Picot, Skoda, Krauth, Penzoldt, and many others, have used it in various instances of difficult breathing, with remarkable palliation. In *emphysema*, *spasmodic asthma*, *uræmic asthma*, in *spasmodic cough*, *chronic bronchitis*, with asthmatic breathing, it has afforded very considerable relief. It has appeared to be much less useful, if not injurious, in the dyspnœa from valvular disease of the heart, and has had no effect in the dyspnœa of old subjects due to atheroma of the vessels. Krauth, however, has used it with advantage in the dyspnœa due to hypertrophy of the heart and in the difficulty of breathing in a case of albuminuria consecutive to scarlatina. The relief to dyspnœa in all cases, Penzoldt thinks, is referable to the increased consumption of oxygen by the blood, but a more rational explanation would seem to be the action on the respiratory center, and the diminution in the sense of need of air.

Having a paralyzing action on the cardiac motor ganglia, quebracho is not without danger in cases of weak heart. It must be considered a doubtful remedy when the motor apparatus of the heart is impaired—especially, if the accelerator nerves and their terminal ganglia are the parts damaged. On the other hand, when the lesions of the heart are merely valvular, it would appear to be safe ; but in the dyspnœa due to this cause it is much less useful (Laquer, Berger). Certain unpleasant results of its administration render prolonged use of quebracho very difficult. These are, according to Laquer, headache, dullness of the sense-organs, vertigo, salivation, and a strong repugnance to its taste.

The preparation most used at present is the *extract*, and the usual dose for an adult is five grains. The alkaloid *aspidospermine* has been administered chiefly in the experimental way, but, although its actions correspond closely to those of the bark itself, it can hardly represent the drug in its entirety, seeing that there are several alkaloids contained in it. The salts of aspidospermine—the citrate, hydrochlorate, and sulphate—are freely soluble in water, while the alkaloid itself is not at all readily soluble in water, but is taken up freely by oils and fats—five to eight parts dissolving in one hundred parts of cod-liver oil by heat.

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REMEDIES USED TO CAUSE SOME EVACUATION FROM THE BODY.—EVACUANTS.

EMETICS.

Some of the agents in this group produce vomiting by virtue of a local action on the stomach, and do not affect this viscus when introduced elsewhere. These may be entitled Emetics by Local Action. There are others which cause emesis when they enter the blood at any point—Systemic Emetics. The first sub-group of emetics make an impression on the gastric nerves, and an action is at once instituted for their expulsion. The process consists in the transmission of the peripheral irritation to the spinal center, the generation of a motor impulse, and the consequent action of the nervous and muscular apparatus concerned in the mechanism of vomiting. The systemic emetics produce their effects through the intermediation of the blood, and the vomiting is only one of the results of the disturbance introduced into the functions of the nervous system.

EMETICS BY LOCAL ACTION.

The most important of these are :

Cupri sulphas, sulphate of copper.
Zinci sulphas, sulphate of zinc.
Hydrargyri sulphas flava, yellow subsulphate of mercury.
Alumen, alum.
Sinapis, mustard.
Scilla, squill.

All of the members of this group have been discussed in other parts of this work, except mustard and squill, and the consideration of these will be more appropriate elsewhere. It is necessary, however, in this place to indicate the nature of the action, the cases to which they are adapted, and the mode of administration of the more important of the emetics belonging to this division.

Cupri Sulphas.—This is a very prompt and efficient emetic. The action begins in a few minutes, and the medicine comes up with the vomited matters. Very little depression follows the emetic action. It is more especially adapted to the treatment of *narcotic poisoning*, because, the action being local, the obtunded state of the reflex centers interferes less with its operation than is the case with the systemic emetics ; and to *phosphorus poisoning*, because of its antidotal power. It is also occasionally used in *croup*, to effect the dislodgment of the false membrane, but other mechanical emetics are preferable.

