ADMINISTRATION OF MEDICINES.

Medicines may be introduced into the circulation by various routes, including the mouth, the stomach, the rectum, the respiratory tract, the veins and arteries, the subcutaneous cellular tissue, and the integument.

The Mouth is the usual receptacle for medicines intended for the stomach, but may itself be employed for the introduction of minute quantities of powerful agents. A drop of the tincture of Aconite placed on the tongue is quickly absorbed, and soon manifests that fact by its symptoms. Many of the small tablets used for hypodermic administration, if placed under the tongue, are readily conveyed into the system, and used in this way form a very convenient means of medication with alkaloids and other active principles.

The Stomach is the most convenient organ for the absorption of medicines and the one most frequently employed. After being swallowed, the remedies find their way into the current of the circulation through the walls of the gastro-intestinal blood-vessels and the lacteals. When the stomach is empty and its mucous membrane healthy, crystalloidal substances in solution pass rapidly through the walls of its vessels. *Colloidal Substances* (fats, albumin, gum, gelatin, etc.) require to be digested and emulsified before they can be absorbed. *Iodine* and *Iodides* should be given on an empty stomach, so that they may diffuse rapidly into the blood; if administered during digestion, the acid gastric juice and the starch of the food will alter their chemical constitution and weaken their action. *Acids* should be given, as a rule, on an empty stomach, especially when they are intended to check the secretion of the acid of the gastric juice. *Alkalies*, of which Sodium Bicarbonate may be taken as the type, are given after meals to neutralize excessive acidity, and before meals to stimulate the acid gastric secretions. *Silver Oxide* and *Silver Nitrate* should be administered after the digestive process is ended; if given during digestion, chemical reactions destroy or impair their special attributes and defeat the object for which they were prescribed. *Metallic Salts* (especially corrosive sublimate), also *Tannin* and pure *Alcohol*, impair the digestive power of the active principle of the gastric juice, and should be given by the stomach only during its period of inactivity. *Malt Extracts*, *Cod-liver Oil*, *Phosphates*, etc., should be administered with or directly after food, so that they may enter the blood with the products of digestion. *Bismuth* should be given on an empty stomach, it being usually employed for its local sedative action on the gastric mucous membrane. *Potassium Permanganate* should be given after meals; on an empty stomach it would irritate the mucous membrane and might possibly produce ulceration thereof. *Arsenic* and other irritant and dangerous drugs (the salts of copper, zinc and iron), should be given directly after food, except where local conditions require their administration in very small doses on an empty

stomach. *Morphine* should only be given by hypodermic injection when the patient is lying down, unless he is previously habituated to its use. *Pilocarpine*, administered to produce sweating, should be given when the patient is in bed in a warm room. *Ammonium Acetate* acts as a diaphoretic when the recipient is warm in bed, but as a diuretic when the patient is in a cold atmosphere. *Sulphonal* should be given two or three hours before its hypnotic action is desired, as it is very slowly absorbed.

Under some circumstances it becomes necessary to introduce medicines directly into the stomach, as in cases of the patient's inability to swallow, through narcotic poisoning or other causes. The stomach-pump or the stomach-tube may then be employed to convey both food and medicine to that organ. In obstruction of the esophagus, as from stricture or malignant disease thereof, it may become necessary to make an opening through the abdominal wall and the wall of the stomach itself. Nasal feeding, by the use of a small catheter with a hard rubber funnel inserted into its end is a very efficient method of conveying liquids into the stomach. The eye end of the catheter is oiled and passed gently along the floor of the nose and down the pharynx; the fluid being then poured into the funnel. This method is particularly serviceable in cases of acute tonsillitis or other painful affections of the mouth or palate, also after excision of the tongue, when swallowing is to be avoided as much as possible. In many cases, especially insane ones, the patient will so constrict the muscles of the throat as to force the catheter into the mouth; but if it is withdrawn until nearly out of the pharynx, the presence of the fluid as it drops down will excite swallowing, and the patient may be fed as well as if the tube were in the esophagus.

The Rectum will absorb many substances applied in the form of enemata or suppositories. Those most suited to this route are the salts of the alkaloids in solution, especially those of Morphine, Atropine and Strychnine, the latter being absorbed more rapidly by the rectum than by the stomach. Acid solutions, if not too frequently repeated, are well administered by this channel. Nutritive enemata must be small, not exceeding three or four fluid ounces, or they will not be retained. They become necessary in many cases, especially in cases of gastric ulcer, in order to afford rest to the stomach. It is often found advantageous to have the food predigested before being administered by the rectum, for which purpose Pancreatin is used. [Compare the articles entitled INJECTIONES and SUPPOSITORIA in Part II and ENEMATA in Part III.]

