungi poisoning. [Compare Muscarine.]

Gamboge. ANTIDOTES,—Potassium or Sodium Carbonates. *Magnesia* in milk. Emetics. Mucilaginous drinks. ANTAGONISTS,—*Opium* for the depression. Alcoholic stimulants.

Gases and Vapors. See *Ammonia*, Acid Hydrocyanic, Chlorine, Illuminating-gas, Nitrous Oxide Gas, Sulphur.

Gelsemium. ANTIDOTE,—*Tannic Acid*, followed by an emetic or the stomach-pump, if recent. ANTAGONISTS,—*Morphine* is the most complete. *Digitalis*, *Ammonia*, Alcohol, *Atropine*, and to some extent the tincture of *Xanthoxylum*, are also antagonistic. Heat externally. Faradization of the respiratory muscles, and *Artificial Respiration* are measures of prime importance. Brandy and *Capsicum* are useful.

Glass (coarse or powdered). ANTIDOTES,—Bread-crumbs freely to envelop it, then emetics.

Gold Salts. ANTIDOTES,—*Ferrous Sulphate*. *Albumin*, as eggs or flour. Mucilage. Emetics. ANTAGONISTS,—*Belladonna* for the salivation, *Hyoscine* for the tremor, *Morphine* for shock. Treatment is the same as for Corrosive Sublimate.

Hyoscyamus. See *Belladonna*.

Hypochlorites, as Javelle Water (Potassium Hypochlorite), Labarraque's Solution (Sodium Hypochlorite), and Bleaching Powder (Calcium Hypochlorite). ANTIDOTE,—*Sodium Thiosulphate*, in dose of gr. xv, well diluted and frequently repeated, reducing them to chlorides, itself undergoing oxidation to the sulphate.

Illuminating-gas. ANTIDOTES,—*Chlorine-water* as spray, inhaled. ANTAGONISTS,—*Oxygen* by inhalation, or *Hydrogen Dioxide* solution internally. *Artificial Respiration* is the chief antagonist, and should be maintained steadily for several hours. *Phlebotomy* and infusion of normal salt solution is most satisfactory treatment (Thompson). *Ammonia* vapor by inhalation. *Galvanism*, the interrupted current to the extremities. Rhythmic traction of the tongue. Fresh air in plenty; open all doors and windows. *Coffee*, black, a pint as enema. *Douche*, alternately cold and warm, to head and chest. Horizontal position, clothing removed. *Alcohol* moderately by mouth or rectum. Catheter may be required in prolonged cases. Subsequently, a warm bed; heat applied to the body and limbs, open windows, perfect quiet, Condy's fluid about the room, stimulants sparingly, cold acid drinks freely.

Iodine. ANTIDOTES,—*Starch*, Albumin, Flour, Gelatin, Sodium and Potassium Carbonates and Bicarbonates. *Starch* is the antidote to free Iodine, but the stomach must be evacuated, as the Iodide of Starch is not inactive. In chronic poisoning by the Iodides, a free salivary flow induced by chewing *Pyrethrum-root* will hasten elimination of the drug. ANTAGONISTS,—*Quinine*, *Digitalis*, and other restorative agents and vaso-motor tonics. *Amyl Nitrite* by inhalation. *Morphine* for pain.

Ipecacuanha. ANTIDOTES,—*Vegetable Acids* and Astringents are incompatible with *Ipecac*, and may be used as antidotes. ANTAGONISTS,—*Bismuth*, Phenol, and Hydrocyanic Acid, also Narcotics, antagonize the emetic action.

Iron Compounds act as simple irritants. ANTIDOTES,—*Magnesia*, Carbonates of Ammonium or Sodium. Mucilaginous drinks. ANTAGONISTS,—*Opium*. Ice. [See also Metallic Salts.]