Administration.—Dissolve twenty grains of the sulphate of copper in two ounces of distilled water, and give a tablespoonful every fifteen

minutes until vomiting occurs. When prompt action is required, as in narcotic poisoning, ten grains of the sulphate of copper may be given at a draught in an ounce or two of water. Its action should be assisted by the free use of diluents.

Zinci Sulphas.—This agent acts in a manner similar to the corresponding copper-salt, but is less powerful. It has the advantage of being less likely to induce gastro-enteritis than sulphate of copper, and is, therefore, usually preferred to the latter. It is administered in cases of *narcotic poisoning*, in *croup*, and to relieve the stomach of *indigestible alimentary substances*.

Administration.—In narcotic poisoning a scruple of the sulphate of zinc may be administered in water, and, if need be, repeated once. In croup, or for other purposes, as an emetic, it may be given as follows: Dissolve a half-drachm in two ounces of water, and administer a tablespoonful every fifteen minutes until emesis is produced. The free use of diluents promotes the emetic action.

Hydrargyri Sulphas Flava.—This is one of the most efficient members of this group. It is an active poison, but, as it is returned with the contents of the stomach, no danger attends its administration. It does not act so speedily as copper and zinc. It produces very little nausea, but, when the action begins, the effects are suddenly experienced, and are powerful, without leaving after-depression and sickness. It is not so well adapted to the treatment of narcotic poisoning as the copper and zinc sulphates, but it is the most desirable emetic in the treatment of *croup*. It was formerly much prescribed in this disease as an emetic, but it fell out of fashion until revived recently by Dr. Fordyce Barker. The author's experience in its use is, in the main, in accord with the much more extended experience of Dr. Barker.

Administration.—As the yellow subsulphate of mercury has but little taste, it is easily administered to children. It should be prescribed in the form of powder, rubbed up with sugar of milk. The dose varies from two to five grains. Dr. Barker makes the useful suggestion that powders of this preparation, labeled "croup-powders," should be kept in every household, the children of which have a tendency to attacks of croup. It should be given when the first symptoms manifest themselves, and its repetition will be governed by the state of the breathing.

Alumen.—Powdered alum is a safe, efficient, but slow emetic. About a half-hour usually elapses after it is swallowed before the emesis occurs. It acts mechanically, produces no considerable nausea, and leaves behind no depression. As an emetic, its only use is in *croup* and *diphtheria*, administered with the view to cause a detachment of the false membrane. Some effect has been ascribed to the local action of the alum in its passage along the throat, but this opinion is scarcely tenable.

Administration.—A teaspoonful of powdered alum may be administered in sirup, honey, or mucilage. It can be repeated, if need be, every half-hour.

Sinapis.—Mustard is a stimulant, local emetic. It acts promptly and efficiently. In emergencies, other emetics not being available, it may be employed in *narcotic and other forms of poisoning*. As an emetic it is especially adapted to depressed conditions of the system—for, while it causes vomiting, it stimulates the action of the heart. When, therefore, an emetic is indicated, and at the same time the circulation is feeble, the surface cold, and the functions of animal life oppressed, mustard should be used.

Administration.—A tea- to a dessert-spoonful of powdered mustard should be stirred up in a tumblerful of tepid water, and quickly swallowed. The irritant action of the mustard may be limited, and its emetic action promoted, by the free use of diluents.

Scilla.—Squill is never employed as an emetic by and of itself. It is harsh and rather slow in action. In the form of the compound sirup of squills, it is not unfrequently used for this purpose, especially in domestic practice, but the emetic property of this combination is due chiefly to the tartar-emetic which it contains.

SYSTEMIC EMETICS.

Apomorphine.—*Apomorphinæ Hydrochloras.*—Hydrochlorate of apomorphine. The hydrochlorate of an artificial alkaloid obtained by the action of strong acids upon morphine contained in closed tubes and subjected to a somewhat elevated temperature. It is obtained also by the action of chloride of zinc in solution on morphine. It is a whitish powder, which becomes greenish by absorption of moisture. It is soluble in water, and it may, therefore, be administered in this menstruum. Dose, gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$. If given hypodermatically, gr. $\frac{1}{16}$ is sufficient; if by the stomach, gr. $\frac{1}{8}$. As it undergoes important changes when in contact with water, the solution for hypodermatic use should be made when required.

