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A

PRACTICAL DICTIONARY

OF

MATERIA MEDICA:

INCLUDING

THE COMPOSITION, PREPARATION, AND USES OF MEDICINES;

AND A LARGE NUMBER OF

EXTEMPORANEOUS FORMULÆ;

TOGETHER

WITH IMPORTANT TOXICOLOGICAL OBSERVATIONS.

ON THE BASIS OF BRANDE'S DICTIONARY OF MATERIA MEDICA AND PRACTICAL PHARMACY.

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PREFACE.

My original intention of presenting Mr. Brande's "Dictionary of Materia Medica and Practical Pharmacy" to the profession in the United States was soon, and almost of necessity, abandoned, after a perusal of that work. The retrenchments and additions, which seemed to me to be requisite, to adapt it to the wants both of the student and the practitioner, and, at the same time, to bring it within certain useful limits, were so numerous and so various, that I could not, without manifest injustice to Mr. Brande, and, I may add, with diffidence, to myself, allow it to be introduced, in its reformed shape, under his name.

The authority of Mr. Brande in chemistry and pharmacy made me adopt without hesitation his nomenclature and details on these branches: but, on approaching that part of the subject on which the chief value of the work would depend, in the opinion of my readers; viz., the uses and effects of the different medicines for the cure of disease, I had no hesitation in either omitting or altering, adding to, or pointedly differing from, his opinions, in the case of most of the substances treated of in the several articles of the Dictionary. My own practical knowledge of these matters, and acquaintance with the recorded experience of practical writers, were of course preferable to the speculative notions of Mr. Brande, who does not practice medicine. Occasionally, however, his summaries are in the main so judicious that I have retained some articles, such as Alcohol, Fermentation, Opium, &c., without change, and have affixed his name to them.

That the present work is on the basis of Mr. Brande's, will be obvious even to those who have not an opportunity of comparing them together, by my stating, that the heads of all his articles, with the exception of a very few which treated of inert or useless substances, have been retained; and that what is said of the chemical composition and combinations of the different medicines and of their tests and physical and sensible properties is, also, by him. To the same source must be referred the chief portion of the toxicology; and the quotations from Dr. Paris (*Pharmacologia*), and from Dr. A. T. Thomson (*London Dispensatory*); and also nearly all the officinal formulæ and extemporaneous prescriptions.

The retrenchments which I have thought it advisable to make, are of details and diagrams illustrating the chemical affinities in the preparation of various drugs; the directions, in Latin, of the London Pharmacopœia, which were accompanied by an English translation; and the mode of preparing some simple substances and chemical compounds, which are now made chiefly by the manufacturing chemist or druggist, and rarely, if ever, by the physician. The botanical description of plants and their ultimate analysis have also been left out; not that such details are useless to the student and practitioner, but because in making a

selection with reference to almost assigned limits, I preferred other topics of more direct moment, either practically or in reference to the requisitions of medical teachers and the expectations of professional brethren. I feel the less regret at omissions of this kind, as they are so fully supplied in the United States Dispensatory—the excellent work of my friends Drs. Wood and Bache.

The additions which I have introduced into the present volume are almost entirely of a practical nature; such as are required for a knowledge of the circumstances under which the substances of the Materia Medica are most successfully and beneficially prescribed, for the cure or alleviation of disease. They are interwoven in nearly every article with the summaries of Mr. Brande; and often, without their taking up much additional space, they give a different complexion to the opinions which he had advanced, but one which is more in consonance with clinical experience. Some articles which had a place in the English work have been replaced, on account of their meagreness and incompleteness, by other more extended ones prepared by myself. Of these I may mention *Emetics*, *Emmenagogues*, *Epispastics*, *Hirudo*, and *Iodinum*, including under this latter the combinations of iodine with *carbon*, *sulphur*, *arsenic*, and *mercury and arsenic*, none of which were noticed by Mr. Brande. To the articles under the heads of *Antimony*, *Ferrum*, *Plumbum*, and *Zincum*, the additions have been considerable, either in their novelty or amount, as compared with the original copy. Quite a different view of the therapeutical powers of antimony are given from those advanced by Mr. Brande. Neither the *lactate of iron*, nor the *carbonate* or *iodide of zinc* was mentioned by him, and the remarks on the disease caused by the poison of lead belong to the American work. *Monœsia*, now noticed, was not known to the English physicians when Mr. Brande wrote.

In preparing a work on Materia Medica on this side of the Atlantic, the claim of readers to an acquaintance, through its pages, with the medical virtues of our indigenous plants could not be well overlooked. The articles, twenty-eight in number, introduced into the volume, will to a certain extent meet this reasonable expectation. Additional features of an American character might have been given to the pharmaceutical portion of these pages by a more frequent citation of the Pharmacopœia of the United States in place of that of London, which latter has been followed nearly throughout: but, knowing that the revision of our Pharmacopœia is, at this very time, in the hands of a most efficient and business-like committee, and that a new edition may ere long be expected, I preferred following well-known and generally admitted good authority, to tantalizing my readers with references which, in a few months, may be not a little modified, if not entirely changed.

If it had been thought advisable to prepare at this time a larger volume, I would have preferred to dilate on Therapeutics in conjunction with Materia Medica, and would then have turned to fuller account the richly stored pages of the *Elements of Therapeutics and Materia Medica* of my venerated friend, Dr. Chapman. The time may yet come when this pleasure will be allowed me.

JOHN BELL.

A TABLE

OF

INCOMPATIBLES.

Medicinal Substances. — *Incompatibles.*

Acid (Citric) — Sulphuric and Nitric Acids, Acetate of Lead, Alkaline, Earthy and Metallic Carbonates; all alkaline substances and solutions, as those of Ammonia, Soda, Magnesia, Lime, Barytes, &c., &c. Tartrate of Potassa.

—— (Hydrocyanic) — Oxides of Mercury, and Antimony, Nitrate of Silver, Mineral Acids, Chlorine, the Sulphurets.

—— (Nitric) — Oxides, Earths, Alkalies, and their Carbonates, Acetate Lead, Sulphates of Zinc, and of Iron, Acetate of Potassa, Essential Oils.

—— (Sulphuric) — Metallic Oxides, some of the Earths, their Carbonates, and the Alkaline Carbonates, Solutions of Acetate of Lead, Chlorides of Calcium and of Barium, Essential Oils.

—— (Tartaric) — Alkaline Solutions, Magnesia, Lime Water, Tartrate of Potassa, Acetate of Lead, Salts of Mercury, Vegetable Astringents.

Ammoniæ Sesquicarbonas — Acids, Fixed Alkalies, and their Carbonates, Lime, Magnesia, Alum, Bitartrate of Potassa, Acidulous Salts, Sulphates of Magnesia, Zinc, and Iron; Acetates of Mercury and Lead; Protochloride and Bichloride of Mercury.

—— Hydrochloras — Sulphuric and Nitric Acids, Fixed Alkalies, and their Carbonates, Lime, Magnesia, Acetate of Lead, Nitrate of Silver, Sulphates of Magnesia, Zinc, and Iron.

—— Acetatis Liquor — Acids, Fixed Alkalies, Lime, Magnesia, Alum, Lime Water; Bichloride of Mercury; Sulphate of Magnesia, Nitrate of Silver; Sulphates of Zinc, Copper, and Iron; Acetate of Lead.

Antimonii Potassio-tartras — Mineral Acids, Alkalies, and their Carbonates, Hydrosulphates, Earths, Metals, Soaps, Infusions, or Decoctions of the Vegetable Astringents.

N.B. From these the Infusions of *Gentian* and *Wormwood* are excepted.

Argenti Nitras — Fixed Alkalies, Alkaline Earths, Sulphuric, Hydrochloric, and Tartaric Acids, and all Salts that contain them. Hydrosulphates, Arsenic, Soaps, Undistilled Waters, Astringent Vegetable Infusions.

Columba (Infusion of) — Infusion, and Decoction of Yellow Cinchona Bark, Infusion of Nutt-galls, Acetate of Lead, Lime Water, Bichloride of Mercury.

Capsicum (Infusion of) — Infusion of Nutgalls, Bichloride of Mercury, Nitrate of Silver, Acetate of Lead, Sulphates of Copper, Zinc, and Iron, Alum, Carbonate of Potassa, Ammonia.

Catechu . . . Alkalies and their Salts, Metallic Salts, especially those of Iron.

Medicinal Substances. *Incompatibles.*

CINCHONA (INFUSION OR DECOCTION OF) — Salts of Iron, Sulphate of Zinc, Potassio-tartrate of Antimony, Bichloride of Mercury, Nitrate of Silver, Arsenical Solutions, Infusion of Nutgalls, Lime Water, Alkaline Carbonates, Bitter infusions.

COLOCYNTHIDIS PULPA — Nitrate of Silver, Sulphate of Iron, Fixed Alkalies, Acetate of Lead.

CUPRI SULPHAS — Alkalies and their Carbonates, Tartrate of Potassa, Acetate of Lead, Biborate of Soda, Acetate of Ammonia, Chloride of Calcium, Bichloride of Mercury, Nitrate of Silver, Astringent Vegetable Infusions.

CUPRI AMMONIO-SULPHAS — Acids, Fixed Alkalies, Lime Water.

CUSPARIA (INFUSION OF) — Mineral Acids, Sulphates of Iron, and Copper, Bichloride of Mercury, Nitrate of Silver, Acetate of Lead, Potassio-tartrate of Antimony, Potassa, Infusions of Nutgalls and Yellow Cinchona.

DATURA STRAMONIUM — Mineral Acids, Salts of Iron, Silver, and Mercury.

DIGITALIS (INFUSION OF) — Acetate of Lead, Sulphate of Iron, Infusion of Yellow Cinchona Bark.

FERRI AMMONIO-CHLORIDUM — Alkalies and their Carbonates, Lime Water, Astringent Vegetable Infusions.

FERRI SULPHAS — Alkalies and their Carbonates, Earths, Hydrochlorate of Ammonia, Nitrate of Potassa, Biborate of Soda, Acetate of Ammonia, Tartrate of Soda and Potassa, Nitrate of Silver, Acetate of Lead, Soaps, Astringent Vegetable Infusions.

FERRI SESQUICHLORIDI (TINCTURA) — Alkalies and their Carbonates, Mucilage of Gum Arabic, Astringent Vegetable Infusions.

FERRI POTASSIO-TARTRAS — Strong Acids, Hydrosulphate of Potassa, Lime Water, Astringent Vegetable Infusions.

GALLS (INFUSION AND TINCTURE OF) — Metallic Salts, especially those of Iron; Acetate of Lead, Potassio-tartrate of Antimony; Sulphates of Zinc and Coppers; Nitrates of Mercury, and Silver; Bichloride of Mercury, Carbonate of Soda and Potassa, Lime Water; Sulphuric and Hydrochloric Acids, Gelatine.

GENTIAN (COMPOUND INFUSION OF) — Acetate of Lead, Sulphate of Iron.

GUAIACUM . . Mineral Acids.

GUM ACACIA (MUCILAGE OF) — Acetate of Lead, Alcohol, Sulphuric Ether, Tincture of Sesquichloride of Iron, Nitric Acid, some Metallic Salts.

HYDRARGYRI BICHLORIDUM — Fixed Alkalies, Alkaline Carbonates, Potassio-tartrate of Antimony, Lime Water, Nitrate of Silver, Acetate of Lead, Sulphuret of Potassium, Sulphur, Soaps, Iron, Lead, Metallic Mercury, Copper, Bismuth, Zinc, Volatile Oils, Astringent Vegetable Infusions.

HYDRARGYRI CHLORIDUM — Alkalies and their Carbonates, Lime Water, Soaps, Sulphuret of Potassium and Antimony, Chlorine, Iron, Lead, Copper, Nitric Acid.

HYOSCYAMUS (TINCTURE OR INFUSION OF) — Nitrate of Silver, Acetate of Lead, Sulphate of Iron.

IPECACUANHA . Vegetable Astringents, Infusion of Galls, &c.; Vegetable Acids, especially the Acetic.

KINO . . . *Vide* Gallæ.

LIQUOR CALCIS — Alkaline and Metallic Salts, Borates, Tartrates, Citrates, Acids, Spirituous Preparations, Sulphur, Astringent Vegetable Infusions.

LIQUOR CALCII CHLORIDI — Sulphuric Acid, Sulphates, fixed Alkalies, Alkaline Carbonates.

LIQUOR PLUMBI DIACETATIS — Alkalies, Alkaline Carbonates, Sulphate and Sulphurets, Undistilled Water, Mucilaginous Fluids.

MAGNESIÆ CARBONAS — Acids, Acidulous Salts, Alkalies and Neutral Salts, Bitar-

Medicinal Substances.	*Incompatibles.*
	trate of Potassa, Alum, Nitrate of Silver, Acetate of Lead and Mercury, Bichloride of Mercury, Sulphates of Zinc, Iron, and Copper.
Magnesiæ Sulphas	— Fixed Alkalies, Alkaline Carbonates, Lime Water, Chlorides of Barium and Calcium, Hydrochlorate of Ammonia, Acetate of Lead, Nitrate of Silver.
Morphia (Salts of)	— Alkalies, Alkaline Carbonates, Magnesia, Lime, Nitrate of Silver, Acetate of Lead, Astringent Vegetable Infusions and Decoctions. N.B. Acetate of Lead may be combined with Morphia.
Moschus (Solutions of)	— Bichloride of Mercury, Nitrate of Silver, Sulphate of Iron, Infusion of Yellow Cinchona Bark.
Oleum Amygdalarum	— Acids, Syrups of Squills and Poppies, Oxymel, Supersulphate of Potassa, Tartrate and Bitartrate of Potassa, Bichloride of Mercury, Resins, Hard Water.
Opium . . .	Ammonia, Alkaline Carbonates, Nitrate of Silver, Bichloride of Mercury, Acetate of Lead, Sulphates of Iron, Zinc, and Copper, Infusion of Nutgalls.
Plumbi Acetas	— Alkalies, Alkaline Earths and their Carbonates, Alum, Borax, Sulphates, Hydrochlorates, most Acids, Soaps, Sulphurets; Potassio-tartrate of Antimony, Tartarized and Ammoniated Iron, Undistilled Waters, Astringent Vegetable Infusions.
Potassæ Acetas	— Mineral Acids. Decoction of Tamarinds, Bichloride of Mercury; Alkaline, Acid, or Metallic Neutral Salts; most Subacid Fruits.
Potassæ Bicarbonas	— Mineral Acids, Acidulous Salts, Borax, Hydrochlorate of Ammonia, Acetate of Ammonia, Alum, Sulphate of Magnesia, Lime Water, Acetate of Lead, Ammonio-sulphate of Copper, Potassio-tartrate of Iron, Potassio-tartrate of Antimony, Chloride of Iron, Proto and Bichlorides of Mercury, Sulphates of Iron, Copper, Zinc, &c.
Potassæ Nitras	— Sulphuric Acid, Sulphates of Soda and Magnesia, Alum, Metallic Sulphates.
Potassæ Carbonas	— *Vide* Potassæ Bicarbonas.
Potassæ Sulphas	— Mineral Acids, Salts of Lime, Bichloride of Mercury, Nitrate of Silver, Acetate of Lead.
Potassæ Bitartras	— Mineral Acids, Alkalies, and Alkaline Earths.
Potassæ Tartras	— All Acids and Acidulous Salts, Magnesia, Baryta, and Lime, Nitrate of Silver, Acetate of Lead, Acidulous Fruit, Tamarinds.
Rheum (Infusion of)	— Strong Acids, Potassio-tartrate of Antimony, Acetate of Lead, Bichloride of Mercury, Sulphates of Iron, and Zinc, Gelatine, Infusions of Yellow Cinchona, Cusparia, Catechu, Galls, &c.
Sodæ Potassio-tartras	— Acids, Acidulous Salts, Tamarinds, Sulphates of Soda, Potassa, and Magnesia, Acetate of Lead, Hydrochlorate of Ammonia, Salts of Lime, and Baryta. N.B. Bitartrate of Potassa forms an exception.
Sodæ Biboras	. Acids, Earthy Sulphates and Chlorides, Potassa, Ammonia.
Sodæ Carbonas	. Same as Potassæ Bicarbonas.
Sodæ Sulphas	. Same as Magnesiæ Sulphas.
Taraxacum	. . Bichloride of Mercury, Acetate of Lead, Sulphate of Iron, Nitrate of Silver, Infusion of Galls.
Tormentilla	. . Alkalies and Alkaline Earths, Salts of Iron, Solution of Isinglass.
Valerian	. . . Salts of Iron, Infusion of Yellow Cinchona.
Zinci Sulphas	. Alkalies, Earths, Hydrosulphates, Milk, Astringent Vegetable Infusions, and Tinctures.

TABLES OF WEIGHTS AND MEASURES.

In the compounding of medicines TROY WEIGHT is directed to be employed by the London College: the *pound* (containing 5760 grains) is subdivided into twelve *ounces;* the *ounce* into eight *drachms;* the *drachm* into three *scruples;* the *scruple* into twenty *grains.*

lb. Pound.		℥ Ounces.		ʒ Drachms.		℈ Scruples.		gr. Grains.		French Grammes.
1	=	12	=	96	=	288	=	5760	=	372·960
		1	=	8	=	24	=	480	=	31·080
				1	=	3	=	60	=	3·885
						1	=	20	=	1·295

But nearly all drugs, like other ordinary commodities, are purchased and sold by AVOIRDUPOIS WEIGHT, of which the *pound* (containing 7000 grains) is subdivided into sixteen *ounces,* and the *ounce* into sixteen *drachms.*

lb. Pound.		oz. Ounces.		dr. Drachms.		gr. Grains.		French Grammes.
1	=	16	=	256	=	7000	=	453·250
		1	=	16	=	437·50	=	28·328
				1	=	27·34	=	1·770

175 Troy pounds are equal to 144 avoirdupois or IMPERIAL pounds; 175 troy ounces are equal to 192 avoirdupois ounces. 14 ounces, 11 pennyweights, 15½ grains troy, are equal to 1 pound avoirdupois; and 18 pennyweights, 5½ grains troy, are equal to 1 ounce avoirdupois. The following is the usual division of the troy pound:—

lb. Pound.		oz. Ounces.		dwt. Pennyweights.		gr. Grains.
1	=	12	=	240	=	5760
		1	=	20	=	480
				1	=	24

In the measurement of liquids the IMPERIAL or STANDARD Gallon is employed; it contains 10 avoirdupois pounds of water of 7000 grains each, or 70,000 grains of water = 277·273 cubic inches at the temperature of 62° Fahrenheit. It is subdivided for medicinal purposes as follows:—

C Gallon.		O Pints.		f℥ Fluid-ounces.		fʒ Fluid-drachms.		♏ Minims.
1	=	8	=	160	=	1280	=	76800
		1	=	20	=	160	=	9600
				1	=	8	=	490
						1	=	60

In addition to the above standard measures there are others in domestic use which the physician directs in family prescriptions: such as a teacupful, a wineglassful, &c. Time was, when one could

indicate with tolerable accuracy the quantity of fluid which these, respectively, would hold, but in the continual changes and fluctuations of fashion of late years, this can no longer be done. In one house a common teacup will hold six ounces; in another barely three; and so in respect to wineglasses: champagne seems to require a particular fashion and size of glass, hock and sauterne a fashion and colour of their own; nor can madeira and sherry be drunk for two years in succession, out of glasses of the same size.