Lead Salts. ANTIDOTES,—*Sodium* or *Magnesium Sulphate*, Sodium Phosphate, Diluted Sulphuric Acid, Magnesium Bicarbonate, Ferrous Sulphate, freshly precipitated. Albumin, Milk. Emetics or the stomach-pump. *Potassium Iodide*, gr. xv-xxx, 3 or 4 times daily, in cases of chronic poisoning as eliminative (R). The cachexia is much relieved by a combination of Quinine Sulphate, Ferrous Sulphate and Diluted Sulphuric Acid (B). Baths of *Potassa Sulphurata* (3j) or more in the necessary water), are also very useful in chronic poisoning by lead (R). ANTAGONISTS,—*Opium*, to allay irritation. *Belladonna*, the extract, gr. ʒ, with Pulv. Rhei, gr. ij, in pill twice daily, for the great pain at defecation (Da C). *Alum*, is the most efficient remedy for the colic; to a pint of boiling milk add 90 grains of powdered Alum, separate the curd and sweeten with sugar; give a wineglassful every hour or two (B). *Tetranitrin* in ½ grain doses, to reduce the high arterial tension. *Strychnine*, for the paralysis, gives good results; also *Atropine*, gr. ʒ, with Potassium Iodide, gr. v. *Electricity*, a slowly interrupted current until it causes reaction, for the paralysis of extensors (dropped wrist); cure to be completed by the faradic current (B). MARKED DIAGNOSTIC SIGNS of chronic poisoning by Lead are—the dropped wrist, due to paralysis of extensor muscles and a dark, blue line around the margin of gums. [Compare the article on Colic, Lead.]

Lime. See Alkalies.

Lobelia. ANTIDOTES,—*Tannic Acid*, to form the insoluble tannate. *Charcoal*, powdered in water [see under *Aconite*]. ANTAGONISTS,—*Alcohol*, *Digitalis*, *Belladonna*, *Ergot*, the vaso-motor excitants, antagonize its effects on the circulation; *Strychnine*, *Picrotoxin*, and *Thebaine*, antagonize those on the nervous system.

Mercury. [See Corrosive Sublimate, also Metallic Salts]. ANTIDOTES,—*Albumin*, Gluten, Flour, Milk. Vegetable astringents. Hydrated Protosulphide of Iron. *Charcoal*. Alkalies, especially Magnesium Bicarbonate (R). *Potassium Iodide*, to saturation of the system, as after-treatment; converts the metal into soluble combinations (B). Baths, simple or sulphurous (R). ANTAGONISTS,—*Bismuth*, Tannin, Sodium Sulphite, Diluted Nitric Acid in water, as gargles and mouth-washes for salivation. *Belladonna*, ʒv-x of tincture every 4 to 6 hours, to lessen secretion in ptyalism (B). *Hyoscyamine*, for the tremor, gr. ʒ gradually increased to gr. ʒ (Oulmont).

Metallic Salts. ANTIDOTES,—*Albumin*, Milk, Magnesia, Starch, Soap. *Oils* and other demulcents. Sodium or Potassium Carbonate or Bicarbonate. Lavage of stomach. Emetics and cathartics. ANTAGONISTS,—*Opium*, Alcohol, Cocaine and other stimulants, for shock and vital depression.

Mezereum. ANTIDOTES,—*Albumin*, Milk, Oils and Fats, Mucilaginous drinks. ANTAGONISTS,—*Opium*, as stimulant against shock and depression. Poultices, cool, to abdomen.

Morphine. See Opium.

Muscarine. ANTIDOTES,—[see Alkaloids]. ANTAGONISTS,—*Atropine* exactly opposes Muscarine, and vice versa. *Digitalis* is antagonistic to some extent, so also is Physostigmine. There is no example of physiological antagonism so complete in all particulars as that between Atropine and Muscarine.

Mushrooms. ANTIDOTES.—*Emetics*, if poisoning very recent; *Cathartics*, especially Castor Oil, if some time has elapsed. *Tannic Acid*, has been recommended. ANTAGONISTS,—*Atropine*. Alcoholic Stimulants. Poultices, warm, to the abdomen. Compare Muscarine, above.]