The Respiratory Tract admits of the rapid absorption of medicinal substances through its extensive blood-supply. The inhalation of vapors or atomized fluids, the insufflation of powders into the nares, fauces, larynx, etc., and the use of a medicated nasal douche, are methods whereby this channel may be utilized. [Compare the article entitled INHALATIONES, in Part II.]

The Veins are only used as a route of medication in emergencies, when the other channels are not available, and where immediate action is necessary to the preservation of life, the operation being a highly dangerous one. The injection intravenously of *Saline Solutions* in the collapse of cholera, diabetic coma, etc., *Blood* or *Milk* as a last resort in excessive hemorrhage, epilepsy, uremia, the collapse of cholera, and a solution of *Ammonia* for the bites of venomous reptiles, in Hydrocyanic-acid poisoning, opium-narcosis, and chloroform-asphyxia, are instances admitted in practice.

Arterial Transfusion has also been performed successfully in a number of cases, and is considered safer than venous transfusion when a large quantity of fluid has to be introduced

into the circulation. A special apparatus is employed for these purposes, known as Aveling's transfusion syringe, but the ordinary Dieulafoy's aspirator slightly modified may be used with safety and convenience. The danger of the operation lies in the liability of introducing air into the circulation, an occurrence which may cause instant death in the human subject.

The Hypodermic Method is the introduction of medicines into the organism by injecting them into the subcutaneous areolar tissue, from which they are quickly absorbed by the lymphatic and capillary vessels. The great advantage of this method is the absolute certainty as to the quantity of drug actively affecting the organism, a very essential question when using small quantities, as when powerful alkaloids are employed. Another advantage is the avoidance of reaction between the drug and the contents of the stomach, which may destroy the activity of the former, or seriously change its character. In the presence of a chill or other condition of impaired peripheral circulation, hypodermic injections cannot be expected to act with any degree of speed or certainty, and in the presence of dropsy they are useless because the drug lies in the fluid contained in the subcutaneous tissues until, as the result of purgation, increased circulation, or diuresis, absorption of the dropsical fluid occurs.

The medicine must be in solution, and the latter should be of neutral reaction and *freshly prepared*; the usual menstruum being distilled water, though filtered spring water will answer just as well, and much better than distilled water which has been standing several days and frequently exposed to the air. The solution is to be injected *beneath* the skin, not into it, by a hypodermic syringe, care being taken to avoid puncturing a vein. The most suitable localities for the injection are the *external* aspect of the arms and thighs, the abdomen, the back, and the calves of the legs. On the external aspect of the thigh, just in front of the great trochanter, there is an area of some two inches square, over which the insertion of a fine hypodermic needle is not felt, so barren is the skin of sensitive nerve filaments in that region. A few years ago the sight of a hypodermic syringe in a physician's hand suggested an injection of morphine to the patient and to the patient's friends, and many a physician has acquired the reputation of giving morphine on every possible occasion because he administered drugs by the hypodermic method. It is therefore well to inform the patient that another drug is being so administered when such is the fact. In this age of toxin and antitoxin treatment the hypodermic syringe has become a necessity, as many of these agents are inert when given by the stomach. Whenever such preparations are employed their injection must be administered under strict aseptic conditions, applied to the syringe and needle as well as to the site of the operation, and the contents of the syringe should be discharged very slowly into the tissues *beneath the skin*, giving time for the fluid to diffuse itself without rupturing the connective tissue.