A *teacup* is represented to contain, in general, about *four fluid ounces*, or a gill; a wineglass, *two fluid ounces;* a tablespoon, indicated in formal prescriptions by *cochlear magnum*, is considered to be equal to *half a fluid ounce;* a teaspoon or *cochlear parvum* to a *fluid drachm.*

In directing a given number of drops of a fluid preparation of a medicine, it is necessary to bear in mind, that the number of drops in a stated measure, say a drachm, will vary with the menstruum. It is not a matter of any great moment to know that, in bulk, sixty drops of water is less than the same number of dilute sulphuric acid, and more than that of a spirituous tincture, since experience has determined the relative doses of medicinal liquids, in reference to the quantity of the solid substance infused or macerated, and not to that of ulterior comparisons between these liquids. But, so soon as we propose to represent a certain number of drops by a standard measure, it is very important for us to be aware that the latter, when required to be filled, will contain a much larger number of drops of some fluid medicines than of others. Thus, although it will be correct enough to direct a fluid drachm or a teaspoonful of a clear watery infusion, in place of prescribing sixty drops of the same, we should commit a grievous error if we directed a fluid drachm of laudanum to be taken by a patient, under the belief that we were prescribing sixty drops of the medicine to him; when in fact he would receive a hundred and twenty drops.

The difference between *minims* and *drops*, is that the former bears a fixed and positive relation to a drachm and other standard measures, whereas the latter varies greatly in this respect. But even in regard to minims the standard is so far conventional, that it assumes distilled water as the fluid to be measured. This premised, *sixty minims* are contained in a fluid drachm; and they may be considered so long as distilled water or even a moderately clear aqueous infusion is to be measured, as equivalent to *sixty drops.* We should probably gain in simplicity, and be nearer to medical accuracy, if, with a knowledge of the great difference in different chemical and pharmaceutical fluids, we were always to direct drops; the dose being, as it always ought to be, relative to the effects on the animal economy of the solid substance, the tincture of which is prescribed for the emergency. Tables have been made setting forth the proportions among different medicinal fluids, taking the fluid drachm of sixty minims of distilled water as the standard.

The following is one by Shuttleworth in which the equivalent weight in grains is given at the same time:—

	Grains.	Drops.
A Drachm of distilled Water is estimated to weigh	60 and to number	60
Fowler's Arsenical solution	60¾	60
White Wine	58¾	94
Ipecacuanha Wine	59¾	84
Antimonial Wine	59¾	84
Rectified Spirits of Wine	51½	151½
Diluted Alcohol	55¾	140
Tincture of Opium (Laudanum)	59½	134
Tincture of Digitalis	58	144

Of course slight differences in the preparation of tinctures and solutions, and in the size and fashion of the mouth of the vial from which they are dropped, will cause differences in the results of experimental trials of this nature. Mr. Durand, one of our most skillful apothecaries, has furnished a table which differs from the above of Shuttleworth in many points. I copy some of these estimates. Of the drops equivalent to a fluid drachm:—

	Drops.		Drops.
Alcohol (Rectified Spirits of Wine) gave	138	Vinegar Distilled	78
Arsenite of Potassa (in solution,)	57	Vinegar of Colchicum	78
Sulphuric Ether	150	Vinegar of Opium (black drop)	78
Oil of Aniseed, Cinnamon, Cloves, Peppermint, Sweet Almonds, and of Olives	120	Vinegar of Squill	78
		Aqua Ammonia fortis	54
		dilut.	45
		Tenneriffe Wine	78
Tincture of Digitalis, of Guiac, and of Opium	120	Antimonial Wine	72
		Wine of Colchicum	75
Tincture of Muriate of Iron	132	Wine of Opium	78

DIFFERENCE OF DOSE DEPENDING ON AGE.

The following is one of the tables of proportion:—

		Suppose the dose	
For an Adult	1		℥i.
Between 21 and 14 years	⅔		ʒij.
" 14 and 7 years	½		ʒss.
" 7 and 4 years	⅓		℈i.
At 4 years	¼		gr. xv.
" 3 years	⅙		gr. x.
" 2 years	⅛		gr. viii.
" 1 year	1/12		gr. v.

Hufeland has drawn up the following scale for different ages:—

Years	25	20	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Doses	40	35	30	29	28	27	26	25	24	23	22	21	20	18	16	13	10

Months	11	10	9	8	7	6	5	4	3	2	1	½
Doses	9		8		7		6		5	4	2	1

Suppose the dose at the end of the first year to be 1, then at the fifth it will be 2, at the fifteenth 3, and at the twenty-fifth 4. In the above table the dose for an adult is supposed to be 40 grains. Dr. Young (*Introduction to Medical Literature*, 2d edit. p. 453), gives the following rule for determining the doses for children under

twelve years of age. The doses of most medicines must be diminished in the proportion of the age to the age increased by 12. For example, at 2 years old to $\frac{1}{7} = \frac{2}{2+12}$. At twenty-one the full dose may be given. But as Mr. Pereira properly remarks, no rule is of much value, as the degree of development is very unequal in different children of the same age. Moreover, the rule that applies to one medicine will not hold good with respect to others. This is particularly shown in the cases of opium and calomel: the first must be given to children with the greatest caution, and in excessively small doses, whereas the second may be given to them almost as freely as to adults. I have found it necessary sometimes to prescribe as full a dose of jalap to children from five to seven years of age as to adults, and the same remark applies to spirits of turpentine, which I have given in the dose of half an ounce to children, mixed with an equal quantity of castor oil, without its exciting any harsh effect.

Temperature is in all cases specified in the language of *Fahrenheit's* thermometric scale, in which the freezing point of water is marked 32°, and the boiling point 212°; the space between these two points being divided into 180 equal parts or *degrees*. The graduation proceeds downwards to 0° or *zero*, which is the lowest temperature to be obtained from a mixture of snow and salt, and 32° below the freezing point of water, or what amounts precisely to the same thing, below the point at which ice begins to thaw. The graduation is then carried on below zero, in the same way as above.

In France, Sweden, and many other parts of Europe, the *Centigrade* thermometric scale, originally used by *Celsius* in Sweden, is employed, in which the freezing point of water is marked 0°, and the boiling point 100°.

In Italy, and in many parts of Germany and elsewhere, a third thermometric scale is used, namely, that of *Reaumur*, in which the freezing point of water being marked 0°, the boiling point is marked 80°.

To distinguish, in each of these thermometers, the degrees above 0° from those below 0°, the mark + or *plus* is frequently annexed to the former, and the mark – or *minus* to the latter; but when the degree is merely stated, without prefix or remark, it is generally understood, especially with us, as referring to the degrees above zero.

The temperature, as expressed by one thermometer, may be reduced to that of either of the others, by knowing the relation which subsists between their respective degrees. Thus 180°, (the number of degrees between the freezing and the boiling points of water on *Fahrenheit's scale*,) is to 100° (the number of degrees between the freezing and boiling points on the *Centigrade scale*) as 9 to 5; and to 80° (the number of degrees between the freezing and boiling points on *Reaumur's scale*) as 9 to 4. Nine degrees, therefore, of Fahrenheit are equal to five of the Centigrade, and to four of Reaumur's scale. Hence Fahrenheit's degrees are reduced to those of

the Centigrade by multiplying by 5 and dividing by 9, or to those of Reaumur by multiplying by 4 and dividing by 9. On the other hand, by reversing this process, the degrees of the Centigrade and of Reaumur are reduced to those of Fahrenheit, the multiplier being then 9, and the divisor 5, in the one case, and 4 in the other. In these reductions it must be recollected that the zero of Fahrenheit's thermometer, is 32° below that of the Centigrade and of Reaumur, as in the following instances:—

Fahrenheit. Centigrade.

$68° - 32° = 36 \times 5 = 180 \div 9 = 20°$

$212 - 32 = 180 \times 5 = 900 \div 9 = 100$

Centigrade. Fahrenheit.

$10° \times 9 = 90 \div 5 = 18 + 32 = 50°$

$100 \times 9 = 900 \div 5 = 180 + 32 = 212$

Fahrenheit. Reaumur.

$59° - 32 = 27 \times 4 = 108 \div 9 = 12°$

$212 - 32 = 180 \times 4 = 720 \div 9 = 80$

Reaumur. Fahrenheit.

$40° \times 9 = 360 \div 4 = 90 + 32 = 122°$

$80 \times 9 = 720 \div 4 = 180 + 32 = 212$

Centigrade. Reaumur.

$55° \times 4 = 220 \div 5 = 44°$

$100 \times 4 = 400 \div 5 = 80$

Reaumur. Centigrade.

$56° \times 5 = 280 \div 4 = 70°$

$80 \times 5 = 400 \div 4 = 100$

The above are examples, therefore, of the following general theorem: Let F denote the degrees on the scale of Fahrenheit, C those of the Centigrade, and R those of Reaumur; then,

To convert the degrees of Fahrenheit into those of the Centigrade,

$$C = \frac{(F - 32) \times 5}{9}$$

To convert the degrees of the Centigrade into those of Fahr.

$$F = 32 + \frac{9\,C}{5}$$

To convert the degrees of Fahrenheit into those of Reaumur,

$$R = \frac{(F - 32 \times 4}{9}$$

To convert the degrees of Reaumur into those of Fahrenheit,

$$F = \frac{9\,R}{4} + 32$$

To convert the Centigrade degrees into those of Reaumur,

$$R = \frac{4}{5} \times C$$

To convert the degrees of Reaumur into those of the Centigrade,

$$C = \frac{5}{4} \times R$$

MATERIA MEDICA.

AA, or ANA; *of each.* This term is constantly used in prescriptions, where the same quantity of several ingredients is employed: thus, ℞ Pulveris scillæ, pulveris ipecacuanhæ, āā granum unum; sacchari albi, acaciæ pulveris, *ana* scrupulum unum: or, Take of powder of squills, powder of ipecacuanhæ, *of each* one grain; white sugar, powder of gum arabic, *of each* one scruple.

ABBREVIATIONS, *Medical.* In Latin prescriptions, many words, and sometimes all of them, are more or less abbreviated; but the custom is a bad one, inasmuch as it frequently leads to mistakes, and to a careless and slovenly mode of expression, and is often indicative of haste, or of ignorance. Young practitioners, especially, should write their prescriptions at length, as useful practice in Latin, and as obviating errors of the compounder; carefully avoiding, at the same time, all circumlocution and learned affectation of language. The following are specimens of abbreviated and of full-length prescriptions:—

℞ Quin. disul. gr. ij.
Ac. Sul. dil. m. x.
Syr. Aur.,
T. Card. c. āā f ℥ss.
Inf. Ros. c. f ℥iss.

M.: ft. h. merid. s. et ant. prand. repet.

℞ Op. pulv.,
Hydr. chlor., āā gr. i.
Ext. Col. c. gr. iij.

Ft. pil. h. s. s.

The same, at length:—

Recipe. Quiniæ disulphatis, grana duo.
Acidi Sulphurici diluti, minima decem.
Syrupi Aurantii,
Tincturæ Cardamomi compositæ, āā semifluidrachmam.
Infusi Rosæ compositi, fluidunciam unam cum semisse.
Misce: fiat haustus, meridie sumendus, et ante prandium repetendus.

Recipe. Opii pulverisati,
Hydrargyri Chloridi, āā granum unum.
Extracti Colocynthidis compositi, grana tria.
Fiat pilula hora somni sumenda.

Some abbreviations may always be conveniently employed, such

as ℞ for *Recipe*, M. for *Misce*, &c.; and the customary abbreviations for *weights* and *measures* (which see), when carefully written, are useful; but it has happened that ℥j (one drachm) has been read for ℨj (one ounce), and *vice versâ:* it is the duty of the prescriber to write a clear and legible hand, and of the compounder of prescriptions to read them cautiously and considerately.

ABIETIS *Resina.* The resin of the *Pinus abies*, or Spruce fir. *Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Coniferæ.

This tree grows to a height exceeding 150 feet, and flourishes in Europe and the northern parts of Asia.

The resin is usually imported from Germany, in casks of one to two hundred weight each; and is obtained either by spontaneous exudation, or by cutting the wood into billets, and heating them, when it flows out. This is the form of the resin, which is termed in the *London Pharmacopœia*, *Resina abietis.* Its only use is as an ingredient in some plasters. It has an aromatic and terebinthine odour; a pale yellowish-brown colour, often intermixed with white streaks; and is occasionally met with in the form of rounded masses or tears, which have spontaneously exuded from and dried upon the trees.

Burgundy pitch, the *Pix abietina* of the list of the *Materia Medica*, is also the produce of the *Pinus abies*, obtained by incision through the bark, where it gradually concretes in the form of flakes, which are successively scraped off, fused in boiling water, and cleansed by pressing through canvass cloths. It is largely collected in the vicinity of Neufchatel. When genuine, it has a very peculiar odour; and although brittle in cold weather, it assumes a tenacious viscidity when gently heated, or kneaded in the warm hand. It therefore forms an excellent adhesive and gently stimulant plaster, exciting some degree of irritation, and often a slight serous exudation from the parts to which it is applied. It will remain adherent to the cuticle for a long time; and is usefully applied to the thorax in catarrhal affections and dyspnœa; and to the loins, in rheumatism and lumbago. These plasters, independent of the cuticular irritation which they excite, are useful as merely keeping the part warm and supported. Apothecaries often keep Burgundy pitch in a ladle, or saucepan, and re-melt the same portion repeatedly, by which it loses its characteristic adhesiveness and irritating quality, and is little more active than common rosin. It should always be applied fresh, and spread upon the leather with the aid of as little heat as possible.

Upon some skins a Burgundy pitch plaster, or any similar application, creates incessant itching, or excites a pimply eruption, attended by intolerable irritation, so that it is frequently necessary to remove it within a few hours after its application. In these instances, however, it often does service, especially in chronic rheumatism, where it may thus prove almost as effectual as a blister.

Spurious Burgundy pitch is detected chiefly by deficiency in the strong and peculiar odour and viscidity of the genuine resin. It

often has a nauseous or stercoraceous smell, is very moist and brittle, and evidently a manufactured or adulterated article.

Burgundy pitch enters into the composition of the *galbanum*, *opium*, and *aromatic plasters*.

ABSINTHIUM. *Artemisia absinthium*, or *common Wormwood*. *Cl.* 19. *Ord.* 2. Syngenesia Polygamia Superflua. *Nat. Ord.* Corymbiferæ.

Wormwood contains, besides an essential oil, a bitter principle, *absinthin*, and an acid, *absinthic*.

A perennial herb, growing wild in many parts of Britain: generally cultivated for medical use.

The aroma of wormwood depends upon *essential oil*, which may be obtained by distillation, one hundred-weight of the fresh herb yielding, upon an average, four ounces of oil.

Wormwood is sometimes spoken of as an antispasmodic, and the older writers extol it as a vermifuge; but it deserves little attention at the present day in either of these characters. Applied externally, infusion of wormwood has no advantage over warm water; it is not more discutient, and scarcely more antiseptic.

If used internally, wormwood should be fresh; and for this purpose ℥ij of the recent plant may be infused in a pint of boiling water for four hours.

℞ Hujusce infusi f ℥iss.
Aquæ Cinnamomi f ℥ss.
M.: ft. haustus 4tis vel 6tis horis sumendus.

The powdered root has been recommended by Dr. Burdach as a remedy for epilepsy in doses of fifty to seventy grains. The common dose of the leaves in powder is ℈i. to ʒi.

The ashes of wormwood afford by lixiviation a quantity of impure carbonate of potassa, which used to be called *salt of wormwood*.

ABSORBENTS (Lat. *Absorbeo*, I suck up). A term applied to medicines which are themselves inert or nearly so, but which absorb or combine with acid matters in the stomach and bowels: chalk and magnesia, in reference to such effect, are termed *absorbents*.

ACACIA (Gr. ακη, a point). The name of a genus of plants in the Linnæan system,—the Egyptian thorn. In the *London Pharmacopœia*, it is the *Acaciæ gummi*, or *gum arabic*, a species of gum which exudes from the bark of the *Acacia vera*. *Cl.* 23. *Ord.* 1. Polygamia Monœcia. *Nat. Ord.* Leguminosæ.

Gum Acacia is imported, packed in casks, from Barbary and Morocco, in drops or tears, and in small fragments of a pale straw-colour, and more or less transparent or translucent. It is frequently mixed with what is known in the trade under the name of *gum Senegal*, also an African product, and probably indiscriminately collected from several trees.

Gum Arabic is used to suspend different insoluble substances in water; hence it is often mixed with oils, resins, gum-resins, and the like. The *mistura acaciæ* (*mucilage of gum arabic*) of the London Pharmacopœia, is made by dissolving the powdered gum in twice its weight of boiling water. Cold water is preferable.

To allay the irritation excited by a cough, mixtures of mucilage and oil, or *emulsions*, are often of some service; and they may be rendered palatable, and even pleasant, by the addition of sugar and some very slight aromatic. Thus —

℞ Misturæ Acaciæ ℥j.
Olei Amygd.,
Syrup. Tolutani, āā f ℥ss.
Aquæ Cinnam. f ℥ij.
—— destillat. f ℥iv.
M.: fiat Mistur. cujus sumatur parum subinde.