Narcotics. See Alkaloids, also Opium, Belladonna, Alcohol, Chloral Hydrated, [Cannabis Indica, Carbolic Acid, Chloroform, Illuminating-gas, Hydrocyanic Acid, etc. *Vegetable Acids* antagonize their after-effects to some extent.

Nitrites. See Amyl Nitrite.

Nitrobenzol. ANTIDOTES,—*Ammonia*, diluted, by inhalation. Emetics. ANTAGONISTS,—*Alcohol*, Aq. Ammoniae (3ss in water), or Chloric Ether (3j in water), frequently repeated, as stimulants, given internally, by enema or hypodermically (brandy). *Atropine*. Artificial Respiration. *Galvanic current*, interrupted, to chest-walls, and over cardiac region. FATAL DOSE,—Death has resulted from merely tasting it.

Nitroglycerin. See Amyl Nitrite.

Nitrous Oxide Gas. ANTAGONISTS,—*Artificial Respiration*, to be commenced at once and kept up for two hours if necessary, not faster than 18 per minute. Fresh air, open all doors and windows, and fan the patient. *Oxygen* by inhalation, 3 or 4 pints. Douche to chest, alternately hot and cold. The tongue should be pulled well forward and the mouth cleared of any obstruction to respiration, as artificial teeth. In apparently hopeless cases, two or three violent blows on the chest, delivered in quick succession, may restore the cardiac action (Murrell).

Nux Vomica and Strychnine. ANTIDOTES,—*Tannic Acid*, forms the very insoluble tannate. *Iodine* in dilute solution, or a soluble salt thereof. *Animal Charcoal*, largely. *Potassium Permanganate*, has been taken in large dose by Dr. Fahr, of Milford, N. J., after having ingested gr. ¼ of Strychnine, resulting in the entire absence of any symptoms of strychnine poisoning. *Lard*, is the antidote, as shown by numerous experiments on dogs and other animals (Turner). *Eucalyptus*, a decoction as a wash for the stomach; has a true antidotal action in frogs (Masmeci). *Emetics* or the stomach-pump should follow the administration of any antidote. The bladder must be frequently evacuated to prevent reabsorption. ANTAGONISTS,—*Quiet*, as perfect as possible, is very important. *Chloral* is the antagonist, gr. xxx as soon as possible, repeated in 20-grain doses at hourly intervals, as long as reflex exaltation continues. *Butyl-chloral Hydrate*, is a very energetic antagonist (Grigorescu). *Potassium Bromide*, is almost too slow of action to be of much practical service. *Chloroform* or Ether inhalation, to procure muscular relaxation. *Physostigma*, is antagonistic (R). *Chamomile Oil*, remarkably subdues reflex excitability in frogs after poisoning by strychnine or brucine (P). *Amyl Nitrite*, by inhalation (R). *Veratrum Viride*, cured a bad case; 3j was given at once, then gtt. ij every ten minutes (R). Ethyl Carbamate. Methyl and Ethyl compounds of Strychnine, and Thebaine. Monobromated Camphor. Ice to spine. Tobacco, by enema. Valerian mitigates the spasms (P). Curare, gr. ¼ hypodermically; is warmly recommended, but its claims are doubtful (P). *Apomorphine*,

hypodermically, to relax the spasm (Howard); is very effective in dogs (Wills). *Nicotine*, many cases prove its antagonistic and curative power (P). *Hydrastinine* in doses of gr. j hypodermically, has been successfully employed. *Artificial Respiration*, if possible. MINIMUM FATAL DOSE OF STRYCHNINE,—gr. ½ for an adult, gr. ⅛ for a child.