The classic practice of pinching up a fold of the integument before inserting the hypodermic needle is entirely wrong both in theory and in practice. It is never done by persons who habitually use this instrument on themselves, and they are admittedly the most expert of all operators in this line. It increases the liability to local soreness, and often produces bruises and ecchymoses which might be avoided by following the method described below

After nearly filling the syringe with the solution to be used, the needle, if separate, should

be screwed on tightly; and with the instrument held in a vertical position, point uppermost, the excess of solution over the amount required should be ejected, thus expelling air-bubbles and filling the needle itself A site having been selected, where there is no danger of penetrating a vein or artery, the needle should be quickly inserted at a right angle with the surface, and carried on for fully one-half its length into the subcutaneous tissue, except when a solution of Cocaine is to be injected for the production of local cutaneous anesthesia, in which case it is injected into the skin itself. The syringe should be held steadily, not moved around, so as to avoid injuring the tissue. The piston should be pressed down slowly, and when the injection has been delivered the needle should be quickly withdrawn, and no attention paid to the few drops of solution which may follow it. The very finest needles should alone be used, except in cases where the patient is struggling and liable to break the needle off by his movements. The point of the needle should be perfect and its surface highly polished. It is far better to use a new needle every day than to risk one's reputation for skill on a blunt-pointed and rough-surfaced instrument. The writer buys Green's short and finest needles by the dozen and uses a new one on every patient. He has injected a strychnine solution in this manner on some 300 patients during three years, three or four times daily in the same upper arm for a month in each case, without having produced any more serious results than a hyperemic zone around some punctures in a very few instances. If the solutions are freshly prepared with clean water, the needles sharp, clean and bright, and the injections delivered *beneath* the skin and not *into it*, there is no danger of producing abscesses or even indurations with the agents ordinarily employed in this manner. After using the syringe force out all liquid, and wipe the needle-point dry between the fingers, before returning it to the case; the sebaceous matter on the fingers will keep it free from rust. Avoid puncturing a vein; if you do so, watch the patient and prepare an injection containing gr. $\frac{1}{100}$ of Atropine Sulphate, to administer if dangerous symptoms arise. Never, except under special circumstances, administer the Salts of Morphine or Atropine hypodermically to children less than 15 years of age.

Acetanilide, in minute proportion, added to aqueous solutions for hypodermic use, is said to preserve them from decomposition more efficiently than any other agent hitherto employed for that purpose, but *Phenol*, a drop or two to the fluid ounce, is generally effective in this respect.

Compressed Tablets for hypodermic use are prepared by the prominent manufacturers, and are furnished in glass tubes containing from 20 to 25 tablets each. The writer prefers those which are very small, entirely free from foreign material, sufficiently soluble, and put up in short tubes which can be carried in cases to fit the vest pocket. The tablets may be readily dissolved in a teaspoon at the bedside, or in the syringe itself if the instrument has a screw-hole large enough to admit the tablet before screwing on the needle. A regular line of Hypodermic Tablets includes the agents named in the following list, though many others are prepared by the manufacturing chemists.

List of Hypodermic Tablets.

Aconitine, (crystals) gr. $\frac{1}{120}$.
Apomorphine Hydrochloride, gr. $\frac{1}{10}$.
Atropine Sulphate, gr. $\frac{1}{200}$, $\frac{1}{100}$, $\frac{1}{50}$.
Caffeine, gr. $\frac{1}{2}$.
Cocaine Hydrochloride, gr. $\frac{1}{8}$, $\frac{1}{4}$.
Coniine Hydrobromide, gr. $\frac{1}{8}$.
Colchicine, gr. $\frac{1}{30}$.
Corrosive Sub. and Urea, gr $\frac{1}{25}$.
Digitalin (soluble), gr. $\frac{1}{100}$.
Duboisine Hydrochloride, gr. $\frac{1}{100}$.
Ergotin, gr. $\frac{1}{4}$.
Gelsemine Hydrochloride, gr. $\frac{1}{50}$.
Hyoscine Hydrobromide, gr. $\frac{1}{100}$, $\frac{1}{50}$.
Hyoscyamine, gr. $\frac{1}{100}$, $\frac{1}{50}$.
Morphine Sulphate, gr. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$.
Morphine & Atropine, No. 1.
Morphine Sulph., gr. $\frac{1}{8}$.
Atropine Sulph., gr. $\frac{1}{200}$.
Morphine & Atropine, No. 2.
Morphine Sulph., gr. $\frac{1}{4}$.
Atropine Sulph., gr. $\frac{1}{150}$.
Nitroglycerin, gr. $\frac{1}{200}$, $\frac{1}{100}$, $\frac{1}{50}$.
Physostigmine Sulphate, gr. $\frac{1}{100}$.
Picrotoxin, gr. $\frac{1}{50}$.
Pilocarpine Hydrochloride, gr. $\frac{1}{3}$.
Sodium Arsenate, gr. $\frac{1}{10}$.
Sparteine Sulphate, gr. $\frac{1}{30}$.
Strychnine Nitrate, gr. $\frac{1}{100}$, $\frac{1}{60}$, $\frac{1}{40}$.
Strychnine Sulphate, gr. $\frac{1}{100}$, $\frac{1}{60}$, $\frac{1}{30}$, $\frac{1}{20}$.