Or, the diluted mucilage may be more simply prescribed as the vehicle of an expectorant; thus—

℞ Misturæ Acaciæ ℥ij.
Syrupi Mori f ℥j.
Aquæ Rosæ f ℥iij.
Syrup. Scillæ f ℥ij.
M.: cochlearia duo vel tria ampla sumantur subinde.

To render different substances miscible with aqueous vehicles, different proportions of mucilage are required. *Oils* will require about three-fourths of their weight, *balsams* and *spermaceti* equal parts, *resins* two parts, and *musk* five times its weight.

Gum Lozenges, made of gum arabic ℥iv.; starch ℥i.; pure sugar ℔i.; mixed, pulverized, and made into a proper mass with pure water, are an agreeable pectoral.

Much has been said of the use of viscid mucilages in cases of poisoning by acrid substances, as a means of sheathing and protecting the alimentary canal; upon many occasions they appear to be useful as auxiliaries, although not to be depended on.

As an article of food, gum has been supposed by some to be very nutritious; by others it is represented as passing through the bowels unaltered: this, however, is not strictly true. During the gum-harvest, the Arabs are said to subsist almost exclusively upon it, and that six ounces a day are sufficient to sustain life in a healthy adult. Hasselquist states that a caravan of Abyssinians would have starved, had they not discovered among their merchandise a stock of gum arabic, upon which they lived for two months. But no carnivorous animal can be immediately brought to subsist upon food destitute of nitrogen: they require to be gradually inured to the change; and even then it is doubtful whether any animal can thrive, or even subsist for a long period, if limited to one article of diet. Thus, Tiedemann and Gmelin found that geese fed upon gum died on the sixteenth day; those fed on starch died on the twenty-fourth day; and those fed on boiled white of egg on the forty-sixth day; and in all these cases they gradually dwindled away and died, as if of starvation.

ACESCENTS (Lat. *Acescere*, to turn sour). Substances which readily run into acetous fermentation. Articles of diet which produce morbid acidity in the stomach.

ACETATES (Lat. *Acetum*, Vinegar). Salts formed by the union of acetic acid with bases.

ACETIC ACID: *Acidum Aceticum.* ACETUM: *Vinegar.* ACETUM FERMENTATIONE PARATUM: *Vinegar prepared by fermentation.* ACETUM DESTILLATUM: *distilled Vinegar.*

The acetic acid, like several others, requires to be considered under two points of view; *anhydrous*, or in combination with bases; and *hydrated*, or in combination with water: the anhydrous acid has not been obtained in an insulated or separate state; its equivalent is 51.

The *hydrated acetic acid* is sometimes termed *glacial acetic acid*, because it concretes into a crystalline mass when cooled down to about 40°, and retains its solid form even at higher temperatures. Its odour is pungent, and agreeable when diluted: it absorbs moisture from the atmosphere; it is a strong acid, and when applied to the skin, acts as a powerful rubefacient and irritant. The specific gravity of this acid is 1·063 at 60; but, as shown by Dr. Thomson, its density is not directly as its strength, so that the proportion of real acetic acid in any quantity of the dilute acid, can only be accurately ascertained by its saturating power.

The equivalent of carbonate of lime (pure white marble, for instance,) is so near that of acetic acid as to enable us to determine, with sufficient accuracy for all practical purposes, the strength of acetic acid by the weight of a piece of white marble which it is capable of dissolving, and which is the direct equivalent of the anhydrous acetic acid.

ACETUM. *Vinegar.* "A yellowish liquid, of a peculiar odour, of which one fluid ounce is saturated by a drachm of crystals of carbonate of soda. Solution of chloride of barium being added, the precipitated sulphate of baryta does not exceed 1·14 of a grain. Hydrosulphuric acid being added, the colour is not changed."

There are many processes by which vinegar may be obtained. In wine countries it is procured by the exposure of wine to the action of air, and a due temperature: it is sometimes made from solutions of sugar and saccharine fruits; in England it is prepared from *wort*, or infusion of malt, and in the United States from cider. In these instances the liquids are suffered to ferment: alcohol is first formed, and this, by the loss of hydrogen, passes into acetic acid.

The malt vinegar of commerce varies in strength and colour: according to the Pharmacopœia, a fluid ounce should be saturated by a drachm of crystallized carbonate of soda. It contains colouring matter, gum, starch, and gluten, and a small portion of alcohol, and frequently malic and tartaric acids (when made from wine), with traces of alkaline and earthy salts. According to Mr. Phillips, the strongest vinegar contains 5 per cent. of real acetic acid; but usually, not more than 4·6 per cent. A fluid ounce weighs about 446 grains, saturating 58 grains of carbonate of soda (crystallized), and two grains of it, making up the drachm, are allowed for saturating the sulphuric acid, (which Mr. Phillips states is permitted to be mixed with the vinegar,) and for decomposing the sulphates used in vinegar making. The precipitate of *sulphate of baryta*, afforded

by adding chloride of barium to good vinegar, should not, according to the London Pharmacopœia, exceed 1·14 grain from the fluid ounce, and the vinegar should not be discoloured by hydrosulphuric acid (solution of sulphuretted hydrogen).

A very important source of acetic acid is the destructive distillation of wood, by which an impure vinegar, formerly called *pyroligneous acid*, is formed.

Medical uses of Acetic Acid, Vinegar, and Distilled Vinegar. As an article of the Materia Medica, concentrated acetic acid is chiefly valuable as a rubefacient stimulant, and as it is soluble in alcohol, and dissolves camphor, liniments of camphorated spirit of wine may be sharpened to any desired extent by the addition of concentrated acetic acid.

℞ Tincturæ Camphoræ f ℥iij.
Acidi Acetici f ℥j.
Misce fiant embrocatio parti affectæ applicanda.

To this any of the volatile oils may be added, for acetic acid also dissolves most of them, as we see in *aromatic vinegar*, which is the acid thus perfumed, and furnishes an agreeable nasal stimulant. According to Dr. Paris, Henry's Aromatic Vinegar is an acetic solution of camphor and of the oils of cloves, lavender, and rosemary. A preparation of this kind, he observes, may be extemporaneously made by putting ℥j. of acetate of potassa into a phial, with a few drops of some fragrant oil, and ♏xx. of sulphuric acid (*Pharmacologia*). Marseilles, or Thieves' Vinegar, consists of camphor, volatile oils, and vinegar, and resembles the *acetum aromaticum* of the *Edinburgh Pharmacopœia*.

A piece of blotting-paper, or cambric, moistened with acetic acid, and applied to the cuticle, soon excites heat and redness; and if suffered to remain upon the spot, the cuticle peals of. This forms a good occasional substitute for a blister, especially in inflammatory sore throat, where external irritation, rapidly excited, is often singularly effectual in alleviating the internal tumefaction and pain. It may also be useful in croup, where a quick external counteraction is wanted. The inhalation of the vapour of acetic acid has proved useful in hoarseness arising from local irritation of the larynx and epiglottis: it may be mixed in small quantity with boiling water in an inhaler, and used in the usual way.

The vapour of acetic acid is sometimes used for fumigation; but it is ineffectual as a destroyer of contagious or infectious matter.

Common vinegar and acetic acid, in various states of dilution, form a refreshing ingredient in diluent drinks in cases of fever, and in those affections of the digestive and urinary organs which are attended by the appearance of *white* deposits in the urine (phosphate of lime and ammoniaco-magnesian phosphate); but lemon and orange juice, or other acid fruits, are generally preferred. Distilled vinegar is a proper addition to lotions containing acetate of lead; diluted with rose or elderflower water, it does good in chronic ophthalmia; and it forms an useful addition to astringent gargles

in relaxed uvula, and superficial inflammation of the posterior fauces. A glyster of diluted vinegar is sometimes used in typhus fever, and is an effective evacuant of the lower bowels.

℞ Aceti f℥ij.
Infusi Anthemidis f℥v.
M. pro enemate.

ACIDS. This term was originally applied to substances having a sour taste, reddening vegetable blue colours, and combining with bases so as to produce neutro-saline compounds; and it was presumed that they all contained oxygen. At present, the power of neutralising and definitely combining with salifiable bases is assumed as the essential characteristic of an acid. There are two leading classes of acids, namely: *oxyacids* and *hydracids;* the former consisting of oxygen, the latter of hydrogen, in combination with acidifiable bases; and the same bases often form both classes of acids; thus sulphur combined with oxygen forms *sulphuric acid;* combined with hydrogen, it forms *hydrosulphuric acid;* chlorine and oxygen form the *chloric acid;* chlorine and hydrogen form the *hydrochloric*, or muriatic acid. In these cases the acidifiable base is a simple or elementary substance; but in many cases it is a compound: thus, *cyanogen*, which is a compound of nitrogen and carbon, is the base of the cyanic and of the hydrocyanic acid, and various compounds of hydrogen and carbon, or of hydrogen, carbon and oxygen, are the bases of the *organic* acids.

In medicine, the acids are an important class of remedies. Some of them, when duly diluted, are powerful tonics, astringents, and refrigerants; others are laxatives; and the hydrocyanic acid is a peculiar sedative.

ACONITE (from *Acone*, a place in the Crimea celebrated for poisonous herbs). *Aconiti folia.* The leaves of the *Aconitum paniculatum.* *Cl.* 13. *Ord.* 3. Polyandria Trigynia. *Nat. Ord.* Ranunculaceæ.

This herbaceous perennial, frequently, from the shape of its flowers, termed *Monkshood*, grows wild in many parts of Europe, and is cultivated in gardens and shrubberies.

The leaves of aconite have little taste till long chewed, when they are acrid, and somewhat bitter, producing a tingling sensation upon the tongue, followed by some tumefaction, and greatly impairing the power of taste for some hours afterwards.

The activity of aconite, like that of most other eminently active and poisonous vegetables, appears to reside in a peculiar alkaloid, which is termed *aconitina.*

Aconitina is said to be more abundant in the root than in any other part of the plant; but successfully to extract it, a much larger quantity must be operated on than that directed by the Pharmacopœia, and a somewhat different process adopted. This alkaloid seems to have been first noticed in 1828, by Pallas, and was afterwards examined by Brandes and by Hesse, but its properties are as yet imperfectly ascertained; it has, however, an alkaline reaction,

is intensely bitter, neutralises the acids, and contains nitrogen as one of its ultimate elements. When anhydrous, it has a gummy appearance, but in the state of *hydrate* it is white and pulverulent.

It is stated to be soluble in 150 parts of cold water, and abundantly soluble in alcohol and in ether: it is difficult to crystallize, inodorous, bitter, and acrid. It is intensely poisonous, and is especially active when applied to a wound; a twentieth part of a grain immediately killed a sparrow.

The only other preparation of this plant directed in the Pharmacopœia, is the *extract*, or the inspissated juice of the leaves.

The activity of the extract is, of course, referable to the aconitina which it contains, but in what state of combination has not been determined, though it is probably united with a vegetable acid.

The extract is of a dark-brown colour; it has a peculiar odour, and a bitter and somewhat pungent flavour; about five pounds of it are obtained from each hundred-weight of the fresh herb.

The only preparations of aconite, whose activity can be relied on, are the *tincture*, (made with rectified spirit,) the *alcoholic extract*, and Morson's *aconitina*.

The *topical effects* of aconite are peculiar and most remarkable. If a leaf, or a small portion of the root be applied to the lips, there are produced in a few minutes numbness and a remarkable tingling sensation. These effects endure for many hours. If the quantity taken into the mouth be somewhat larger, the palate and throat are affected. When, continues Mr. Pereira, *small* and repeated doses of the alcoholic tincture of the root are taken internally, they cause a sensation of heat and tingling in the extremities, and occasionally slight diuresis. The *extract of aconite* of the shops is little to be relied on. Many samples produce neither numbness nor tingling when rubbed on the lips and gums.

In comparing, says the writer just quoted, the operation of aconite with that of other cerebro-spinants, we observe that its most characteristic topical effect is *numbness* and *tingling*. Applied to the eye it causes *contraction of the pupil*. When the root or its tincture is swallowed, the most marked symptoms are *numbness and tingling of the parts about the mouth and throat and of the extremities, vomiting, contracted pupil, and failure of the circulation*. The heart appears to be weakened or paralyzed, and a state approaching to asphyxia is produced. *Convulsion* or *spasm* is not constantly present, and when it does take place, is probably a secondary effect arising from the incipient asphyxia. In neither of the cases recorded by Mr. Pereira nor in that of Mr. Sherwen did *stupor* occur; yet in some instances related, this symptom has presented itself.

As a *topical remedy*, aconite, in the form of tincture, gives speedy amelioration of the pains of rheumatism and neuralgia; and in many cases, after being repeated a few times, it completes the cure. It has been observed that where it succeeds it gives more or less relief at the first application.

Aconite has been administered internally by Fouquier in passive dropsies with success, and by Lombard in hypertrophy of the heart with similar results, depending on its decidedly sedative action on the heart. Dr. Lombard employs an alcoholic extract of aconite, and believes that it acts specifically on certain forms of rheumatism, and also on gout. Some of his patients expressed themselves as greatly relieved from their sufferings within an hour from the time of taking the medicine. The symptoms to which it gave rise were a certain degree of excitement of the brain, marked by a degree of gaiety, great vivacity, and nocturnal visions. He did not perceive any disagreeable effects arise in a single instance, although he has administered as much as a drachm and a half in twenty-four hours. But such a statement ought not to make us overlook the undoubted activity and, at times, violently poisonous effects of this drug in a much smaller dose than that just mentioned. The physicians of the Bordeaux Hospital had long been in the habit of administering the alcoholic extract of aconite in cases of neuralgia, chronic rheumatism, &c., in doses of from three to ten grains within twenty-four hours, without any disagreeable symptom resulting. They, however, procured subsequently from the druggist some fresh extract, of which they gave doses of five grains, each, to three patients — one of whom died three hours after taking the medicine, with all the symptoms of poisoning by aconite. The others recovered chiefly through the means of the free exhibition of stimulants.

Dr. Burgess expresses, after its use in three cases, his confidence in the efficacy of the extract of aconite for the cure of nervous headach, especially "in relieving that agonizing, harassing, and depressing pain to which the invalid is a martyr, and which almost renders life a burden." He ordered twelve grains of the extract of aconite to be made into twelve pills with liquorice powder, one of which the patient was directed to take every two hours. After three had been taken, the patient, a female, experienced a kind of giddiness and tingling sensation about the ears, temples, and forehead, together with slight trembling of the tongue. She continued, however, the use of the pills until the twelve were taken; and the relief from them was so entire that after the lapse of six weeks she stated that she felt perfectly free from those distressing headachs from which she had long suffered. (*Edinb. Med. & Sur. Journ.* July, 1840.) I have recently given the extract of aconite in two cases, one of spinal irritation, the other of protracted inter costal and lumbar neuralgia extending sometimes down the sciatic nerve, — with benefit. In the second case I gave a pill with a grain and a half of the extract in it and about the same quantity of jalap three times a day for a fortnight.

Aconitina. The effects of this alkaloid are similar to those of aconite root, but, of course, much more powerful. If the ointment or alcoholic solution of this substance be rubbed into the skin, it causes intense heat, tingling, and numbness, which continue for

more than twelve or eighteen hours. In very minute doses it has caused heat and tingling upon the surface of the body, and sometimes diuresis; but it cannot be administered internally with safety. In one case (an elderly lady), one-fiftieth of a grain had nearly proved fatal. Dr. Turnbull says that he has long since ceased to employ it in this way, as the slightest inattention on the part of the dispenser may be attended with fatal results.

The following are Dr. Turnbull's formulæ for using aconitina externally:—

1. *Unguentum Aconitinæ. Aconitine Ointment.* Aconitina gr. xvi; Olive Oil ℥ss; Lard ℥i. Mix. It is employed by friction with the finger for several minutes.

2. *Solutio Aconitinæ. Aconitine Embrocation.* Aconitina gr. viii; Rectified Spirit ℥ij. Dissolve. Used by friction-sponge (as a sponge toothbrush). Care must be taken not to employ it where the skin is abraded.

ACORUS CALAMUS (Gr. ἄκορον). *The Sweet Flag*, commonly called *Calamus Aromaticus. Cl.* 6. *Ord.* 1. Hexandria Monogynia. *Nat. Ord.* Acorideæ.

This is a common plant in moist situations, as upon the banks of rivers, and the borders of pools and marshes. The *rhizoma*, or rootstock, is the part in which its most active qualities reside.

When dry, the root has an agreeable aromatic odour, and a pungent and warm flavour. Its fracture is short and rough, and of a pale-buff colour. When too old, it loses smell and taste, and is often wormeaten or mouldy.

The *volatile oil* has a peculiar odour, less agreeable than that of the root, and is sometimes in demand for perfumery. Some writers on the Materia Medica say that this root is less prescribed than it should be; but there are so many more agreeable and equally effectual aromatic tonics, that it is nevertheless rarely employed. The infusion, in the proportion of from one to two ounces of the bruised root to one pint of water, is the best form of administering it. Its aroma is dissipated by boiling. It may also be given in powder, in doses from ten grains to half a drachm or two scruples.

Dr. Paris states (*Pharmacologia*) that it is so favourite a remedy with the native practitioners of India, in the bowel complaints of children, that there is a penalty incurred by any druggist who will not, in the middle of the night, open his door and sell it if demanded; but Dr. Thomson observes (*Mat. Med.*) that the Indian *acorus* is not our plant, but a variety described by Willdenow under the name of *acorus verus*, which is also a native of Tartary, Poland, and Flanders.

The rhizoma of the *acorus calamus* is said to cure the intermittents of Norfolk (England); its infusion may be used as a vehicle for cinchona, or for sulphate of quinine; and it is a good stimulant tonic in flatulent dyspepsia. The following are formulæ:—

℞ Acori contusi ℥j., infunde per horas quatuor in aquæ bullientis octario et cola.

℞ Infusi Acori f ℥jss.
Quiniæ disulphatis gr. ij.
Tinctur. Cinnam. f℥j.
M.: fiat haustus sextâ quaque horâ sumendus.