Opium and Morphine. ANTIDOTES,—*Tannic Acid*, or vegetable astringents, followed by evacuation of the stomach, if the poison has been taken by the mouth. *Charcoal*, 3ss or more (R). *Apomorphine*, as emetic, gr. ⅛ to ¼ hypodermically; must be administered before narcosis sets in (B). Stomach-pump better than emetics, which by the mouth are generally useless in these cases. *Potassium Permanganate*, an efficient antidote if given soon after ingestion of the poison. Compound Tincture of Iodine. ANTAGONISTS,—*Cocaine* is the most rational antagonist against Morphine, in doses of gr. ½ every half hour until consciousness returns and the respiratory and cardiac functions are sufficiently aroused (Barnes); is effective as to the respiration, arterial tension, body temperature, and psychic functions, and should be given in small doses cautiously repeated (Reichert). *Caffeine* acts similarly to cocaine but with less marked effect (Id). *Atropine* is antagonistic but if given too freely may deepen the narcosis, no one is warranted in omitting it (P); is synergistic in many important actions and may prove dangerous, even fatal (Reichert). *Strychnine* has found favor with some, especially for the respiratory paralysis, but must be pushed to a dangerous physiological effect (Reichert). *Coffee* strong and black, frequently given by the mouth or per rectum, or caffeine hypodermically (see above). *Adrenalin* is useful in the collapse (Takamine). *Serum* of animals immunized against morphine, was successfully used in a case of acute opium poisoning (Hirschlaff). *Amyl Nitrite*, by inhalation, or *Ammonia* by intravenous injection, when the heart shows signs of failure; the former proved eminently successful in a case wherein Atropine proved useless to restore the patient. *Capsicum*, the tincture, 3ss-j by rectal injection, is said to antagonize the stupor almost instantaneously. *Vegetable Acids*, as Vinegar and water, Lemon-juice, Cream of Tartar in water, etc., every 10 minutes (R); to antagonize the narcotism. *Douche*, alternately cold and hot, or hot water and ice alternately to nape of neck, for the narcosis. *Artificial Respiration*, should be kept up for at least two hours (Murrell). *Oxygen*, by inhalation, is of great value (Macalister). *Venesection*, has proved effective after all other measures failed; is especially beneficial when death is impending from failure of respiratory action due to distention of the right heart with backward pressure (Marshall). *Potassium Bromide* removes some of the cerebral effects of Opium, as the vertigo and mental confusion; others are antagonized by *Quinine*, and the general intracranial effects of the drug are to some extent opposed by *Digitalis* and Tartar Emetic. THE IMPORTANT MEASURES indicated in Opium or Morphine poisoning are—(1) the removal of the poison, (2) the maintenance of respiration, (3) the keeping up of the circulation. The stomach should be evacuated at once, and then washed out repeatedly at short intervals, in order to recover the morphine which is constantly excreted into that viscus. *Faradization* of the chest muscles, cold affusion and artificial respiration are of great value, and evacuation of the bladder frequently is important, to prevent reabsorption. *Flagellation* is a very dangerous procedure, from the exhaustion which may be thereby induced,—strong faradic currents are much more efficient. The anode should be placed over the lowest conjoined root of the phrenic nerve, the cathode three inches below the ensiform cartilage and a little to the left of the median line. COMMON SOURCES OF DANGER,—Overdosing with cough mixtures, or *Paregoric*, or the *Soothing Syrups* so much used for quieting children, all of which contain Opium. The American Journal of Pharmacy estimates the loss of life from the latter cause at 150,000 yearly.

Phenacetin (Acetphenetidin). See under Acetanilide, for the treatment of poisoning by Phenacetin, Antipyrine and similar compounds.

Phosphorus. ANTIDOTES,—*Potassium Permanganate*, is probably the most reliable. *Copper Sulphate*, as an emetic and a chemical antidote, doses of 3 grains in dilute solution every 5 minutes, until emesis occurs; is recommended by authority, but does more harm than good. *Turpentine*, old and acid, containing oxygen, given rapidly in a gum emulsion, is said by some to be the best antidote; it is generally unattainable and has proved useless in many cases. *Lime-water* or *Charcoal*, to prevent action on the