Physiological Actions.—Whether injected under the skin or taken into the stomach, apomorphine causes vomiting. The rate at which it moves to affect the stomach depends somewhat on the dose administered. From five to twenty minutes usually elapse after the hypodermatic injection before vomiting begins. The act of vomiting is preceded by very little nausea, the contents of the stomach are usually thoroughly evacuated, and the vomiting recurs a few times at intervals of a quarter to a half hour. In young subjects very consider-

able depression has been observed to be produced by it, and dangerous symptoms of cardiac paralysis have followed its emetic action in a few instances. These clinical facts seem to contradict the experimental observations of Siebert and Moerz, who have shown that apomorphine does not affect the blood-pressure, and that the pulse rises when emesis comes on, reaches its maximum during vomiting, and declines in the interval. The cardiac depression which has been observed, clinically, may have been the result of idiosyncrasy, yet we should not lose sight of the fact observed by Harnack, that in cold-blooded animals it may be produced experimentally.

Apomorphine causes at first increased rapidity of the respiration, afterward diminishes the force and depth of the movements, and finally arrests them. As this result occurs when the vagi are divided, the drug must necessarily first excite and afterward exhaust the irritability of the respiratory center. Apomorphine has no appreciable influence on the temperature.

As respects its influence on the nervous system, apomorphine is at first strongly excitant. Afterward it causes muscular tremblings, followed by paralysis and convulsions. The muscular irritability is impaired but not destroyed, and the functions of motor and sensory nerves remain intact; hence it may be concluded that the convulsant action of this agent is due to a direct impression on the spinal cord (the spasm-center).

Therapy.—Apomorphine is indicated as an emetic when swallowing is difficult or impossible, and when very prompt action is necessary. As it produces vomiting by its spinal action, profound narcosis will prevent it, and hence, in *narcotic poisoning*, it may fail of effect unless administered before narcosis has supervened. It is a suitable emetic when it is desired to empty promptly an *overloaded stomach*. It is to be preferred to all emetics which must be introduced into the stomach, when this viscus is in a state of inflammation, for it is best given subcutaneously. Apomorphine has been administered as an emetic in *suffocative catarrh*, to empty mechanically the bronchial tubes, but it produced serious depression—a result which might have been *a priori* predicted, since this drug exerts a paralyzing action on the respiratory organs. It has also been given as an *expectorant*, but on insufficient data, for it does not seem to have an effect upon the vagi, and, as above stated, at first it excites the respiration movements, and afterward paralyzes them.

As compared with its congeners, morphine and codeine, it is more excitant than morphine and codeine, and without their hypnotic and anodyne properties. As respects its convulsant action in animals, it has close physiological relations to narcotine and thebaine. Some clinical experiences have shown (Riegel und Böhm) that apomorphine causes heaviness in the head, giddiness, drowsiness, yawning, mental

hebetude, etc. The trials in which these results were noted were made with Merck's preparation of apomorphine.

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Ipecacuanha.—*Ipecacuanha.* The root of *Cephaëlis ipecacuanha* A. Richard (Nat. Ord. *Rubiaceæ*). (U. S. P.) *Racine d'ipécacuanha*, Fr.; *Brechwurzel*, Ger.

Extractum Ipecacuanhæ Fluidum.—Fluid extract of ipecacuanha. Dose, ♏ ij—ʒ j.

Syrupus Ipecacuanhæ.—Sirup of ipecacuanha (fluid extract, ℥ ij; sirup, ℥ xxx). Dose, ʒ j—℥ ss.

Tinctura Ipecacuanhæ et Opii.—(Deodorized tincture of opium and fluid extract of ipecac.) Dose, ♏ v—♏ xv. A liquid equivalent of Dover's powder.