[For Formulæ for Hypodermic Solutions, see Appendix.]

Parenchymatous Injection is the delivery of a medicine deeply into the tissues, either to affect a muscle itself or to locally influence some important nerve-trunk. The principal agents used in this manner are Strychnine for palsied muscles, Chloroform for sciatic and other neuralgias, Salts of Cocaine for local anesthesia, and Phenol for deep-seated inflammations.

The Integument is an active absorbent of crystalloidal substances when its epidermis or cuticle is removed, and many substances may be made to pass

through the latter and produce their characteristic effects on the system. By this route there are four methods of introducing medicaments into the circulation—the Endermic, Enepidermic and Epidermic Methods, and Inoculation.

The Endermic Method obviates the difficulty of absorption through the cuticle by removing the latter with a blister, and then powdering the medicament over the surface of the denuded derma. Before the introduction of the hypodermic method this procedure was quite common, but it is rarely employed now, as it is both painful and unpopular.

An ordinary Cantharides-plaster, followed by a poultice to raise the blister, may be employed; but a quicker method is to place upon the skin a piece of lint soaked in Stronger Water of Ammonia, covering it with a watch-glass or a piece of oiled silk to prevent evaporation. The blister raises rapidly and should be removed with scissors and the medicine in powder is then placed on the raw surface. Morphine, Atropine, Quinine, and Strychnine are the agents generally used in this manner.

The Enepidermic Method consists in placing the medicine in simple contact with the epidermis, no friction being used to hasten its penetration. Chloroform and oleic acid solutions of the alkaloids pass by osmosis in this manner with comparative ease, but aqueous solutions act very slowly, and alcoholic ones with great difficulty if at all. Drugs are readily absorbed from the surface of hot, moist poultices, a fact to be remembered in directing such applications for children, as narcotic poisoning may follow the liberal use of opium in this manner. A good belladonna plaster will cause dilatation of the pupils and may produce the characteristic rash all over the body.

The Epidermic Method or *Inunction* consists in the use of friction to promote the passage of the medicament between the cells of the epidermis. Mercurial ointment, cod-liver oil, and other fats, oleates, etc., are rubbed into the skin of the armpits, the popliteal space, and other parts of the body, for their local and systemic effects. Oil inunctions are an excellent method of introducing fatty substances into children and persons who cannot take oils by the stomach. The inunction of castor oil will produce a purgative effect.

Inoculation is the introduction of medicinal agents through the scraped or punctured skin by an operation which is similar to that employed for vaccination.

DOSAGE OF MEDICINES.

The Doses given throughout this book are for adults; for children the following rule (Young's) will be found the most convenient. Add 12 to the age and divide by the age, to get the denominator of a fraction, the numerator of which is 1. Thus, for a child two years old, $\frac{2+12}{2} = 7$, and the dose is one-seventh of that for an adult. Of powerful narcotics scarcely more than one half of this proportion should be used. Of mild cathartics, two or even three times the proportion may be employed.

For Hypodermic Injection, the dose should be two-thirds or three-fourths of that used by the mouth; *by rectum* five-fourths of the same. Strychnine acts more actively when given per rectum than by the stomach.

Children bear Opiates badly:—but on the other hand they stand comparatively large doses of several other drugs; such being Arsenic, Belladonna, Ipecacuanha, Calomel and other preparations of Mercury, also Squill, Rhubarb, and several other purgatives. Pilocarpine has very little effect on children, though it readily induces perspiration and salivation in adults.

Conditions which modify the action of medicines, and therefore affect their dosage, are—age, body-weight, temperament and idiosyncrasy, drug-habits, intervals between doses, time of administration, condition of the stomach, temperature of the body, cumulative drug-action, mode and form of drug-administration, disease, climate, race, etc.