℞ Infusi Acori ℥vss.
Pulveris Acori ℥j.
Ammoniæ sesquicarbonatis, ℥ss.
Syrupi Aurantii,
Spiritus Cinnamom., ââ f℥ij.
M.: fiat mistura de qua sumantur cochlearia duo vel tria ampla urgente flatulentiâ.

ADEPS. *The Lard of the Sus Scrofa, or Hog.* This is a very useful article in the formation of ointments, and the more tenacious and unctuous class of liniments. It combines with the fixed and volatile oils, with camphor, and with the resins. It fuses at a temperature of about 100°, and, like other varieties of fat, it appears to consist of an *oil* and a *suet* in combination, which may be imperfectly separated by pressure between folds of bibulous paper. Chevreul has called the former ingredient *elaine*, and the latter *stearine*; from the Greek words ελαιον and στεαρ, signifying *oil* and *tallow.* By long exposure to air, lard becomes rancid and sourish, and in that state it acquires certain solvent and oxidizing powers, which it did not before possess. It is generally sold in bladders, and often contains a considerable portion of salt, which, previous to its pharmaceutical employment, should always be carefully removed by washing it in repeated portions of water.

ÆRUGO. *Verdigris. Diacetas Cupri impura.* Impure Diacetate of Copper. This is the impure *subacetate of copper* of the former Pharmacopœia; in the *notes* it is said to be partially soluble in water, and almost entirely soluble either in ammonia, or, with the assistance of heat, in dilute sulphuric acid. Verdigris, as it usually occurs in commerce, is generally an impure, and consequently uncertain, preparation of copper, and might be omitted in the list of the Materia Medica.

As far as all pharmaceutical purposes are concerned, *sulphate of copper* may be substituted. Independent of the adulterations to which common verdigris is subject, there is a substance occasionally found in trade, under the name of *English verdigris*, which is made by triturating acetate of lead and sulphate of copper with a certain quantity of chalk and water; the mixture is dried in cakes, and grape stalks added *ad libitum.*

According to Dr. Paris, powdered verdigris is the active ingredient in the quack medicine called *Smellome's Eye-Salve*, which may be imitated by rubbing half a drachm of finely-powdered verdigris with a little oil, and then mixing it with an ounce of yellow basilicon. An ointment composed of one drachm of finely-powdered verdigris, with one ounce of lard, or of spermaceti ointment, is sometimes useful in cutaneous affections, especially in psoriasis or tetter. Mixed with savin, verdigris is used to destroy venereal warts.

ÆTHER, or ETHER. This term is applied to a variety of products usually obtained by distilling mixtures of alcohol and acids; the composition of the product differs according to the acid employed; in some cases containing the acid or its elements, and in others, not containing them. The *æther sulphuricus* of the London Pharmacopœia is of the latter description; it contains no sulphuric acid, and is simply designated as *Ether*, whilst the ethers which include acids are distinguished by the name of the acid employed, as *nitrous ether*, *acetic ether*, &c.

Under the head *Ætherea* (preparations of ether), in the Pharmacopœia, directions are given for the preparation of *sulphuric ether* (æther sulphuricus), *ethereal oil* (oleum æthereum), *compound spirit of sulphuric ether* (spiritus ætheris sulphurici compositus), and *spirit of nitric ether* (spiritus ætheris nitrici).

Ether, as obtained by the Pharmacopœia process, is a transparent colourless liquid, of a penetrating and agreeable odour, and a pungent and sweetish taste. It is exhilarating, and produces a species of intoxication when its vapour is respired mixed with air. Its boiling point, under mean pressure, is about 98°, and it is so volatile that at common temperatures it cannot be poured from one vessel to another without sustaining loss by evaporation: its vapour is heavy and highly inflammable, so that much caution is requisite in regard to the approach of flame. Exposed to light, and to the occasional access of air, as in a bottle which is often opened, it becomes sour, from the formation of a little acetic acid; and when long kept, its properties are further modified. It is soluble in about nine parts, by measure, of water; and ether which has been agitated with water retains about a tenth of its volume of that fluid. It mixes in all proportions with alcohol, and the *spiritus etheris sulphurici* of the former Pharmacopœia was a useful solution of this kind, formed by mixing one part of ether with two of rectified spirit. This preparation is now omitted by the London College.

Ether is a very powerful and diffusible, but at the same time a transient stimulus, acting upon the brain nearly in the same way as alcohol, and therefore, to a certain extent, narcotic. In many instances it also proves antispasmodic; it is, however, most frequently administered in combination with alcohol, as in the *compound spirit of ether*.

A teaspoonful or more of undiluted ether has been successfully given in the cure of intermittent fever, immediately previous to the accession of the cold fit: it occasions a powerful shock to the system, momentarily taking away the breath, and giving great anxiety and uneasiness for a few seconds; but the febrile paroxysm is not unfrequently checked in its progress, and the disease has sometimes altogether disappeared; the practice, however, is by no means commendable. Hysterical fits, and even epilepsy, are said to have been successfully treated in the same way. In nervous fever, particular symptoms are often relieved by ether, and in a variety of spasmodic diseases it is advantageously employed, especially in

cramp and tetanic affections, and in the paroxysm of spasmodic asthma; in the latter case, and in catarrhal dyspnœa, the inhalation of the vapour of ether has been recommended; but the practice is not always safe, especially where determination of blood to the head is to be apprehended.

The usual *dose* of ether is from *twenty minims* to *two fluidrachms*, and it is usually prescribed in conjunction with other antispasmodics, especially camphor. The following is a very effectual form, applicable in any case of violent spasm: as the effect of ether is but transient, the dose should be repeated every hour, or every two or three hours, according to the effect produced, and to the severity of the symptoms.

℞ Ætheris Sulphurici f℥ss.; Misturæ Camphoræ f℥vij.; Syrupi Croci f℥ss. Fiat mistura, cujus sit dosis cochlearia tria ampla.

In the disease commonly called nervous headach, unattended by vascular fulness, and allied to the general debility of the nervous system, the following has proved effective:—

℞ Ætheris Sulphurici; Liquoris Ammoniæ, āā f℥ss.; Misturæ Camphoræ f℥x.; Aquæ Cinnam. f℥ss. Misce pro haustu bis vel ter die sumendo.

A small teaspoonful of ether in a glass of white wine is often an effectual remedy in allaying the distressing symptoms of sea-sickness, and in restoring the tone of the stomach after it.

Ether is applied externally as a refrigerant and stimulant; it produces the former effects by the facility and rapidity with which it evaporates. A little poured into the hand and held near the eye stimulates that organ, and is supposed to be useful in incipient corneal opacity. In all these applications of ether, great care should be taken to avoid the proximity of fire.

Ethereal oil is not used alone, and the only preparation into which it enters is *Hoffmann's anodyne liquor*, or, in the present Pharmacopœia, the *compound spirit of sulphuric ether*.

Compound Spirit of Sulphuric ether.—Take of Sulphuric Ether, eight fluid ounces; Rectified Spirit, sixteen fluid ounces; Ethereal Oil, three fluid drachms. Mix.

As far as the mixture of the ether and alcohol is concerned, this is a useful form, but the ethereal oil merely gives it a peculiar flavour, without modifying its activity; and as the uncertain process for ethereal oils is only retained in the present London Pharmacopœia for the purpose of this formula, both might, without inconvenience, have been omitted, provided the "Spiritus Ætheris Sulphurici," above alluded to, of the former Pharmacopœia, had been retained.

The medical uses of the *spiritus ætheris sulphurici compositus* are analagous to those of ether. Half a drachm to a drachm and a half is the medium dose. In faintness, low spirits, and generally as a nervine stimulant, it is prescribed, as in the following nervous mixture; compound spirit of lavender and syrup of red poppies being occasionally substituted for the compound spirit of ammonia and syrup of saffron, and pennyroyal-water for the camphor mixture

℞ Misturæ Camphoræ f℥vij.; Spiritûs Ætheris Sulphurici compos., Spiritus Ammoniæ compos., āā f℥ij.; Syrupi Croci f℥ss. Fiat mistura nervina, de qua sumantur cochlearia tria vel quatuor magna, urgente agitatione.

ÆTHER, NITRIC. This ether is not directed in our Pharmacopœia, but its alcoholic solution is employed under the name of *spirit of nitric ether.*

Spirit of nitric ether is the *spiritus nitri dulcis*, or sweet spirit of nitre, of old pharmacy. It is colourless, and has a very peculiar and agreeable odour and flavour. It is inflammable and volatile, and is always slightly acid, especially after long keeping. When it is so acid as to dissolve carbonate of soda with effervescence, or to act powerfully on litmus paper, it should be rejected. It mixes in all proportions with water and alcohol. If its specific gravity exceeds ·834 it is apt to contain water, or excess of acid, or both.

Spirit of nitric ether is diuretic and antispasmodic; and, conjoined with proper regimen, it also proves diaphoretic. Half a drachm to a drachm is the usual dose; it is sometimes given in low febrile affections, with saline remedies.

℞ Spiritûs Ætheris Nitrici f℥iij.; Liquoris Ammoniæ Acetatis f℥j.; Misturæ Camphoræ f℥ivss.; Syrupi Zingiberis f℥ij. Fiat mistura, cujus capiat cochlearia tria ampla subinde.

As a diuretic in dropsical affections, it is conjoined with other diuretics, such as acetate of potassa, nitre, squills, digitalis, &c.

℞ Infusi Armoraciæ compos. f℥iss.; Spiritûs Ætheris Nitrici, Syrupi Zingiberis, āā f℥j.; Tincture Scillæ ♏xx. Fiat haustus ter die sumendus.

℞ Infusi Digitalis f℥iv.; Aquæ Cinnamomi f℥v.; Potassæ Acetatis ℈j.; Spiritûs Ætheris Nitrici f℥i. M.: fiat haustus sextâ quâque horâ sumendus.

℞ Potassæ Acetatis ℥ss.; Misturæ Camphoræ, Infusi Quassiæ, āā f℥vj.; Syrupi G. Acaciæ, Spir. Æther. Nitr., āā f℥j.; Tincturæ Digitalis ♏vj. Fiat haustus ter in die sumendus.

The following often allays the troublesome tickling sensation in the throat which attends a common catarrh, but the mixture is very apt to ferment.

℞ Oxymellis f℥j.; Syrupi Papaveris, Spiritûs Ætheris Nitric., āā f℥ss. Fiat mistura, cujus sumatur pauxillum subinde.

ALCOHOL. A term of Arabian origin, applied by the alchemists to highly-rectified spirit of wine. In chemistry and pharmacy the term *alcohol*, or *absolute alcohol*, is used to denote a definite compound of carbon, hydrogen, and oxygen, obtained by depriving the *rectified spirit* of commerce of its adhering water.

Alcohol, from its solvent powers, is an important pharmaceutical agent; it dissolves the greater number of the alkaloids, resins, essential oils, and soaps, and several of the fixed oils. When diluted, as in the state of *proof spirit*, it is a good vehicle for the active ingredients of many vegetable substances; hence its applications in the form of *tinctures.* Medicinally considered, it is a valuable, but often mischievous, stimulant: it is always employed more or less diluted, as in the form of proof spirit, brandy, rum, and similar spirituous liquors, or of wine. It is used externally as a stimulant: and occasionally as a refrigerant, in consequence of the cold which is produced by its evaporation.

As remedial agents, spirituous liquors quicken and fill the pulse,

and elevate the sensible and thermometric heat of the body; they stimulate the brain and nervous system, and inebriate, or poison, when taken in excess, producing determination of blood to the head, wandering of the mind, great general excitement, succeeded by drowsiness and more or less insensibility, and afterwards headach and sickness. When taken in excessive quantity, fatal apoplexy, or coma, supervene, or death ensues from some more accidental cause, such as a fall, or suffocation during vomiting. In such cases, it sometimes happens that the patient may rally from the primary effects of the debauch, and then become delirious, and comatose, or sudden and fatal lethargy may supervene. There are also cases on record, in which large quantities of the stronger spirituous liquors have been taken at one draught and undiluted, as for a wager, or some similar folly; in such cases profound coma soon comes on, with stertorous breathing, and death often ensues, either almost immediately or in a few hours.

But if the habitual drunkard be not thus suddenly carried off by the consequences of his excesses, he becomes the prey of other forms of disease, such as tuberculated liver, and other local organic disorders, or epilepsy, or mania, or falls into a state of delirium, accompanied by tremors of the hand and limbs, succeeded by coma, or by furious mania, which, if not of immediate fatal termination, ends in the most miserable and melancholy of all forms of what is called slow death. In these cases the membranes of the brain are found, upon examination after death, to be more or less inflamed, and there is generally serous effusion; and the mucous coat of the stomach is in a pulpy state. All these forms of disease, and every modification of slow and rapid poisoning by alcohol, are now unfortunately too familiar to the medical practitioner, in consequence of the prevalence of gin-drinking; but they assume a variety of complicated aspects, as will be observed by reference to the numerous cases which have been published, dependent upon various pre-existent diseases or tendencies to disease; and, in the lower orders, are aggravated by the usual concomitants of poverty.

It is not my object here to consider in detail the manner in which alcohol acts, or the treatment which is best adapted to the relief of habitual inebriety. Sir Benjamin Brodie's experiments have rendered it probable that its principal effects are produced through the medium of the nerves upon the brain (*Phil. Trans.*, CI. 118); others conceive that it is absorbed, and enters the blood (*Christison on Poisons*, chapter XLI.), and have founded this opinion upon the smell of the breath, and upon its deleterious influence when injected into the cellular tissue.

The treatment of *drunkenness*, and its consequences, may be considered under two heads: 1, occasional; 2, habitual. Cases of the former kind, resulting from great excess of wine, which is a dilute, and in some respects, peculiar form of alcohol, generally relieve themselves by vomiting; but where this does not effectually ensue, and where the stupor is continuous or alarming, the stomach-

pump should be resorted to [and cold affusions practised on the head and neck, ears, &c., and ammonia, or the acetate of ammonia internally; if there be evidences of cerebral congestion, cupping will be of service, and if of suspended animation from asphyxia, artificial respiration should be used]; yet even an occasional or accidental debauch, in habits predisposed to certain diseases, sometimes proves fatal, or lays the foundation of a fatal consequence, such as cerebral inflammation, apoplexy, or inflammatory fever. The latter cases, however, or those in which spirituous liquors, and especially alcoholic liquors, by which I mean those obtained by distillation, are habitually, and therefore excessively indulged in, are of a very complicated character, and generally very difficult to manage; for abstinence from the usual excitement, even if it could be insisted on, is not unfrequently productive of maladies almost as serious as those consequent upon its continuance; the mind, as well as the body, is almost always more or less affected, and the chronic diseases of the latter are not only numerous but peculiarly obstinate. The stomach, liver, kidneys, bladder, mucous membranes, and brain, one or all, may be the seat of various morbid actions, which are sustained by the slow poison; and if abstinence from the usual stimulant be enforced, there is a sinking of the energies of mind and body, and an indescribable restlessness, and sensation of lassitude and misery, which must be witnessed to be fully understood, and to avoid which, the unfortunate sufferer is induced not only to continue the habit which has brought it on, but to increase the quantity of the stimulant; hence it is that inveterate cases of habitual tippling are never cured; that those which are attacked in an earlier stage are very difficult of cure; and that poverty, and mental distress, which are so often the drunkard's excuse, though, perhaps, at first mitigated, come upon him afterwards with additional and irremoveable horrors. Among the lower orders, the great temptation to drink (I mean the habitual use of gin, and similar ardent spirits), is temporary excitement, and a lessened appetite for bread and meat, and such expensive necessaries of life; the higher and educated classes of society too often find an oblivious antidote in the same dangerous delusion: the result is as surely fatal in the one case as in the other, and as the habit, when once established, can scarcely, for the reasons I have stated, admit either of palliation or remedy, it becomes the duty of the moral and medical philosopher, to turn all his powers of advice and persuasion towards prevention, and to paint in strong colours the utter hopelessness of a cure.

In answer to these trite remarks, there are some who, admitting the evils of habitual drunkenness, advocate diurnal excess, in telling of statesmen, philosophers, and poets, who, in the enjoyment of health of mind and body, have attained a respectable old age, and have yet been what is called "two bottle men:" but such cases are rare exceptions to the rule, and, when carefully inquired into, are almost all fallacies. It is true that some herculean constitutions

will resist all ordinary causes of wear and tear; but in general, persons in advanced life who indulge, with apparent impunity, in such excess, have passed through its earlier periods abstemiously and actively, and have only gradually habituated themselves to a more luxurious diet, as the advances of age have crept upon them, in the enjoyment of worldly prosperity and mental quiet: habits of inebriety are, in fact, rarely acquired late in life; and never, by persons who are fit for anything else. Old debauchees, when other sources of bodily gratification fail, will occasionally take to the bottle, and so demolish a constitution which had resisted the other inroads of disease. In these days, it is fortunately almost unnecessary to caution the young, among the educated classes of society, against the fatal consequences of inebriety: the drunkenness and profaneness of the olden time are now happily out of fashion, and though other and equally mischievous vices may possibly prevail, they are not such as find a place under the subject now before us. —*Brande.*

ALE, *see* FERMENTATION.

ALEXIPHARMICS (from αλεξειν, *to repel*, and φαρμακον, *poison*). Articles of the Materia Medica, supposed to be antidotes to poisons.

ALEXITERICS (αλεξειν, *to repel*, and τηρειν, *to preserve*). Repellents of, and preservatives against, poison. The *aqua alexiterica* of the *London Pharmacopœia* for 1764, was a distilled water of mint, wormwood, and angelica.

ALIMENT. *Alimentum* (from *alere*, to nourish). Food. That which is capable of supporting life, and of nourishing the body. Medical observations on the general qualities and relative nutritive powers of vegetable and animal food, and an enumeration of their varieties, constitute a branch of dietetic medicine sometimes included under the term *materia alimentaria.*

ALKALI, or ALCALI. *Arabic.* This term is generally limited to substances of a peculiar acrid taste, soluble in water, and capable of neutralising the acids, and converting many vegetable blue colours to green, yellows to brown, and certain reds (or blues which have been reddened by acid) to blue. It is usually limited to *potassa*, or the vegetable alkali; *soda*, or the mineral alkali; and *ammonia*, or the volatile alkali. These alkalis convert the oils into soaps, which are soluble in water; they also combine with carbonic acid to form soluble carbonates. There are some of the earthy bodies which are called *alkaline earths*, in consequence of their partaking more or less of the alkaline properties. Potassa and soda are called *fixed alkalis*, from resisting a red heat without evaporation; and they, as well as the alkaline earths, are *metallic oxides.* Ammonia is a compound of hydrogen and nitrogen.