Trochisci Ipecacuanhæ.—Troches of ipecacuanha (ipecac, tragacanth, arrow-root, sugar, and sirup of orange-peel). Dose, one or more. Each troche contains one fourth of a grain of ipecacuanha.

Trochisci Morphinæ et Ipecacuanhæ.—Troches of morphine and ipecacuanha (each troche contains one fortieth of a grain of morphine, and one twelfth of a grain of ipecac).

Vinum Ipecacuanhæ.—Wine of ipecacuanha (fluid extract of ipecac, ℥ ij; sherry wine, ℥ xxx). Dose, ♏ j—ʒ j.

Pulvis Ipecacuanhæ et Opii.—Compound powder of ipecacuanha. Dover's powder. Ten grains contain one grain each of ipecac and opium, and eight grains of sugar of milk. This preparation has already been discussed in the article on opium, and requires no consideration here.

Composition.—Ipecacuanha contains an active principle, designated *emetina* or *emetine*. This exists in the bark of the root, in combination with a peculiar acid—*ipecacuanhic acid*. The alkaloid is found in the root in a proportion somewhat less than one per cent. It is a bitter, inodorous, and amorphous substance, colorless, and alkaline in reaction. It is freely soluble in chloroform, and only slightly so in ether. Ipecacuanhic acid is a glucoside, and is chemically related to kinic and caffetannic acids.

Antagonists and Incompatibles.—The salts of lead and mercury, the vegetable acids, and astringent infusions, are incompatible. The tannate of emetine is extremely insoluble. Bismuth, carbolic acid, hydrocyanic acid, and narcotics generally, hinder its emetic action.

Synergists.—The emetics—those by local action and the systemic—favor the vomitive action of ipecac. Its effects on the skin and bronchial mucous membrane are promoted by opium, warm diluents, etc.

Physiological Actions.—Inunctions of ipecacuanha excite very considerable irritation of the skin: at first, small, isolated pustules appear, and these are followed by large pustules and ulceration (Duckworth). When applied to the mucous membrane of the nares, it produces a sensation of heat, and causes sneezing. Some persons are so susceptible to its action that the smallest quantity inhaled will induce an asthmatic paroxysm.

Administered by the stomach in small doses (from one eighth to one quarter of a grain), ipecacuanha acts as a stomachic tonic, and probably increases the gastric secretions. In larger doses (from five grains to a scruple), it is nauseant and emetic; but the sickness which it causes is not severe, and the vomiting is not accompanied nor followed by much depression. Its action as an emetic is rather slow, from twenty minutes to a half-hour being required, and is not persistent. Repetition of large doses will, in most cases, but not invariably, produce a condition of *tolerance*, when vomiting does not occur, but a cathartic action is induced, the stools having a peculiar bilious character, appropriately designated "ipecacuanha-stools." Both vomiting and purging are sometimes produced by an emetic of ipecacuanha.

Like other nauseants and emetics, ipecac increases the secretions of the broncho-pulmonary mucous membrane, and is, therefore, held to possess *expectorant* properties. More than any other agent of the class, it relaxes the skin, and promotes cutaneous transpiration.

Ipecacuanha exerts but little influence over the circulation. In animals, lethal doses of emetine cause death by paralysis of the muscles of respiration, the heart continuing in action after the cessation of the respiratory movements (D'Ornellas). The temperature of the surface falls, but the internal temperature remains the same, or rises somewhat, owing, it is said (D'Ornellas), to the irritant action of the agent on the intestinal mucous membrane.

In the *post-mortem* examination of animals killed by emetine, very considerable gastro-intestinal irritation is found. The lungs are sometimes seen to be hyperæmic and presenting patches of hepatization, and sometimes exsanguine, but the former condition is more frequently observed. As the most common state of the lungs, caused by lethal doses of ipecac, is similar to that which is induced by section of the vagi, it is a reasonable conjecture that it has a special action on these nerves—according to Chouppe, on the terminal filaments of the vagi.

The elimination of emetine takes place in large part by the gastro-intestinal mucous membrane, and it is found in the secretions.