The Dosage of Medicines is the weakest part of the therapeutic armament, the flaw in our weapons which may be the cause of their failure at any moment, perhaps the most critical one for a life. If the accumulated rubbish of ages, which has been called therapeutic knowledge, is ever to be given scientific shape, or placed in process of becoming a science, the question of dosage must form one of the principal corner-stones in the foundation. Drugs have widely differing actions on the human organism in health and in disease, according as they are administered in different doses, in different menstrua, and during different conditions of the subject's health. This difference, when between extremes of dosage, is often so wide as to separate actions directly contrary to each other, the action of the very large dose opposing that of the very small one:—a truth hidden by one set of dogmatists under their former doctrine (now rule) of *similars*, and avoided by the great mass of the medical profession, through dread of the bogy-name *irregular*.

The U. S. Pharmacopœia now gives an average approximate dose for adults of each drug and preparation intended for internal administration, but disclaims any intention to have them regarded as obligatory. In the British Pharmacopœia a minimum and maximum dose is stated for all the more important medicines, the quantities being intended to represent the average range in ordinary cases, for adults. In the preface to that work it is however distinctly stated that these doses "are not authoritatively enjoined," and that "the practitioner must rely on his own judgment and act on his own responsibility in graduating the doses of any therapeutic agents which he may wish to administer to his patients." As a matter of fact, most British practitioners ignore the doses given in their pharmacopœia, or at

best consider them as mere indications. The German Pharmacopœia has appended to it a table giving the maximum single dose and the maximum daily dose for a number of drugs and preparations, but they are of little value in practice except to catch an unwary physician in a legal proceeding for mal-practice.

In the following pages an effort has been made, whenever possible, to indicate the different doses of active agents for different purposes, and the proper intervals for repetition in certain cases, as determined by the accumulated experience of clinicians, which is the only safe guide in this respect at present. The average doses of official drugs and preparations are given in brackets, preceded by the contraction av., thus— [av. gr. xxx.] These should be memorized by the student, and the following rules will be found useful for that purpose.

Average Adult Doses of Official Preparations.

Acids (dilute), ♏xxx;—except Hydrochloric and Nitro-hydrochloric, ♏xv; and Hydrocyanic, ♏jss.

Alkalies,—Solution of Potassium Hydroxide (Liquor Potassæ), ♏xv. Carbonates, gr. xv, except that of Magnesium, gr. xlv; of Lithium, gr. vijss; of Ammonium, gr. iv. Potassium Bicarbonate, gr. xxx; Sodium Bicarbonate, gr. xv. Sodium Borate, gr. vijss.

Alkaloids and their Salts,—form several groups: (1) Aconitine, gr. $\frac{1}{400}$: (2) those from plants of the *Solanaceæ*, including Atropine, Hyoscine, etc.; also including Colchicine, gr. $\frac{1}{128}$: (3) Strychnine and Physostigmine, gr. $\frac{1}{65}$: (4) those from *Opium* gr. $\frac{1}{4}$, except Codeine, gr. ss; Narcotine (unofficial) gr. iij; and Apomorphine, as an expectorant gr. $\frac{1}{30}$, as an emetic gr. $\frac{1}{10}$: (5) those from *Cinchona*, gr. iv: (6) Pelletierine, gr. iv; Piperine, gr. iij; Caffeine, gr. j; Cocaine and Hydrastinine, gr. ss; Hydrastine, Sparteine and Pilocarpine, gr. $\frac{1}{5}$; Veratrine, gr. $\frac{1}{30}$.

Extracts vary from gr. $\frac{1}{8}$ to gr. xv, as follows:—Physostigma, gr. $\frac{1}{8}$; Belladonna, Cannabis Indica, Digitalis, Scopola, Stramonium, gr. $\frac{1}{5}$; Nux Vomica, gr. $\frac{1}{4}$; Colocynth, Opium, gr. ss; Colchicum, Hyoscyamus, Quassia, gr. j; Aloes, Euonymus, gr. ij; Cimicifuga, Ergot, Gentian, Leptandra, Rhamnus (Cascara), Rhubarb, Sumbul, gr. iv; Colocynth compound, Krameria, gr. vijss; Glycyrrhiza, Hematoxylon, Taraxacum, gr. xv. Extract of Malt, ʒiv.

Fluidextracts vary from ♏j to ℥ij; 25 have an average dose of ♏xv, and 27 have ♏xxx. Of the rest, those of Aconite, Belladonna Root, Cannabis Indica, Capsicum, Digitalis, Gelsemium, Ipecac, Nux Vomica, Scopola, Staphisagria, Stramonium, have an average dose of ♏j; Phytolacca, Sanguinaria, Squill, Veratrum, ♏jss; Colchicum Seed, Conium, Hyoscyamus, Quillaja, ♏iij; Convallaria, Euonymus, Lobelia, Lupulin, Podophyllum, Quassia, ♏viij; Matico, Pareira, Spigelia, ʒj; Taraxacum, Triticum, ʒij; that of Mezereum is not given internally.