ALKALOID (from *alkali* and ειδος, *like*). Certain proximate principles of vegetables, many of which are crystallizable, and in which the characteristic medical properties of the plant chiefly reside, have been termed *alkaloids*, because they neutralise acids and act upon vegetable colours like alkalis, such as cinchonia, quinia, morphia, strychnia, &c.

ALKANET (*Alkana*, a reed. *Arabian*). The root of the *Anchusa tinctoria*. It contains a red colouring matter, soluble in oils, and hence was formerly used for tinging salves and ointments. Lip-salve is often coloured red by this drug.

ALLIUM. *Garlic.* The bulb of the *Allium sativum*, or common garlic. *Cl.* 6. *Ord.* 1. Hexandria Monogynia. *Nat. Ord.* Asphodeleæ.

Garlic is now principally used in cookery, and is well known as a heating condiment. Bergius prescribed it in agues, Sydenham in dropsy, and Lind in scurvy; and when boiled in milk, it has long been used as an anthelmintic. A gentleman who had suffered under a complication of what were termed nervous diseases, recovered after partaking largely of a soup overseasoned with garlic, which was followed by the evacuation of a long round worm, evidently the cause of his distressing symptoms. Garlic generally heats and stimulates, aggravating the temporary fever from which most persons suffer after partaking of highly-seasoned dishes. It soon impregnates the secretions with its odour. Externally it is sometimes applied to the soles of the feet, in the form of poultice, to cause what is called a *revulsion* from the head or breast, and is a common domestic application to indolent tumours and tardily-suppurating boils. A boiled clove of garlic is often put into the ear, to remedy those cases of deafness attended by deficient ceruminous secretion. The pulp or juice of garlic is an active rubefacient, but its acrimony is much diminished by continued boiling.

Dr. Paris observes, that garlic has a considerable analogy to squill and onion, and, like them, exerts a diuretic, diaphoretic, expectorant, and stimulant operation. Taylor's remedy for deafness is said to consist of oil of almonds impregnated by garlic and coloured by alkanet root. Garlic is also an ingredient in the different aromatic vinegars recommended by various foreign authors as antidotes to contagion. The most powerful antidotes to the flavour of this tribe of vegetables are said to be the leaves and seeds of the aromatic *umbelliferæ;* hence the odour of the breath, after partaking of onion or garlic, is counteracted by parsley; and if leek or garlic be mixed with a combination of aromatic ingredients, its virulence will be greatly mitigated and corrected.—(*Pharmacologia.*)

ALLSPICE, *see* PIMENTA.

ALMONDS, *see* AMYGDALA.

ALOE. *Aloës.* The inspissated juice of the *aloë spicata*. *Cl.* 6. *Ord.* 1. Hexandria Monogynia. *Nat. Ord.* Asphodeleæ.

This plant is found largely in Africa, and is cultivated in Jamaica, Barbadoes, &c., and in Hindostan. The *aloe vulgaris* is a native of Greece, and supplied the aloe of the ancients.

The finest aloes is the expressed juice of the leaves of the plant, which is inspissated by exposure to the sun and air. It has a brilliant reddish-brown colour, and is translucent at the edges of the fragmented pieces: its fracture is smooth and conchoidal, its odour aromatic and rather agreeable, its powder deep gold colour, its

taste intensely bitter and nauseous. But such is rarely found in trade: it is generally opaque, of a dull-brown (*Hepatic aloes*), often passing into black (*Caballine aloes*), of a disagreeable odour, and very nauseous taste. The inferior kind of aloes is obtained by cutting the plant into pieces, and boiling it in water; this decoction is then evaporated to the consistence of honey, when it is poured into large gourd shells, in which it becomes concreted.

Aloes appears to be a mixture of gum, extractive, and a little resin; but whether its activity resides in one or all of these components has not been accurately ascertained. The relative proportion of the extractive to the resin has been variously stated, and of course differs in the different kinds: the bitter extract will be found to constitute 70 to 80 per cent. of the commonly occurring aloes, and the resin, or altered extract, 20 to 30 per cent. The action of nitric acid upon aloes is attended with some interesting chemical results, which have been examined by Braconnot (*Ann. de Chimie et Physique*, LXVIII. 24), but they throw no light upon its medicinal uses. Aloes is nearly soluble in boiling water, but, as the solution cools, some resin and altered extractive are thrown down: the alkalies and their carbonates form with it permanent solutions, and proof-spirit dissolves and retains it with only a slight precipitation of resin.

The medical qualities of aloes give it a place of its own in the Materia Medica. It is a warm stimulating purgative, but slow in its operation; its action is chiefly upon the large intestines, of which it singularly promotes the evacuation, probably by increasing the muscular or peristaltic action rather than by augmenting their secretions, for it rarely produces liquid motions. It generally sits well upon the stomach, and its bitterness promotes appetite and digestion; when in the small intestines, it creates little alarm, and is seldom perceived till the sigmoid flexure of the colon feels its influence, the peristaltic movements of which are often perceptibly increased to the sensations of the patient, and then the rectum is quietly emptied.

Much has been said of the mischief done by aloes in irritating the rectum, and no doubt it is liable to create excitement there, but this is only where it is frequently used, and, in cases of habitual costiveness, all purgatives are open to the same objection. Sedentary, studious, and idle persons, and more especially females in the higher classes of society, often resort to purgatives to obtain that regularity of intestinal evacuation which bodily exertion and due exercise only will insure; and aloes, in consequence of its moderate, but at the same time certain operation, is among the usual remedies thus erroneously employed; whence a portion of the ill fame which it has acquired, as especially productive of piles and uterine and rectal irritation.

In all cold indolent habits, where costiveness is attended by general sluggishness of the circulating system, with loss of appetite, irritability of temper, with disinclination both to mental and bodily

exertion, and other symptoms of the milder hypochondriasis; where there is dyspepsia in females, blended with the disorders which arise from irregularity and inertness in the uterine system, aloes, in one or other of the forms to be presently mentioned, is a valuable and safe remedy; and is by far the most certain and secure substance for the relief of that temporary, but often obstinate and injurious costiveness, which usually follows the exhibition of opium.

But there are cases in which aloetics are hurtful, such, for instance, are plethoric and irritable habits, subject to hæmorrhoidal affections, or to excessive uterine evacuations.

The *dose* of aloes may vary from *two* to *ten* or *fifteen grains;* about five grains will usually evacuate the bowels in one or two bulky motions; but it is seldom that we give aloes alone; it is usually combined with stomachics, tonics, other purgatives, or with nervine stimulants.

The following pills are useful for obviating costiveness in dyspeptic habits, but they should not be kept too long in a dry place, as they are apt to become hard, and so insoluble as to pass through the bowels, an inconvenience which may to a great extent be remedied by the addition to the mass of about a fourth part of sugar or of soap.

℞ Pulveris Aloës, Pulveris Mastiche, Pulveris Rhei, āā ʒss; Aquæ q. s. ut fiant massa in pilulas xxiv. dividenda, quarum sumantur duæ vel tres ante prandium.

The time for taking these pills is immediately before dinner; they then blend with the food, prevent flatulency, and are usually found to be operative the following morning after breakfast.

There is a large quantity of aloes prepared in Barbadoes, and exported thence in large gourds, which contain upwards of half a hundred weight each.

It is deeper coloured and more opaque than the former; its consistence is tougher, its fracture less shining, and its odour strong and peculiar, especially when breathed upon; the colour of its powder is dirty-yellow, and is said to be more active than Socotrine aloes, and hence, though its price usually exceeds that of the other varieties, it is preferred in the preparation of horse medicines, a channel by which enormous quantities of aloes are consumed.

Compound Decoction of Aloes. — Take of Extract of Liquorice, seven drachms; Carbonate of Potassa, a drachm; Aloes, powdered, Myrrh, powdered, Saffron, of each a drachm and a half; Compound Tincture of Cardamom, seven fluid ounces, Distilled Water, a pint and a half. Boil down the liquorice, carbonate of potassa, aloes, myrrh, and saffron, with the water, to one pint, and strain; then add the compound tincture of cardamom.

Cinnamon or peppermint water may be substituted for the compound tincture of Cardamom.

In this formula, the aloes is rendered permanently soluble by the alkaline carbonate; the liquorice covers its nauseous flavour, and the myrrh is tonic and stimulant; the tincture of cardamom or its equivalent renders it grateful to the stomach, and preserves it from

decomposition. The saffron, which might be omitted, is by some conceived to improve its flavour, but to most persons renders it more disagreeable.

In doses of *half an ounce to an ounce* this is a mild warm aperient, and a useful form of aloes: it somewhat resembles the "Baume de Vie" of the French pharmaceutists, but is less purgative and bitter. In some hysterical, hypochondriacal, and spasmodic affections, and where the bowels have become torpid from the use of opiates, an ounce every morning, or every other morning, will generally produce one or two free motions. In dyspepsia it corrects acidity and flatulency, and often relieves palpitation, headach, sickness, and other symptoms of disordered digestion. It may be given with some aromatic water or infusion, and in some cases its aperient quality may be increased by the addition of infusion of senna.

Enema of Aloes.—Take of Aloes, powdered, two scruples; Carbonate of Potassa, fifteen grains; Decoction of Barley, half a pint. Mix and rub them together.

In mixing these ingredients, the aloes and carbonate of potassa should be well rubbed together, and the decoction of barley gradually added, so as to insure solution. Aloetic enemata are sometimes useful in cases of amenorrhœa, attended by a loaded state of the lower bowels; they are also employed for the dislodgment of ascarides.

Purified Extract of Aloes.—Take of Aloes, powdered, fifteen ounces; Boiling water, a gallon. Macerate for three days by a gentle heat, then strain and set by, that the dregs may subside. Pour off the clear liquor, and evaporate to a proper consistence.

The dose of this extract is from five to fifteen grains, in the form of a pill; it is supposed to be a less stimulating purgative than the original aloes, but where aloetics are required, the original drug is preferable.

Compound Pills of Aloes.—Take of Aloes, powdered, an ounce; Extract of Gentian, half an ounce; Oil of Caraway, forty minims; Syrup, as much as may be sufficient. Rub these together until incorporated.

The above and similar combinations of aloes with bitters and aromatics, are often resorted to in habitual costiveness, and some forms of dyspepsia: this pill is apt to be too soft to retain its figure, otherwise it is a good medicine. From *five* to *twenty grains* is a *dose:* two pills of five grains each, taken two hours before dinner, generally evacuate the bowels once or twice in the evening or following morning.

Pills of Aloes with Myrrh.—Take of Aloes, two ounces; Saffron, Myrrh, each an ounce; Syrup, a sufficient quantity. Reduce the aloes and the myrrh separately to powder; then beat the whole together until incorporated.

These pills have long had a place in the different Pharmacopœiæ, under the name of *Pilulæ Rufi.* The saffron is useless, except, perhaps, as dividing the other ingredients; but the mixture of myrrh and aloes affords a good purge in chlorotic and leucophlegmatic habits. Two or three pills of five grains each may be taken

twice or thrice daily, and the mass is frequently conjoined with the sulphate or some other preparation of iron. These, and many other pills, are apt to become hard and inactive by keeping, so that it is generally better, in regard to these formulæ, to keep the ingredients ready mixed in the form of powder, and to add the syrup at the time the pills are made.

Compound Powder of Aloes.—Take of Aloes, an ounce and a half; Guaiacum Resin, an ounce; Compound powder of Cinnamon, half an ounce. Rub the aloes and guaiacum resin separately into powder; then mix them with the compound powder of cinnamon.

This powder has been recommended as a warm diaphoretic purge, the dose being from ten to fifteen or even twenty grains; but it is an awkward and nauseous mode of administering aloes, and requires to be made into pills, for which the addition of syrup or mucilage is necessary.

I have prescribed with advantage aloes and the sulphate of potassa in amenorrhœa.

I omit a notice of the tincture and wine of aloes.

There are other pharmaceutical formulæ into which aloes enters, and which will be noticed under other heads, such as the compound extract of colocynth (*see* Colocynth) the compound gamboge pills (*see* Gambogia), and the compound rhubarb pills (*see* Rheum).

ALTERATIVES. (*Altero, I change.*) Medicines by which the healthy functions of the body are slowly and gradually re-established, without the intervention of any sensible evacuation, either from the skin, stomach, or bowels. Small doses of the most powerful and active remedies occasionally operate as alteratives; hence mercurials and antimonials, and compounds of iodine and of bromine, are frequently administered in *alterative doses:* there are several mineral waters also which rank amongst the most effective alteratives. These medicines are generally administered daily for a considerable period, and some of them require to be given in large doses, especially certain *vegetable alteratives*, such as sarsaparilla.

ALTHÆÆ FOLIA ET RADIX. The leaves and root of the *Althæa officinalis, or Marshmallow* (from ἀλθέω, *I heal*, from its supposed healing qualities). *Cl.* 16. *Ord.* 8. Monadelphia Polyandria. *Nat. Ord.* Malvaceæ.

The marshmallow is a native of England, and grows in marshy places and near the shore; it flowers in July and August.

The roots are dug up for use in the autumn. 100 parts of the dried root contain, according to Meyer, mucilage with malic acid and several salts, 20: sweet extractive matter, 10·14: starch and inulin, 2: woody fibre, 66. Plisson has shown that the supposed principle called *althein* is asparagin, which this root yields in small quantity.

It is difficult to say why the leaves and root of marshmallow are still retained in the Pharmacopœia; their decoction is sometimes employed as a demulcent drink; but barley water, and other similar mucilaginous liquids, are preferable, and less liable to decomposition.

ALUMEN, Alum. *Sulphas Aluminæ et Potassæ.* Sulphate of Alumina and Potassa. "It is entirely soluble in water: from the solution, ammonia or potassa, when added, throws down alumina, free from colour, which again dissolves when potassa is added in excess."

Alum, in the crystallized form, consists of

	Atoms.	Equivalents.	Per cent.
Sulphate of Alumina	3	174	35·73
Sulphate of Potassa	1	88	18·07
Water	25	225	46·20
Crystallized Alum	1	487	100·00

Alum is a powerful astringent, but it is chiefly employed externally. It is sometimes prescribed in doses of from five to fifteen grains, conjoined with aromatics, but it is apt to gripe and nauseate. It has been administered in agues, internal hemorrhages, and gleets; in the latter, *alum-whey* has sometimes proved useful; it is prepared as follows:—

℞ Lactis Vaccini bullientis, oct. j.; Aluminis contriti, ʒij Ebulliant simul ut fiat coagulum, coletur serum, et sumatur cyathus subinde.

Alum may also be given in pills:—

℞ Aluminis contriti, Pulv. Cinnam. compos., āā ʒss.; Confectionis Rosæ Gallicæ q. s. ut fiat massa in pilulas xviij. dividenda; ij. vel. iij. pro dosi.

Externally applied, aluminous solutions are useful in chronic ophthalmia and in gleets, and alum forms a good addition to gargles, in relaxed uvula.

In these cases it may be prescribed as follows:—

℞ Aluminis, gr. vj. Solve in Aquæ Rosæ f ʒv. ut fiat collyrium.

℞ Aluminis ℈j.; Aquæ Rosæ, f ʒv.; Mellis Rosæ, fʒvj. M. fiat gargarisma sæpe utendum.

A saturated solution of alum is recommended by Dr. Scudamore as a remarkably efficacious styptic. One ounce of water holds about thirty grains of alum in permanent solution.

What is termed *alum-curd* is sometimes used as an astringent and cooling external application. It is made by beating up the white of an egg with a piece of alum till it forms a coagulum.

Dried Alum.—Let alum liquefy in an earthen vessel on the fire, then let the fire be increased till the ebullition has ceased.

In this process, the greater part of the water of crystallization of the alum is expelled, so that it loses nearly half its weight, and becomes a white porous mass; but care must be taken, not so far to increase the heat as to decompose the remaining salt.

Alum, by drying, is rendered more active, as an external application, and in this state it forms an ingredient in some styptic powders.

Compound Solution of Alum.—Take of Alum, Sulphate of Zinc, of each one ounce; Boiling water, three pints; dissolve the alum and the sulphate of zinc together in the water; then filter.

This is the *aqua aluminosa Bateana* of the London Pharmacopœia of 1745. It is a powerfully astringent solution. It furnishes

a good collyrium in some cases of ophthalmia, diluted with rose or elder-flower water; but it must be recollected that mischief frequently results from the injudicious use of corrugating eye-washes. A small proportion of mucilage of gum arabic is often a good addition to astringent injections; it retains them longer upon the parts: upon this principle the following may be used for the cure of gleet:—

℞ Liquoris Aluminis compositi, f℥vj.; Aquæ destillatæ, f℥vjss.; Misturæ Acaciæ, f℥vss. M.

The following collyrium may be employed in ophthalmia, after local bleeding has been properly resorted to:—

℞ Liq. Alum. compos. f℥ss.; Aquæ Rosæ f℥vss. Misce.

The above, and other aluminous solutions, are often used as detergent applications to old ulcers, and they are sometimes very effective in relieving chilblains. Salts of zinc and of iron may be correctly combined with aluminous solutions, but when any soluble salt of lead is added to them, an insoluble sulphate of lead is immediately formed. Thus, if solutions containing equivalents of acetate of lead and of alum are mixed, sulphate of lead is precipitated, and acetate of alumina remains dissolved. No considerable portion of alcohol can be added to a solution of alum, without either immediately precipitating a portion of the salt, or causing it shortly to deposit a crystalline sediment; hence the impropriety of mixing spirituous preparations with aluminous lotions.

AMBER. *Succinum.* A fossil resin, chiefly brought from the southern coast of the Baltic, where it is thrown up on the beach; it is also found in the beds of brown coal and bituminous wood. It is of various shades of yellow, more or less transparent, and a little heavier than water; it appears to contain two distinct resins, bitumen, volatile oil, and succinic acid. When heated, it fuses, burns, and exhales an agreeable aromatic odour. It has a place in the Materia Medica, as a source of a peculiar volatile or empyreumatic oil.