Therapy.—For ordinary purposes no emetic is more safe and efficient than ipecacuanha. As it causes but little depression, and is free from irritant effects in ordinary doses, it may be given in conditions of the system in which tartar-emetic and the other mineral emetics are inadmissible. When the stomach is to be relieved of *undigested aliment*, ipecacuanha is the most suitable emetic. Attacks of *acute indigestion*, *migraine*, and the so-called *bilious sick-headache*, may not unfrequently be cut short by an ipecac-vomit. The good effects of the vomitive treatment are, not unfrequently, most strikingly exhibited in the beginning of *continued fevers*, the *eruptive fevers*, *erysipelas*, and *periodical fevers*. It has been alleged that fevers are sometimes "aborted" in this way. In denying the possibility of such results, it must be admitted that clinical experience has shown the good effects of the practice on the subsequent course of the malady. Formerly an ipecacuanha-emetic was much more frequently emplyed at the outset of fevers than is the fashion at present, and the author is convinced that this mode of treatment should be resorted to now in suitable cases. The indications for the use of emetic doses of ipecacuanha, in the fevers above named, are these: a heavily-coated tongue, much nausea and ineffectual efforts to vomit, a strong sense of epigastric oppression, icterus or an icterode hue of the surface, a hot and dry skin, acid and turbid urine. When these symptoms are present in cases of *malarial fever*, the antiperiodic remedies will be much more effective in their action if their administration has been preceded by an ipecacuanha-emetic.

In all the cases in which emetics are employed for mechanical effects, as in *membranous croup*, *capillary bronchitis*, *foreign bodies lodged*, etc., ipecacuanha may be used. In croup it is not so effective as the yellow subsulphate of mercury; in capillary bronchitis, as tartar-emetic; but, as respects the latter disease, ipecacuanha is to be preferred in the very young or very old, and in those debilitated by any cause. In the domestic treatment of *laryngismus stridulus* an emetic dose of the sirup of ipecac is the most usual remedy.

As an emetic, twenty grains of the powder of ipecacuanha may be diffused in a cup of warm water, and a tablespoonful of the mixture exhibited every fifteen minutes until emesis occurs. Two grains may cause vomiting; and four grains will usually act efficiently; hence a good method of proceeding, when an emetic effect is desired, is to exhibit a powder of four grains in a tablespoonful of warm water every fifteen minutes until vomiting occurs. The action will be facilitated by drinking freely of warm water; but, if the systemic impression of the ipecacuanha is desired, the patient should retain the recumbent posture, and all fluids should be withheld. If the cathartic as well as the

emetic action is sought for, some weak animal broth should be given when the stomach is emptied of its contents. If free action of the skin is to be promoted, as soon as the vomiting has ceased warm aromatic infusions should be administered, and the patient should be covered with blankets.

It has long been known that ipecacuanha, in small doses, has the power to arrest certain kinds of *vomiting*. Attention has recently been recalled to this curious fact. It is in *nervous vomiting* more especially that this remedy is useful: for example, in the *vomiting of pregnancy*, *vomiting of drunkards*, *vomiting of migraine*, etc. A minim of the vinum ipecacuanhæ, given every half-hour or hour in a little water, will sometimes relieve these cases in a very remarkable manner; but it very frequently fails, and there are no indications at present known which will enable the practitioner to determine beforehand whether it will or will not be successful.