Glucosides. Ammoniated Glycyrrhizin, gr. iv; Salicin, gr. xv; Strophanthin, gr. $\frac{1}{200}$.

Infusions. Digitalis, ʒij; Wild Cherry, ℥ij; Senna, the Compound Infusion, ℥iv.

Mixtures. Chalk ʒiv; Compound Iron Mixture ʒij; Rhubarb and Soda ʒj; Compound Glycyrrhiza ʒij.

Oils, Fixed. Cotton Seed Oil, Codliver Oil, Castor Oil, ʒiv; Expressed Oil of Almond, Linseed Oil, Olive Oil, ℥j. Lard Oil and Oil of Theobroma are only used externally.

Oils, Volatile, ♏iij:—except that of Mustard. ♏ss; Bitter Almond, ♏ss; Cinnamon, Savin, Croton, ♏j; Cajuput, Copaiba, Cubeb, Eucalyptus, Santal, ♏viij; Betula, Erigeron, Gaultheria, Turpentine, ♏xv. Ethereal Oil is not used internally.

Oleoresins. Ginger, Pepper, gr. ss; Lupulin, gr. iij; Capsicum, gr. vijss; Aspidium, gr. xxx.

Pills ij;—except those of Opium, Phosphorus, and the Pills of Podophyllum, Belladonna and Capsicum, pill j.

Powders form two classes: (1) those given in *grains*, Acetanilide Compound, Ipecac and Opium, Compound Morphine, gr. vijss; Aromatic Powder, gr. xv; (2) those given in doses of *half a drachm* or more, Compound Chalk, Compound Jalap, Compound Rhubarb, ʒss; Compound Glycyrrhiza ʒj.

Resins. Podophyllum, gr. $\frac{1}{4}$ as a purgative, gr. $\frac{1}{10}$ as a laxative. Jalap, gr. ij; Scammony, gr. iij.

Spirits ʒss,—except that of Nitroglycerin, ♏j; Bitter Almond, ♏viij; Ammonia, Camphor, ♏xv; Ether, Anise, ʒj; Compound Juniper, ʒij. Spiritus Frumenti (Whisky) and Spiritus Vini Gallici (Brandy), according to the amount of alcohol desired to be administered.

Syrups ʒj or more,—except that of Ferrous Iodide, ♏xv; Ipecac as an expectorant, ♏xv, as an emetic ʒiv; Squill and Compound Syrup of Squill, ♏xxx; Lime ♏xxx.

Tinctures ʒj,—except that of Iodine, ♏jss; Belladonna Leaves, Cantharides, ♏v; Capsicum, Iron Chloride, Gelsemium, Ipecac and Opium, Opium, Stramonium, Strophanthus, ♏viij; Aconite, Cannabis Indica, Nux Vomica, ♏x; Arnica, Asafetida, Benzoin, Digitalis, Hyoscyamus, Lobelia (as an expectorant), Myrrh, Physostigma, Sanguinaria, Squill, Veratrum, ♏xv; Aloes, Aloes and Myrrh, Benzoin (compound), Cinchona (compound), Cinnamon, Colchicum Seed, Guaiac (ammoniated), Lactucarium, Lavender (compound), Quassia, Rhubarb (aromatic), Tolu, Valerian (ammoniated), Ginger, ♏xxx; Camphorated Tincture of Opium (Paregoric) ʒij. The tinctures of Calendula, Lemon, Pyrethrum, Quillaja, and Vanilla, are not assigned any dose.

Waters ℥ss,—except Ammonia, ♏xv; Bitter Almond, Hydrogen Dioxide, ʒj; Orange Flower (stronger), Camphor, Creosote, Hamamelis, Rose (stronger), ʒij.

Wines ʒij,—except Opium, ♏viij; Antimony, Ipecac, ♏xv; Colchicum Seed, ♏xxx; Coca, ʒiv. White Wine and Red Wine are not assigned any dose, but are prescribed according to the amount of alcohol desired to be given.

Vinegars, are only two,—that of Opium, ♏viij, and that of Squill, ♏xv.