Rectified oil of amber has a pungent acrid taste, and a peculiar but not unpleasant odour: it is insoluble in water, and sparingly soluble in alcohol. In doses of from five to fifteen minims, this oil was once esteemed as an antispasmodic stimulant, and prescribed in hysterical and convulsive affections, either in pills, or diffused by the aid of mucilage, or of yolk of egg, in aromatic waters. It is now scarcely ever used, except externally; and as it appears to possess no efficacy beyond that of a stimulant, its high price and strong odour are against its employment. The following liniment, rubbed upon the chest two or three times a day, has been recommended in hooping-cough:—

℞ Tincturæ Camphoræ, Tincturæ Opii, Olei Succini, āā f℥ss. Fiat linimentum.

A celebrated empirical remedy for this disease, known under the name of *Roche's Embrocation,* is said to be composed as follows:—

℞ Olei Succini, Olei Caryophillorum, āā f℥ss; Olei Olivæ f℥j. Misce.

AMMONIA. *Volatile Alkali. Sal ammoniac*, the substance from which pure ammonia is chiefly obtained, was originally procured by burning the dung of camels, which was collected for the purpose near the temple of Jupiter Ammon, in Egypt, whence the term, *Sal ammoniac*, and *ammonia*.

Ammonia, in its pure or gaseous state, was first obtained by Priestley; its composition was afterwards determined by the two Berthollets, and ultimately accurately settled by Gay-Lussac.

To procure ammonia, two parts of dry quicklime and one of sal ammoniac (hydrochlorate of ammonia) are to be separately powdered, then mixed, and introduced into a small retort; upon the application of a moderate heat, *ammonia* is evolved in the form of a gas, extremely soluble in water, so that when it is required pure, and in its gaseous state, it must be collected in the mercurio-pneumatic apparatus.

The specific gravity of ammonia, as compared with air, is as 590 to 1000, or, compared with hydrogen, as 8500 to 1000; so that it is much lighter than air, and much heavier than hydrogen; 100 cubical inches weigh between 18 and 19 grains; it is pungent and acrid, and, therefore, unrespirable; but when largely diluted with air, it is an agreeable nasal stimulant; it has a powerful alkaline action on vegetable colours, but the change of tint is only temporary, and disappears as the ammonia, in consequence of its volatility, escapes. It retains its gaseous state at all common pressures and temperatures; but when subjected to a pressure of six and a half atmospheres, it is condensed, at the temperature of 50°, into the liquid form. It is greedily absorbed by water, which, at the temperature of 50°, is capable of taking up between six and seven hundred times its volume of gaseous ammonia; the specific gravity of this saturated solution is ·875, that of water being 1000 (*see* Liquor Ammoniæ).

When ammonia is passed through a red-hot tube, or subjected to a long succession of electric sparks, its volume is doubled, and it is decomposed into a mixture of hydrogen and nitrogen gases, which, therefore, are its elements:—

	Atoms.	Equivalents.	Per Cent.	Volumes.
Nitrogen	1	14	81·13	1
Hydrogen	3	3	18·87	3
Ammonia	1	17	100·000	2

Ammoniæ Hydrochloras, hydrochlorate of ammonia (Sal ammoniac). — This salt, dissolved in lotions, furnishes a good stimulating discutient; and if previously mixed with about its weight of powdered nitre, and dissolved in six or eight parts of cold water, it produces a very cold lotion, which may sometimes be employed as a substitute for ice. It is rarely used internally, though it acts as a refrigerant and diuretic, in doses of from five to twenty grains dissolved in water. In all cases of its employment, the fixed alkalis and alkaline earths, as also solutions of lead and silver, are incompatible with it.

The solution of ammonia, or *Liquor Ammoniæ*, is procured by the admixture of sal ammoniac with quicklime in water. This *liquor ammoniæ* contains about 10 *per cent.* of ammonia, and the *liquor ammoniæ fortior* contains about 30 *per cent.;* for the proportion of ammonia in these aqueous solutions is inversely as their densities.

In medicine, the above *liquor ammoniæ* is employed as a powerful stimulant and antacid; it may be given in *doses* of from *fifteen minims to half a drachm or a drachm*, in various degrees of dilution. It is an effective nervous stimulant in certain paralytic affections, and in those cases of indistinct vision and noise in the ears to which nervous persons are subject, and which sometimes appear connected with debilitated digestive powers. Faintness and giddiness, and the stupor of drunkenness, are also frequently immediately relieved by a due dose of ammonia; and in heartburn and acidity in the stomach and *primæ viæ*, it is useful, not merely as a stimulant, but as neutralizing the irritating acid matter. In such cases it may be conveniently given with small doses of bitters, and occasionally with a little magnesia, as in the following formula: in all these cases, however, preparations of carbonate of ammonia are usually substituted for the pure alkali:—

℞ Liquoris Ammoniæ, Aquæ Cinnam., Infus. Gentianæ compos., āā f ℥ss.; Mistur. Camphoræ f ℥i. M. fiat haustus.

In the latter stages of typhus, in which tremors and *subsultus tendinum* occur, moderate doses of ammonia, in conjunction with aromatic confection, and analogous cordials, are sometimes prescribed: but it must be recollected, that although a powerful, it is a transient stimulus. A large dose of ammonia, diluted with such a quantity of water as may enable it to be swallowed without much inconvenience, often operates as an emetic, especially if followed by a draught of warm water; but, although it has been recommended in this way, in some cases of asthma and pulmonary obstruction, it is not to be relied on.

In pyrosis or water-brash, ammonia with small doses of opium is of service, and in a variety of spasmodic disorders, similar combinations, with ether, may be resorted to; they also prove diaphoretic.

As a *nasal stimulant*, liquid ammonia is used for the relief of headach, faintness, and vertigo. A piece of rag moistened with it, and applied to the region of the stomach, in cases of spasmodic pains of that viscus; to the throat externally, in the varieties of inflammatory sore throat; or to the joints in rheumatic affections, is a remedy often useful: but in such cases, combinations of ammonia with oily substances are usually to be preferred.

An ointment prepared and recommended, after much experience, by M. Gondret, is the "*pommade ammoniacale*," with the name of the inventor to more particularly designate it. He directs its composition, as follows: Take of hog's lard seven drachms, mutton suet or oil of sweet almonds one drachm, solution of ammonia (of

twenty-five degrees) from five to six drachms. Melt the hog's lard and suet, or, if oil, mix the melted lard with it and pour them into a wide-mouthed bottle with a ground glass stopper; then add the ammonia, close the bottle, mix the contents together by shaking, and keep the mixture in a cool place. If a rubefacient effect is sought, its application for one or two minutes, spread thickly on linen, answers the purpose: in case vesication is required, a similar application for five or ten minutes produces the effect. On the other hand, should absolute cauterization be desired without alarming the patient, or shocking the prejudices of certain medical men against the cautery, a somewhat longer application attains this end.

It has been proposed to inhale ammonia, duly diluted with atmospheric air, in the latter stages of pneumonia, and in cases where the bronchial tubes are loaded with mucus which cannot be expectorated; but, if so employed, the utmost caution must be observed in regard to the quantity administered, and the mode of administration; for ammonia is an acrid or irritant poison, and there are several cases on record where it has acted as such, having been inadvertently administered in over-doses, or strong liquid ammonia incautiously applied to the respiratory organs.

Ammonia is sometimes spoken of as an antidote to certain poisons, and more especially where persons have been bitten by venomous snakes. *Eau de luce* (the *tinctura ammoniæ composita* of the present London Pharmacopœia), which is strong liquid ammonia, flavoured by oil of amber, and of lavender, and rendered milky by mastic, is among the remedies most esteemed in these cases, in many parts of India; but we have no satisfactory evidence of its real efficacy, either as relates to its external or internal use. In very mild cases, so powerful a stimulant may possibly be of service; the sting of the scorpion, and the bite of the viper, are said to have been thus successfully treated, but in these cases, the symptoms are so various in different individuals, and so seldom fatal, that no specific virtue can be assigned to ammonia upon such evidence.

Ammonia is one of the most powerful, but, for reasons assigned above, the least manageable of the antidotes to hydrocyanic acid, which see.

As an external stimulant, ammonia is almost exclusively applied in the form of Liniment, which see.

Sesquicarbonate of ammonia, the *ammoniæ subcarbonas* of the former Pharmacopœia, is obtained by sublimation, from a mixture of *sulphate of ammonia* and carbonate of lime, or from hydrochlorate of ammonia and carbonate of lime.

Sesquicarbonate of ammonia is an antacid, and nervous stimulant, useful in the same cases as the *liquor ammoniæ*. It is generally given in solution, and often with aromatics, as in the *spiritus ammoniæ compositus*, but its solid form renders it a proper ingredient in pills; and when mixed with extracts, it does not readily escape by evaporation. It may be given in doses of from two to ten or twelve grains; in larger doses, it is apt to nauseate.

The following may be adopted, where it is required in the form of pill: —

℞ Ammoniæ Sesquicarbonatis pulver., Extracti Gentianæ, āā ʒss. Fiat massa in pilulas xij. dividenda, quarum sumatur una bis vel ter die.

Saturated by citric acid, ammonia is sometimes employed in preference to citrate of potassa, and is thought to be more diaphoretic; as in the following "Haustus ammoniæ citratis:" —

℞ Ammoniæ Sesquicarbonatis ℈j.; Succi Citri recentis fʒvj.; (Vel Acidi Citrici Cryst. gr. xxiv.); Aquæ Destillatæ fʒvij.; Syrupi Tolutani fʒss. M.

Coarsely bruised, and scented with a little oil of lavender, cloves, or bergamot, sesquicarbonate of ammonia forms common *smelling salt*, and is a nasal stimulant in faintness and hysteria, and serves as an occasional substitute for snuff, where persons are desirous of breaking themselves of its habitual use. A little calcined magnesia, or a few drops of the strong solution of ammonia, renders the smelling-bottle more pungent; and in some cases, coarsely-powdered glass, moistened with strong and scented solution of ammonia, is a good substitute for the salt. Reduced to fine powder, and mixed with lard, or spermaceti ointment, it is sometimes usefully applied as a rubefacient; it may also be employed as an adjunct to anodyne plasters, for rheumatic and muscular pains. One part of the powdered salt, mixed with three of extract of belladonna, and applied in the form of a plaster, is effectual in allaying some rheumatic and spasmodic pains.

We occasionally hear of carbonate of ammonia acting as a poison. Huxham has related a case of a young man who had acquired the strange habit of chewing this salt. (*Essay on Fevers*, p. 308, as quoted by Dr. Christison.) He was seized with hemorrhage from the nose, gums, and intestines; his teeth dropped out; wasting and hectic fever ensued; and although he was at length prevailed on to abandon his pernicious habit, he died of extreme exhaustion, after lingering several months.

Solution of Acetate of Ammonia.—Take of Sesquicarbonate of Ammonia, four ounces and a half, or as much as may be sufficient; Distilled Vinegar, four pints: add the sesquicarbonate of ammonia to the vinegar till it is saturated.

When pure acetic acid is saturated by ammonia, and carefully evaporated, prismatic crystals of the acetate are obtained, which, when heated to about 250°, lose ammonia, and yield a crystalline sublimate of bicarbonate of ammonia. The neutral salt probably consists of

	Atoms.	Equivalents.	Per Cent.
Ammonia	1	17	25
Acetic Acid	1	51	75
Acetate of Ammonia	1	68	100

Liquor ammoniæ acetatis is sometimes prepared by saturating strong acetic acid with solution of ammonia, and duly diluting the solution. It is generally slightly turbid, or has a yellowish tint, which may be removed by filtering it through a little well-burned

charcoal. It is the *spirit of Mindererus* of old pharmacy, and has long been employed as a diaphoretic febrifuge; though in itself not very active, it is usefully conjoined with other diaphoretics. The dose, in such cases, is from half an ounce to an ounce, in conjunction with syrup of poppies, spirit of sulphuric ether, compound powder of ipecacuanha, antimonials, &c. The following is a good night draught for allaying the restlessness and irritation that often attends a common catarrh :—

℞ Liq. Ammoniæ Acetatis, Mistur. Camphoræ, āā f℥vj.; Syrup. Papaveris f℥j.; Vini Antimon. Potassio-Tartratis ♏xx. M. ft haustus hor. s. s.

Like many other diaphoretics, if its operation be not aided by external warmth, it is apt to act by the kidneys, and, in some cases, it proves considerably diuretic.

Liquor ammoniæ acetatis is also used externally, as a discutient and stimulant; it is an excellent application in common cases of mumps; it should be applied hot upon a flannel. As a collyrium in opacity of the cornea, Boerhaave long ago recommended it, diluted with its bulk of water and dropped into the eye. In chronic ophthalmia the following is a useful application :—

℞ Liq. Ammon. Acet. f℥ss.; Aquæ Rosæ, f℥iijss.; Tinctur. Opii. f℥j. M. ft. collyr.

Dr. A. T. Thomson recommends it as a lotion in porrigo affecting the scalp.

Spirit of ammonia is a transparent colourless fluid, of a pungent smell and acrid taste; its specific gravity is 0·860; it is principally employed in the preparation of other ammoniated formulæ, and occasionally as a stimulating liniment, either alone, or mixed with the *linimentum saponis compositum.* For internal use, the aromatic, or compound spirit of ammonia, is generally preferred.

Aromatic Spirit of Ammonia, the *spirit of salvolatile*, or *compound spirit of ammonia*, of former Pharmacopœia, is not so strong as the preceding simple spirit of ammonia, and is rendered more agreeable in taste and odour by the presence of the aromatics. Its specific gravity is 0·914; it becomes brown by keeping. It is employed in the dose of from *twenty to sixty minims* in an ounce or an ounce and a half of any proper vehicle, such as water or camphor mixture. It is very commonly prescribed with æthereal preparations; and being compatible with sulphate of magnesia, is usefully added to aperient draughts containing that salt, as a preventive of spasm and flatulency.

In acid dyspepsia, accompanied by languor and irritability, the following is a useful formula :—

℞ Magnes. Carbon. ℈j.; Mistur. Camphor. f℥iss.; Spt. Ammon. Arom. f℥ss.; Tinct. Opii ♏v. M. fiat haustus horâ decubitûs sumendus.

The Fœtid Spirit of Ammonia is rarely resorted to, and it might, without inconvenience, have been omitted, since a combination of

spirit of ammonia and tincture of assafœtida, extemporaneously made, may be substituted for it.

For the remaining preparations of ammonia, see LINIMENTS.

AMMONIACUM. The gum resin of the *Dorema ammoniacum*. *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

This plant is a native of Persia; it is perennial, and grows without cultivation on the plains of the province of Irak, about forty miles south of Ispahan.

Ammoniacum is found in two forms in the London drug market: either in separate drops, or tears; or in agglutinated masses. That which is decidedly guttiform, of a clean buff-colour externally, paler within, and free from impurities, is most esteemed. Ammoniacum has little smell, but its taste is bitter, nauseous, and somewhat pungent. The chemical characters of ammoniacum are those of a gum resin; it is imperfectly soluble in water and in alcohol; but triturated with the former, the soluble gummy portion suspends the resin, and the mixture is tolerably permanent.

Ammoniacum is placed by systematic writers on the Materia Medica among the stimulating expectorants; antispasmodic virtues are also ascribed to it; but, independent of other aid, little reliance can be placed in the use of ammoniacum as fulfilling such character, and it is chiefly used in combination with, or as a vehicle for, more powerful and certain medicines, as in the *pilulæ ipecacuanhæ compositæ*, and *pilulæ scillæ compositæ* of the Pharmacopœia. In the coughs, however, of aged persons, unattended by inflammatory action, and characterised by the secretion of viscid mucus in the bronchiæ, with difficult expectoration, and some degree of spasmodic action, *ten grains* of ammoniacum, three times a day, seem to have proved of service in allaying spasm and facilitating the evacuation of the mucous matter. The *mistura ammoniaci* of the Pharmacopœia may also be used, in doses of from *half an ounce to an ounce*, in cases of this kind; and in females, where it is desired to increase the activity of the uterine system, as well as to fulfil the other abovementioned indications, the following may sometimes be usefully administered:—

℞ Mistur. Ammoniaci, Aq. Menth. Pulegii, āā f℥vj.; Spirit. Ammon. Arom., Syrup. Scillæ, āā f℥ss. M. fiat haustus bis die sumendus.

According to Dr. Thomson, in that peculiar state of the bowels often accompanying hypochondriasis and dyspepsia, in which there is an almost constant degree of cholic, particularly after taking food, and which appears to arise from a viscid mucus lodged in the intestines, a combination of ammoniacum and rhubarb is singularly efficacious.

Mixture of Ammoniacum.—Take of Ammoniacum, five drachms; water, a pint; Rub the ammoniacum with the water, gradually added to it, till they are perfectly mixed.

This is a useful form for the exhibition of ammoniacum. Clean tears of the gum-resin should be selected for its preparation, and

the mixture should appear uniformly milky. To these suspensions of the resinous matter of the gum-resins in water, the term *lac*, or *milk*, was formerly applied, and under that term they are still frequently designated in pharmacy; but they are better adapted for extemporaneous prescription, than pharmacopœia formulæ, for the resinous portion subsides, and cannot, after a time, be blended with the gummy solution.

Mixture of ammoniacum is used as a slightly stimulating expectorant, and is often of much service in dry hoarse coughs, unattended by decided inflammatory action or a quick pulse, and in the cases which have been alluded to above. From six drachms to an ounce is the usual dose, and its most elegant accompaniment is almond emulsion; it is thus a favorite vehicle for small doses of squills, or of ipecacuanha, as in the following prescriptions, applicable to the cases mentioned:—

℞ Misturæ Ammoniaci, Misturæ Amygdalæ, ää f℥vj,; Syrup. Scillæ ℥ss.; Misce pro haustu ter die sumendo.

℞ Misturæ Ammoniaci f℥j. Misturæ Camphoræ f℥ss.; Pulveris Ipecacuanhæ gr. j. Tincturæ Camphoræ compos. f℥j. Fiat haustus bis die sumendus.