It is a singular fact, showing the remarkable phases through which professional opinion passes, that ipecacuanha, which was introduced at the close of the seventeenth century as a remedy for *dysentery*, after a time ceased to be employed in this disease, but has again been restored to the estimation in which it was originally held. *Epidemic dysentery*, especially of malarious and tropical countries, is the form of the disease to the cure of which ipecacuanha seems best adapted. The author has used it with much success in *acute dysentery*, as it occurs in the interior valley of this continent. When the characteristic ipecacuanha-stools are produced, the tormina and tenesmus cease, and the dejections soon become feculent; the skin, previously dry and hot, becomes moist and cool, and a refreshing calm is experienced. Large doses of ipecacuanha are required in the treatment of acute dysentery. In the severe attacks of tropical regions, from twenty to sixty grains are given for the initial dose, and the quantity subsequently administered depends on the effect —usually about twenty grains every four, six, or eight hours. It is important to establish *tolerance* of the remedy as speedily as possible. If the first dose be rejected, subsequent ones may be retained. Various expedients may be resorted to in order to secure the retention of these large doses. The ipecacuanha may be combined with some opium and aromatic powder: ℞ Ipecacuanhæ, ʒ ss; opium, gr. j; pulv. aromat., grs. v. M. Ft. pulv. no. j. After the dose of ipecacuanha is administered a sinapism may be applied to the epigastrium, and an enema of laudanum and starch, or the subcutaneous injection of morphine, may be practiced. Milk is an excellent vehicle for the administration of ipecacuanha. In the cases of dysentery treated on this plan by the author, he has found that doses of fifteen grains, given in milk, were generally pretty well borne. It not unfrequently happens, however, that tolerance can not be established, and the remedy must then be abandoned. Some patients so object to the nausea produced by it as to be reluctant

to take it, and others, after one trial, decline to continue the treatment. Notwithstanding these drawbacks, it must be conceded that ipecacuanha is a most valuable remedy in epidemic and sporadic dysentery. It has been shown that in India, before the introduction of this method of treatment, the mortality from dysentery was about 79·6 per one thousand of cases; but, since the use of ipecacuanha has been generalized, the mortality has fallen to 20·15 per one thousand of cases.

Ipecacuanha has also been used with success in *chronic dysentery*, but, in the author's experience, it is by no means so beneficial as in the acute. It succeeds best in those cases which are the outgrowth of acute attacks, and in which the intestinal ulcerations are not far advanced. The rules for its administration are the same in chronic as in acute dysentery. In the *summer dysentery* and *diarrhœa of teething children* ipecacuanha is often extremely serviceable. The special indication for its use is the occurrence of greenish stools, containing mucus and sometimes blood. These stools are usually voided with much pain and straining. At the same time the skin is harsh and dry, the tongue rather dry and pasty, or glazed, and there is great thirst, although little or no fever may be present. Ipecacuanha changes the character of the stools, induces perspiration, and allays the thirst and dryness of the mouth. From two to five grains every two hours may be given in these cases, or it may be administered with pepsin, oxide of zinc, bismuth, or other remedies. ℞ Ipecacuanhæ, grs. xij; bismuthi subcarb., ʒ j; pepsinæ sacch., ʒ ss. M. Ft. pulv. no. xij. Sig.: *One in milk every two hours.*

The evidence is conclusive that ipecacuanha possesses very valuable antihæmorrhagic powers. It has been successful in *hæmoptysis*, *epistaxis*, *menorrhagia*, *post-partum hæmorrhage*, etc. As Peter has observed, "the vomitive medication" (ipecacuanha) "arrests not only hæmoptysis but all kinds of hæmorrhage, and is, therefore, a general antihæmorrhagic medication." In hæmorrhages the ipecacuanha should be given in frequently-repeated doses until vomiting ensues; usually, when this effect is produced the hæmorrhage ceases. Other antihæmorrhagic agents may be combined with ipecacuanha. ℞ Ext. ipecac. fluidi, ʒ ij; ext. ergotæ fluidi, ʒ iv; ext. digitalis fluidi, ʒ ij. M. Sig.: *Thirty minims to a teaspoonful at a dose, as required.* The author has witnessed excellent results from this combination in hæmoptysis and menorrhagia. In the treatment of *post-partum* hæmorrhage, the most suitable combination is fluid extract of ipecacuanha and fluid extract of ergot. Trousseau strongly urges the employment of ipecacuanha in *post-partum* hæmorrhage, and, indeed, in the various accidents which occur in the *puerperal state*, among which he designates gastro-intestinal irritation, suppression of the lochia, subacute metritis, pelvic cellulitis, bronchial catarrh, subacute pneumonia, etc. "He has not observed the least ill-result from this practice; on the

contrary, in the most of these cases, he has obtained either a cure or a notable amendment" (Trousseau et Pidoux).

Certain acute affections of the broncho-pulmonary mucous membrane are much benefited by non-emetic doses of ipecacuanha; for example, *acute catarrh of the nasal and bronchial mucous membrane, hay-asthma, capillary bronchitis.* An emetic dose will cut short an attack *of laryngismus stridulus.* An occasional emetic gives great relief in *whooping-cough*, when there is profuse bronchial secretion. Non-emetic doses of the fluid extract (♏ j—♏ iij) diminish the violence of the spasms in this disease. Nauseating and emetic doses are serviceable in the attacks of *spasmodic asthma*, but the good effects of the remedy are lost by repetition. Ordinary *colds*, especially in children, are benefited by doses sufficient to produce slight nausea but not vomiting. A troublesome cough at night, which prevents sleep, may not unfrequently be arrested by a dose at bed-hour of some one of the ipecacuanha preparations. For these various purposes the wine or the fluid extract may be used, but the latter preparation is much more trustworthy and effective than the former.

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Antimonii et Potassii Tartras.—*Tartrate of Antimony and Potassa.*—Tartar-emetic.

This is a powerfully spoliative and depressing emetic, which has already been discussed under the head of "Agents promoting Destructive Metamorphosis." It was formerly much employed as an emetic in croup, capillary bronchitis, and at the onset of fevers and inflammations; but the local irritation, as well as the systemic depression which follows its use, has led to its almost entire abandonment for these purposes.

Administration.—Six grains may be dissolved in four ounces of water, and a tablespoonful be given every fifteen minutes until emesis occurs. Ipecacuanha and tartar-emetic are frequently administered together—twenty grains of the former and two grains of the latter.

CATHARTICS.

Purgatives are divisible into several groups, according to the nature of their action.

Laxatives are medicines which stimulate the intestinal movements, without increasing to any considerable extent, at least, the intestinal secretions.

Saline Purgatives excite increased secretion, while at the same time they hasten the peristaltic action. The dejections which are produced by them are loose and watery.

Mercurial Purgatives, chiefly calomel and blue mass, exert an influence peculiar to themselves. Without expressing an opinion at present, for or against their supposed cholagogue effects, the author believes that they differ so much in their action from other purgatives as to be appropriately placed in a separate class.

Tonic-astringent and Resin-bearing Purgatives.—These affect the liver and the glandular appendages of the mucous membrane, and increase the tonicity of the muscular layer of the intestine. They increase the proper secretion of the glands, and do not merely cause an outward osmosis of fluid from the vessels.

Hydragogue Purgatives act with great energy, and not only increase the glandular secretions, but cause a very abundant outward diffusion, so that the dejections which they produce are extremely watery. This group of purgatives also excite very rapid and violent peristaltic movements.

Laxatives.—Manna.—*Manna.* The concrete, saccharine exudation, in flakes, of *Fraxinus ornus* Linné (Nat. Ord. *Oleaceæ*). Dose, ʒ j—ʒ ij, according to age.

Composition and Properties.—Manna has a sweetish, rather mawkish taste; is soluble, when pure, in three parts of cold water, and in its own weight of boiling water. It contains a sugar—*manna-sugar* or *mannite*, which constitutes from seventy to eighty per cent of the best specimens of manna. It is said to contain dextrin, or a mucilage having similar reactions, and ether extracts from it in small quantity a slightly acrid, reddish-brown resin, on which the laxative property of manna probably depends.

Actions and Uses.—Manna is a very mild laxative, but, when administered alone, is apt to cause griping. It is rather slow in its operation, but is free from irritating qualities, and leaves no unpleasant after-effects. It is most frequently combined with other purgatives—senna chiefly—the operation of which it aids, and at the same time renders less drastic. It is rarely given alone, and only to chil-