Solution of acetate of ammonia may often be properly substituted for the camphor mixture in these formulæ, and such combinations are in some instances actively diuretic and sudorific. Ammoniacum in conjunction with nitric acid is said to be a good expectorant, where large accumulations of purulent or mucous secretion exist, with difficult or feeble expectoration; to this end, ten or fifteen minims of dilute nitric acid may be given in one ounce of the ammoniacum mixture.

Plaster of Ammoniacum.—Take of Ammoniacum, five ounces; distilled vinegar, eight fluid ounces. Dissolve the ammoniacum in the vinegar; then evaporate the liquor over a slow fire, constantly stirring it, to a proper consistence.

This is a good adhesive, and slightly stimulating plaster, and generally agrees well with irritable skins. It is most effective when recently prepared; hence the advantage of using a mixture of ammoniacum and vinegar beaten together at the time it is wanted, and applied immediately to the part affected. There is a peculiar disease of the knee, to which servant-maids, who scour floors upon their knees, are liable, and for which, according to Dr. Paris, the ammoniacum plaster is a specific.

AMYGDALA. The seed of the *Amygdalus communis*. *Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Amygdaleæ.

The term *amygdala*, αμυγδαλη, is said to be derived from αμυσσω, *to lancinate*, because, after the green fruit is removed from the kernel, its shell appears fissured or lacerated. Two varieties of the almond are directed for medical use, viz., α. *Amygdala amara*, bitter almond; β. *Amygdala dulcis*, sweet almond. The list of the Materia Medica also includes

Amygdalæ Oleum; Oleum ab alterutriusque nucleis expressum.
Oil of Almond; the expressed Oil of either of the kernels.

The almond-tree is a native of Syria and Barbary, but thrives

well in all the warmer parts of Europe: in this country its fruit seldom ripens, but it forms an elegant ornament to our shrubberies, bearing its beautiful pink blossoms early in the spring, and before the leaves appear.

The two varieties of almond are remarkably distinguished by the flavour of the kernel, being in the one, bland, sweetish, and inodorous; and in the other, of a bitter flavour, and, when rubbed with a little water, smelling of hydrocyanic acid.

Amygdala dulcis. Sweet Almond. — Three varieties of the sweet almond occur in commerce. By steeping for a few minutes in boiling water, or some hours in cold water, the kernel may be squeezed out of the cuticle, or *blanched.*

Mixture of Almonds. — Take of Confection of Almonds, two ounces and a half; Distilled Water, a pint. Gradually add the water to the confection of almonds, rubbing them till they are mixed; then strain through linen.

Milk of almonds, or almond emulsion, is an agreeable diluting drink in inflammatory febrile affections, and it is often directed in preference to other demulcents and diluents, in inflammatory affections of the urinary passages. It is a common vehicle for refrigerants in fevers, and for expectorants in affections of the lungs, though liable to the objection of spontaneous decomposition, for it soon separates into a kind of curd and whey, and afterwards becomes sour, especially in the warm rooms of invalids. Where these inconveniences can be guarded against, it usefully enables us to alter the form and character of a medicine, by substituting it for water, or other comparatively inert vehicles; a consideration not unfrequently of importance, especially where a plan of treatment requires to be pursued for a long time. It is an excellent medium for the exhibition of the alkalies and alkaline carbonates, in cases of urinary gravel, and they in some measure prevent its tendency to decomposition. Nitre, and small doses of the neutro-saline aperients, tincture of squills, and powder or wine of ipecacuanha, are also properly prescribed in this mixture. When ordered for infants, its tendency to acescency should especially be borne in mind, as it has in that way given rise to troublesome diarrhœa. The following formulæ are added for the sake of illustration:

In uric diathesis—

℞ Sodæ Bicarbonatis ℥ss.; Misturæ Amygdalæ f ℥jss.; Infus. Gentian. compos. f ℥ss. Fiat haustus bis vel ter die sumendus.

Proper doses of carbonate of soda, and of carbonate and bicarbonate of potassa, may occasionally be substituted for the bicarbonate of soda in this draught; carbonate of magnesia, and, in some cases, sesquicarbonate of ammonia, may also be given in the same vehicle.

As a diaphoretic in inflammatory disorders:—

℞ Potassæ Nitratis ℥ss.; Liquoris Ammoniæ Acetatis f ℥ jss.; Vini Antimonii Potassio-tartratis f ℥iij.; Misturæ Amygdalæ f ℥vj. Fiat mistura, cujus sit dosis cochlearia tria magna quartâ quâque horâ.

As a vehicle for expectorants in catarrh—

℞ Potassæ Carbonatis ℈j. ; Succi Limonum recentis f ℥ss. ; Misturæ Amygdalæ f ℥x. ; Vini Ipecacuanhæ ♏xxv. Misce pro haustu, mane, meridie, et vesperi sumendo.

℞ Liquoris Ammon. Acet. f ℥jss. ; Misturæ Amygdalæ f ℥vss. ; Syrup Tolutani, Tinct. Scillæ, āā f ℥ij. M. fiat mistura: cochlear. iij. ampla pro dosi.

Sometimes a few bitter almonds are employed in emulsion, on account of their agreeable flavour; and emulsion of bitter almonds has been used as a form of prussic acid, but their uncertain action as a sedative, renders them, in this form, objectionable.

In large doses, *almond oil* is slightly aperient, but it is not employed with that view, except occasionally to clear the bowels of infants; a teaspoonful of a mixture of equal parts of syrup of roses and almond oil, well shaken together, will sometimes answer the purpose.

As a demulcent, oil of almonds is used in the form of emulsion, or of soap; in the former case, the following formula may be adopted:—

℞ Acaciæ Pulveris ℥ss. ; Aquæ Destillat f ℥ss. adde gradatîm, Olei Amygdalæ f ℥iij. tere simul et adde, Aquæ Destill. f ℥iij. ; Aquæ Rosæ f ℥jss. ; Syrupi f ℥iij. Misce fiat emulsio.

Two or three tablespoonsful of this, or some similar mixture, may be taken to allay the irritation of the trachea and larynx in catarrh and cough; or it may be made the vehicle of expectorants and sedatives; cinnamon water, or mint water, may occasionally be substituted for the rose water in the above.

The following will be also found useful in allaying the tickling and irritating cough consequent upon catarrh:—

℞ Confectionis Rosæ Caninæ ℥ij. ; Syrupi Papaveris f ℥ss. tere simul et adde gradatim, Olei Amygdalæ f ℥ss. Misce optimè ut fiat linctus cujus sumatur cochleare unum minimum subinde.

With the alkalis, almond oil yields a soapy mixture, which may be substituted for emulsion, or which sometimes, with an increased quantity of alkali, is used in renal and urinary irritation, especially that arising from uric sand.

℞ Olei Amygdalæ f ℥ss. ; Aquæ Rosæ f ℥ij. ; Liquoris Potassæ f ℥ji. Misceantur agitatione, et adde, Syrupi f ℥ss. ; Aquæ Destillatæ f ℥v. M. fiat mistura, de qua sumantur, f ℥ij. pro dosi.

In cases of catarrh, with hoarseness, f ℥iss. of *liquor ammoniæ* is sometimes substituted in the above mixture for the solution of potassa.

Amygdala Amara. Bitter Almond.—The source of the peculiar flavour of the bitter almond may be obtained by distillation with water; it then appears as a volatile oil, generally heavier than water, having the concentrated odour of the bitter almond, and partaking of some of the properties of the hydrocyanic acid. It is this ingredient which renders bitter almonds intensely poisonous to some animals, and not unfrequently they produce deleterious effects upon the human system.

This oil has been the subject of a curious and interesting inquiry by Robiquet and Boutron-Charlard (*Ann. de Chimie et Physique*, XLIV. 352), and by Wöhler and Liebig (*Ann. de Chimie et Physique*, LI. 273). It appears, from their researches, to be a mixture of hydrocyanic acid and a peculiar volatile oil, neither of which pre-exist in the original almond, but are produced during the distillation, by the joint action of heat and water, upon a distinct principle contained in the almond. This principle has been termed *amygdalin* (*Ann. de Chimie et Physique*, LXIV. 185). By agitating the essential oil of the bitter almond with a solution of potassa and protochloride of iron, the hydrocyanic acid may be separated from the volatile oil just mentioned, and by redistilling the latter over quicklime, it is deprived of adhering water, and obtained pure. It is then clear and colourless, and retains the peculiar odour of the moist bitter almond; when exposed to the joint action of oxygen and light, it is converted into benzoic acid. This oil appears to be a *hydruret* of a base composed of carbon, hydrogen, and oxygen, which base has been called *benzule* (*see* BENZOIN).

As an article of the Materia Medica, the distilled oil of bitter almonds is sedative, and ranks with the narcotic poisons. The symptoms attendant upon it are, trembling, weakness, palsy, convulsions, often of the tetanic kind, and finally coma: but frequently it occasions vomiting, and the animal in that way may escape (see Christison, Orfila, Granville, &c.).

Sir Benjamin Brodie, in the course of his experiments upon this oil, happened to touch his tongue with a probe which had been dipped into it; Mr. Brande was present at the time, and thought he would have fallen, so instantaneous was the effect; it produced an indescribable sensation at the pit of the stomach, feebleness of limbs, and loss of power over the muscles; but these effects were transient, and even momentary. The following case of poisoning by this oil, recorded by Mertzdorff, is quoted by Dr. Christison (*On Poisons*, ART. *Hydrocyanic Acid*). A hypochondriacal gentleman, 48 years old, swallowed two drachms of the essential oil. A few minutes afterwards, his servant, whom he sent for, found him lying in bed, with his features spasmodically contracted, his eyes fixed, staring, and turned upwards, and his chest heaving convulsively and hurriedly. A physician, who entered the room twenty minutes after the draught had been taken, found him quite insensible, the pupils immoveable, the breathing stertorous and slow, the pulse feeble and only 30 in a minute, and the breath exhaling strongly the odour of bitter almonds. Death ensued ten minutes afterwards. Dr. Christison also mentions a fatal case which occurred in London, where the individual, intending to compound a nostrum for worms with beech-nut oil, got, by mistake, from the druggist, *peach-nut* oil, which is nothing less than oil of bitter almonds.

From Sir B. Brodie's experiments to ascertain the mode in which death is immediately produced by this and analogous poisons, it would appear that they operate upon the nervous system; that

through the medium of the nerves, the influence of the poison is conveyed to the brain, the functions of which are more or less impaired; that the organs of respiration are thus secondarily affected, but that the action of the heart continues for a long time unimpaired, circulating venous blood; hence, if respiration be artificially performed, so as to aërate the blood, it sometimes happens that the animal permanently recovers.

Essential oil of bitter almonds contains from eight to fourteen per cent. of hydrocyanic acid. It is largely prepared for the use of perfumers, confectioners, and cooks, who generally use what is called the *essence of almonds*, or a solution of ʒij. of the oil in ʒvj. of alcohol; this is also the most convenient form for its pharmaceutical employment.

The cases in which it has been proposed to administer the essential oil of bitter almonds, are those in which the diluted hydrocyanic acid has been recommended. Affections of the lungs, preceded or connected with phthisis; coughs of a spasmodic character, and especially hooping-cough; an irritable state of the nervous system; asthmatic complaints, and some cases of local irritation, are the principal diseases inwhich it has been found useful; and it may be administered with camphor and other antispasmodics; but its uncertain and varying strength render it highly objectionable (*see* Hydrocyanic Acid).

AMYLUM (from α, *priv.*, and μυλον, *a mill*, because formerly made without the aid of a mill). *Starch.* Triticum Hibernum. *Winter Wheat. Cl.* 3. *Ord.* 2. Triandria Monogynia. *Nat. Ord.* Gramineæ. Seminum fæcula. *The fecula of the seeds.*

This important grain was first cultivated in Sicily. When wheat, swollen and softened by steeping in water, is subjected to pressure, the milky juice which exudes, being diffused through water, deposits a fine impalpable powder, which, when duly washed and carefully dried, splits into columnar masses, known as common starch. It has usually a yellowish hue, which is covered in the starch of commerce by the addition of smalt; or, as in Hall's patent process, is removed by the action of chlorine. For medical use, however, the pure and genuine starch should be used, its colour being unimportant. Starch is marked by well-defined chemical characters. It is insoluble in cold water, but readily dissolves in water at 160°, and at 180° it forms a thick jelly, which in warm weather soon liquefies, and becomes mouldy, sour, and fetid. The diluted jelly of starch is copiously precipitated by subacetate of lead, and when solution of iodine is added to it, a very characteristic blue compound is immediately formed.

Starch, which has been heated till it acquires a pale-brown colour, loses its peculiarities, and is converted into a substance soluble in cold water, not precipitable by iodine, and having the leading chemical characters of gum. When long boiled in water, acidulated by sulphuric acid, starch is converted into sugar. The ultimate composition of starch closely resembles that of gum and sugar.

Starch is very nutritious, and exists in the greater number of esculent grains and roots. A warm solution of starch is often employed as a vehicle for opium and other sedatives, when administered in the form of enema. For this purpose, the following *decoctum amyli* is directed in the Pharmacopœia. It is the former *mucilago amyli.*

Decoction of Starch.—Take of Starch, four drachms; Water, a pint. Gradually add the water to the starch, and rub them together; then boil them for a short time.

Wheat starch, in its usual form, can scarcely be regarded as an article of food; it is chiefly prepared for stiffening various fabrics, and articles of wearing apparel; and is used in the manufacture of lozenges, and other kinds of hard confectionary. But there are some varieties of this vegetable principle which are of common and important use in the diet of invalids; these are, *Sago*, which is the granulated fecula obtained from the pith of certain palms of the genus *Sagus; Tapioca*, which is obtained from an American plant, the *Jatropha manihot*, the milky juice of which is poisonous, but when diffused through water, it deposits a harmless starch; and *Arrow-root*, which is the fecula of the *Maranta arundinacea.*

The last is in most general use, and affords a viscid solution in warm water, which concretes into a gelatinous form on cooling. It is best prepared for use by putting a dessert spoonful into a pint basin, and thoroughly mixing it with about two ounces, or half a teacupful of cold water; this is kept constantly stirred whilst boiling water is gradually added so as nearly to fill the basin, and in this way an even solution is obtained, more or less viscid according to the quantity of water added; if the boiling water be at once poured upon the arrow-root, or if it be put into hot water, it forms a lumpy, intractable, and disagreeable mixture. Thus prepared, it is an excellent vehicle, when, duly sweetened, for wine, brandy, aromatics, and other cordials; or, in opposite cases, for lemon and orange juice, tartar, small doses of nitre, and similar refrigerants.

ANETHUM (from ανευ, *afar*, and θεω, *I run*, because its roots extend far). Dill. *Fructus;* the fruit (seed) of the *Anethum graveolens. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

This plant is a native of Spain and Portugal. The seeds have an aromatic warmth, somewhat like that of caraways. They should be chosen of a fresh and bright colour, heavy, and having their peculiar aromatic odour when handled. Those which are dull, dusty, light, inodorous, or mouldy, should be rejected. They are occasionally given in powder, as a carminative, to infants. They derive their aromatic warmth from essential oil, which they yield in the proportion of about two pounds from each hundred-weight. Distilled with water, they afford the *aqua anethi*, or dill-water, of the Pharmacopœia, which is a good substitute for the powder.

Dill-Water.—Take of Dill, bruised, a pound and a half; Proof Spirit, seven fluid ounces; Water, two gallons. Let one gallon distil.

Dill-water is a good remedy for flatulency, and its consequent hiccup, in young children, to whom a dessert spoonful may be occasionally given. It also is a useful vehicle for magnesia, or prepared chalk, in cases of acidity at the stomach; and for small doses of the saline aperients.

ANGUSTURA BARK, *see* CUSPARIA.

ANISUM. Anise. *Fructus;* the fruit (seed) of the *Pimpinella anisum. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

Aniseed should be free from mustiness, and, when rubbed in the hands, exhale its peculiar aromatic odour. The small and more compact seed, imported from Spain, is usually preferred to the lighter and larger kind, which is the growth of more northern countries. Its taste is warm and sweet. By distillation it affords an essential oil, in the average proportion of about two pounds from each hundredweight of seed. This oil is generally imported, for pharmaceutical use, from Spain. At about 50° it concretes, and, as this is a leading character, it should be attended to in its purchase. It is said that spermaceti is sometimes added to increase its tendency to congeal; a fraud which would be detected by the action of cold alcohol, which would dissolve the oil and leave the adulteration; or simply by careful evaporation, or distillation with water.

Genuine *oil of aniseed* is at first nearly colourless, but acquires a yellow tint when kept; its specific gravity is about ·985. Its tendency to crystallise is said to diminish with age. The concrete part, when pressed in blotting paper, acquires a granular character; it fuses at about 65° or 70°. It is a little heavier than water. At 50° it is soluble in 4 parts of alcohol, but at 60° its solubility is much greater.

Spirit of anise is scarcely ever prescribed, and might be omitted without inconvenience.

ANODYNES (from α, *without*, and ὀδυνη, *pain*). Remedies which diminish or relieve pain.

ANTHELMINTICS (from αντι, *against*, and ελμινς, *a worm*). Remedies against worms. Vermifuges.

ANTHEMIS (from ανθειν, *to blossom*). Chamomile. The single flowers of the *Anthemis nobilis. Cl.* 19. *Ord.* 2. Syngenesia Superflua. *Nat. Ord.* Compositæ Corymbiferæ.

Chamomile flowers should be selected fresh, and should strongly exhale their peculiar fragrancy when rubbed. The large double flowers are sometimes preferred; but, as the virtue chiefly resides in the disc florets, the single kind is best.

Chamomile flowers have long been celebrated as an aromatic bitter; they derive their aroma from essential oil, of which not more than from an ounce and a half to two ounces are obtained from each hundred-weight of the flowers; the produce is, however, very variable: the bitter quality resides in extractive matter, combined with some tannin and *piperine.* The powder was formerly employed in the cure of intermittents, but is now scarcely used, the

requisite dose being inconveniently bulky; the best form for its administration is, perhaps, as an electuary.

According to Dr. Heberden (*Commentaries*), the following, taken every night, either in powder or pills, proves signally useful in the relief of flatulency and eructations:—

℞ Pulveris Anthemidis gr. x.; Piperis longi pulv. gr. iij.; Aloes gr. j. Misce.

Decoction and infusion of chamomile flowers are often used externally as fomentations, but are little preferable to hot or warm water, excepting that the infused flowers, rolled up in a cloth or flannel, serve to retain the heat of the application.

Infusion of Chamomile.—Take of Chamomile (flowers), five drachms; Boiling Distilled Water, a pint; Macerate for the sixth part of an hour, in a vessel lightly covered, and strain.

This infusion has the bitterness, and much of the aroma, of the flowers; and though rarely occurring in prescriptions, is a domestic remedy in general use; the stomachic virtues of a cup of cold chamomile tea taken in the morning, fasting, are well known to those who suffer from want of appetite for breakfast. By some the infusion made with cold water is preferred. Time of maceration, 8 to 10 hours. Warm chamomile tea is usefully employed to assist the operation of an emetic; its tonic qualities render it, perhaps, somewhat preferable to warm water.

Extract of chamomile is a good simple bitter, and a useful vehicle for other tonics, when given in pills, its consistence being such as peculiarly to fit it for that form of administration. About forty-eight pounds of extract are yielded by each hundred-weight of good flowers.

Oleum Anthemidis. *Oil of Chamomile.*—This essential oil, when recently distilled, is sometimes of a blue colour; that which is found in the shops is generally of a yellow or brownish yellow colour, and becomes viscid by age. When fresh, its odour is strong and peculiar, its taste pungent and somewhat nauseous: antispasmodic powers have been attributed to it, and hence it is occasionally added to cathartic pills and powders, to prevent griping. The dose is two or three drops. The following pills have been found useful in indigestion attended with spasmodic pain of the stomach, flatulency, and tendency to costiveness:—

℞ Pulveris Rhei ʒss.; Aloës gr. x.; Olei Anthemidis ♏xx. Divide in pilulas decem, quarum sumatur una ante prandium et vespere, quotidie.

ANTIDOTES (from ἀντι, *against*, and δίδωμι, *I give*). Counterpoisons. The term is sometimes used as synonymous with *specific remedy*.

ANTILITHICS (from ἀντι, *against*, and λίθος, *a stone*). Synonymous with lithontriptics. Remedies against stone, or calculus.

ANTIPHLOGISTICS (from ἀντι, *against*, and φλέγειν, *to burn*). Remedies against inflammation.

ANTISEPTICS (from ἀντι, *against*, and σήπειν, *to putrefy*). Antiputrefactives. Remedies against putrefaction.

ANTISPASMODICS (from ἀντι, *against*, and σπαω, *I draw*). Remedies against spasm.

ANTIMONY. *Antimonium; Stibium.* The officinal compounds of this important metal are, the *sesquisulphuret*, the *oxysulphuret*, the *potassio-tartrate* (and its vinous solution), and the *compound powder of antimony.*

The account of these pharmaceutical preparations of antimony will be rendered more useful and intelligible to the student, if prefaced by a short notice of its chemical history.

Antimony was first made known by Basil Valentine, towards the end of the fifteenth century, who is stated to have poisoned a brother monk by administering to him some of its preparations, whence the usual name of the metal is said to be derived (from ἀντι, *against*, and μονος, *a monk*). His *Currus Triumphalis Antimonii* was published in 1624, and contains many important facts and discoveries. The principal ore of antimony is the *sulphuret* (the sesquisulphuret of the Pharmacopœia), commonly called *crude antimony.* It occurs in many of the mines of Europe; it is steel-gray, of a metallic lustre, brittle, and often in prismatic and acicular crystals; from this ore pure antimony may be obtained.

Antimony is of a silvery white colour, very brittle, and lamellarly crystalline; it fuses at about 800°, and rises in vapour at a white heat. Its specific gravity is 6·7. Its equivalent is 65.

There are three oxides of antimony, of which the protoxide only is salifiable; the other oxides act the part of acids in reference to bases, and have therefore been termed *antimonious acid*, and *antimonic acid.*

The *protoxide of antimony*, or, to speak more correctly, the *sesquioxide* (in reference to the above equivalent), may be obtained by boiling 50 parts of finally-powdered antimony with 200 of sulphuric acid, to dryness, and washing the dry residue, first with water, and then with a weak solution of carbonate of potassa; a white powder remains, which, when thoroughly edulcorated with hot water, and dried, consists of

	Atoms.	Equivalents.	Per Cent.
Antimony	1	65	84·5
Oxygen	1½	12	15·5
Sesquioxide of Antimony	1	77	100·0

This sesquioxide is the base of emetic tartar, and of the other active antimonials of pharmacy. It is fusible and volatile at a red heat, undergoing no change in close vessels, but if air be present, it suffers a slow combustion, and passes into *deutoxide;* by nitric acid it is converted into *peroxide* (antimonic acid). It readily dissolves in muriatic acid, and in a hot solution of bitartrate of potassa.

Deutoxide of antimony, or *antimonious acid*, produced by the combustion of the protoxide, is fixed, infusible, and insoluble in

nitric acid; it combines by fusion with potassa and soda, and forms compounds soluble in water, from which a precipitate of *hydrated antimonious acid* is thrown down by the acids. It consists of

	Atoms.	Equivalents.	Per Cent.
Antimony	1	65	80·25
Oxygen,	2	16	19·75
Antimonious Acid	1	81	100·00

Peroxide of antimony or *antimonic acid*, is procured by boiling powdered antimony in nitric acid, and exposing the product to a heat of about 500°. It is white, or of a pale straw colour, tasteless, insoluble in water; it combines with the fixed alkalis by fusion. It may also be obtained by deflagrating antimony with nitre, and so procured, it constituted the *diaphoretic antimony* of old pharmacy. It consists of

	Atoms.	Equivalents.	Per Cent.
Antimony	1	65	76·5
Oxygen	2½	20	23·5
Antimonic Acid	1	85	100·0

Chlorine acts energetically upon antimony, and forms with it a *sesquichloride*, or *butter of antimony*, or the *muriate* or *hydrochlorate*, and a *perchloride*, corresponding in composition with the *sesquioxide*, and with *antimonic acid*.

Of the remaining compounds of this metal, such as are employed in pharmacy, and directed in the Pharmacopœia, may now be noticed—

Antimonii Sesquisulphuretum. *Sesquisulphuret of Antimony.* This sulphuret is an abundant natural product, and occurs in most mining districts. Exposed to the joint action of a dull-red heat and air, the greater portion of the sulphur may be burnt off, and the antimony becomes protoxidized: a slight increase of heat fuses this protoxide, a portion being at the same time volatilized, and the substance on cooling concretes into a reddish-brown vitreous mass, known and imported under the name of *glass of antimony*. It is a protoxide combined with a variable proportion, generally about one-tenth, of sulphuret, and is sometimes a useful article in the pharmaceutical laboratory. It was placed among the articles of the Materia Medica in the former Pharmacopœia, but is now omitted.

Sulphuret of antimony has long been discontinued as an internal remedy, except in a few nostrums for rheumatism and gout. It is apt in some cases to excite excessive vomiting and purging; and in others it is inert; its activity apparently depending upon the substances it meets with in the stomach and bowels. It is composed of

	Atoms.	Equivalents.	Per Cent.
Antimony	1	65	73
Sulphur	1½	24	27
Sesquisulphuret of Antimony	1	89	100

Oxysulphuret of Antimony (Kermes' Mineral).—Mr. Phillips

states, that the composition of the oxysulphuret of antimony, as it is here called, is very uncertain; a specimen which he examined consisted of

Sesquioxide of Antimony	12·0
Sesquisulphuret of Antimony	76·5
Water	11·5
	100·0

It is made by boiling the sesquisulphuret of antimony in a solution of potassa, and precipitated by the addition of dilute sulphuric acid—the sulphate of potassa to be washed away, and the residuum dried. The oxysulphuret has been used as an alterative and diaphoretic, in herpetic and other cutaneous eruptions, and in chronic rheumatism; in such cases it is sometimes combined with calomel, as in the *pilulæ hydrargyri chloridi compositæ*, a formula originating with Dr. Plummer, unchemical in its nature, and uncertain in its effects. When oxysulphuret of antimony is prescribed, the dose should be small at first, and gradually increased. Half a grain will suffice to begin with, and from two to three grains usually nauseate, purge or vomit. In chronic rheumatism, it is occasionally prescribed with small doses of opium, of henbane, or of hemlock, conjoined with mercurials, as in the following formulæ:—

℞ Antimonii Oxysulphureti gr. v.; Pilul. Hydrargyr., Extract. Hyoscyami, āā ℈j. Misce ut fiat massa in pilulas decem dividenda, quarum sumatur una ter die.

℞ Antimonii Oxysulphureti, Hydrargyri Chloridi, āā gr. ss.; Extracti Conii gr. iv. Fiat pilula ter die sumenda.

With these, half a pint to a pint of decoction of sarsaparilla may be taken during the day, and as they keep up perspiratory action, sudden changes of temperature and exposure to cold should be avoided.

The emetic properties of the oxysulphuret of antimony are apt to be augmented by acids, so that they should be avoided during its use, and where they are likely to prevail in the stomach, some corrective, such as aromatic confection, or magnesia, should be united with it; and hence it should not be made into pills with conserve of roses.

Dr. Paris states, that it is often sophisticated with chalk, and other extraneous matter; that it ought not to effervesce with acids; that it should be entirely vaporizable by heat, and its colour bright orange. He says that a spurious article is vended, which consists of sulphur and sulphuret of antimony, coloured with Venetian red.

Potassio-Tartrate of Antimony. Tartar Emetic.—Take of Sesquisulphuret of Antimony, in powder, Nitrate of Potassa, powdered, of each, two pounds; Bitartrate of Potassa, powdered, fourteen ounces; Hydrochloric Acid, four fluid ounces; Distilled Water, a gallon. Accurately mix the sesquisulphuret of antimony with the nitrate of potassa, the hydrochloric acid being added at intervals, and inflame the powder spread upon an iron plate. When what

remains has cooled, rub it into a very fine powder, and wash it with repeated portions of boiling water till it is rendered tasteless. Mix the powder thus prepared with the bitartrate of potassa, and boil it for half an hour in a gallon of distilled water. Filter the liquor whilst hot, and set it aside that crystals may form. Having removed and dried these, let the liquor be again evaporated till it affords crystals.

NOTE.—*Potassio-Tartrate of Antimony* (*crystals*). It is entirely dissolved in water, no bitartrate of potassa adhering to the vessel; and hydrosulphuric acid being added, it deposits a reddish precipitate. This solution, on the addition of chloride of barium, or of nitrate of silver, deposits nothing. By nitric acid it deposits that which excess of the same dissolves.

The entire solubility of crystals of potassio-tartrate of antimony in (a small quantity of) water, is intended to show that it is not mixed with bitartrate of potassa, which, in that case, would remain undissolved. Hydrosulphuric acid precipitates, from this solution, red hydrosulphate of antimony. The absence of sulphuric salts, and of chlorides, is shown by the non-action of chloride of barium, and of nitrate of silver. Nitric acid throws down oxide of antimony, which excess of the acid redissolves.

The *Potassio-Tartrate of Antimony*, or *emetic tartar*, should always be purchased in the form of crystals; for when in powder, it is more subject to adulteration and impurities. The crystals should become orange-coloured when dropped into an aqueous solution of hydrosulphuric acid. Mr. Hennell has, however, observed, that potassio-tartrate of antimony may be mixed with as much as 10 *per cent.* of bitartrate of potassa, and yet be soluble in the quantity of water required for the solution of the former salt only. To detect, therefore, such uncombined tartrate, he adds a few drops of a solution of carbonate of soda to a boiling solution of the antimonial salt, and if the precipitate formed be not redissolved, he infers the absence of the bitartrate of potassa.

When sesquioxide of antimony is pure and finely divided, it readily dissolves when boiled with bitartrate of potassa and water, forming the *potassio-tartrate of antimony*, or *emetic tartar;* formerly finely-levigated *glass of antimony* was used, which is a compound of the sesquioxide with variable proportions of the sulphuret, and when pure, it answered extremely well; but it was liable to be mixed with glass of lead, and subject to other adulterations, so that it has been omitted in the Materia Medica of the present Pharmacopœia. The sesquioxide of antimony prepared by any of the other methods is equally available.

Wine of Potassio-Tartrate of Antimony.—Take of Potassio-Tartrate of Antimony, two scruples; Sherry wine, a pint. Dissolve the potassio-tartrate of antimony in the wine.

This solution, known under the name of *antimonial wine*, when recently prepared, is a useful form of emetic tartar, but it is liable to occasion deposition, and, in an article of so much importance, it is better to direct a solution to be made at the time it is wanted, than to employ a preparation which may be of variable strength.

Potassio-tartrate of antimony is the only officinal preparation of antimony which can be relied on as of definite composition, and it

may be medicinally employed as a substitute for all the other compounds of this metal. When given in very small doses, it acts principally upon the exhalents; in larger doses it nauseates, and produces purging and vomiting, together with a more powerful diaphoretic effect; and in still larger doses, it is emetic, and even poisonous, though, in some peculiar cases, it has been administered with comparatively little effect.

As a diaphoretic, it may be given in repeated doses of an *eighth of a grain* to *half a grain*, conjoined with saline remedies, in solution.

℞ Antimonii Potassio-Tartratis, gr. j. solve in Aquæ destill. f℥j.

℞ Solutionis præscriptæ f℥j.; Liq. Ammon. Acetat. f℥ss.; Mistur. Camphor. f℥x.; Syrup. Aurant. f℥ss. M. fiat haustus tertiâ vel quartâ quâque horâ adhibendus.

℞ Potass. Carbonatis ℥j.; Succi Limonum recentis f℥iss. vel. q. s. ad saturationem, Aquæ Cinnamomi f℥j.; Aquæ destill. f℥iij.; Solutionis præscriptæ f℥iij.; Syrupi Tolutani f℥ij. M. fiat mistura, cujus sumantur cochlearia duo magna omni horâ.

Or, by triturating it with chalk, or with magnesia, it may be so decomposed as to be a substitute for the simple oxide of antimony.

℞ Antimonii Potassio-Tartratis gr. j.; Cretæ præparatæ, Sacchari albi, āā ℥ss. Accuratissimè misce et divide in partes decem æquales, quarum sumat unam secundâ vel tertiâ quâque horâ.

The sudorific action of these powders may be assisted by warm drinks, and may be combined with saline and other diaphoretics; or the dose of the antimonial may be increased, or the interval of its administration diminished, till the desired effect is produced.

For children, the dose of emetic tartar, as a diaphoretic, or rather counterstimulant, is from a sixteenth to a fourth of a grain; the latter seldom fails to nauseate. But in all such cases, this, and all other antimonials, should be used with extreme caution, for, in infants especially, they sometimes produce very distressing, and even fatal vomiting. In *cynanche laryngea*, or croup, there is great toleration of large doses of tartar-emetic by children: in this disease it is our chief reliance, and should be continued, at *short* intervals, or every ten minutes, until free vomiting or a return of the natural voice is procured. This effect obtained, we ought not to persist in the use of the emetic, which may then produce great and at times alarming prostration.

The dose of emetic tartar, to vomit, is from *one* to *two* grains.

When emetic tartar is given mixed with chalk or other substance by which it is decomposed, and its oxide separated, it appears to have more tendency to act on the bowels, and less to nauseate, than when in undecomposed solution, or where acids are present. As an alvine evacuant it is, however, principally valuable in conjunction with common purges, which it often remarkably aids in their operation, as in the following formulæ:—

℞ Extract. Colocynth compos., Extract. Hyoscyam., āā ℥ss.; Antimon. Potassio-Tart. gr. ij. Misce optime ut fiat massa in pilulas xij. dividenda. ij. vel iij. pro dosi.

℞ Magnesiæ Sulphatis ℥j.; Infus Sennæ compos. f℥ij.; Aq. Menthæ piper. f℥iv.; Syrup Zingiberis f℥ij; Antimonii Potassio-Tartratis gr. ij. Misce fiat mistur: cochlearia tria vel quatuor ampla pro dosi.

Emetic tartar is also an important adjunct to expectorants, and with this view is added, in very small doses, to the *pilulæ scillæ compositæ*, the *pilulæ ipecacuanhæ compositæ*, and similar formulæ.

It may here be remarked, that there are many vegetable substances which more or less perfectly decompose emetic tartar, and which are said, though upon doubtful authority, to render it inert. By forming insoluble compounds with it, or with its oxide of antimony, they in many cases diminish its activity as an emetic to a remarkable extent; and hence, in cases of excessive vomiting ensuing from an over-dose, or where it has been taken as a poison, *infusion of galls*, and especially *infusion of yellow bark*, *green tea*, &c., have been considered as antidotes. A case is related, upon the authority of Dr. Sauveton, of Lyons, of a lady who swallowed, by mistake, a solution of 60 grains of emetic tartar. In ten minutes, she was seen by her physician, and at this time vomiting had not commenced. Tincture of bark was immediately given in large doses. No unpleasant symptom occurred, except nausea and slight colic.

In these cases, however, the contents of the stomach are generally evacuated by vomiting, and no alarming consequences ensue. But where, from some accidental cause, a large dose of emetic tartar remains long in the stomach before it excites vomiting, dangerous symptoms occur, such as a burning pain at the pit of the stomach, with frequently-recurring fits of vomiting, spasmodic pains of the bowels, excessive purging, inability to swallow, and violent cramps. Sometimes blood is vomited and passed by the bowels, and inflammation of the alimentary canal ensues.

Of the *tests* for emetic tartar, none is so effective as hydrosulphuric acid (sulphuretted hydrogen gas). Dr. Turner found that in a solution containing only the eighth of a grain in the ounce, it produced a decided reddish tint, and when the excess of the gas was expelled by heat, an orange-red precipitate was obtained. Where the salt is present in larger quantity, it is at once thrown down by this reagent, with its characteristic brownish-red colour.

Notwithstanding its virulent emetic effects, and poisonous characters, which in some instances manifest themselves unexpectedly, and as the consequence of comparatively moderate doses, the potassio-tartrate of antimony has been administered as a remedy, to the extent, in divided doses, of ten, twenty, and even thirty and more grains a day; and, as it is said, not only without producing any dangerous irritation of the alimentary canal, but even also not unfrequently without any physiological effect whatever. The disease which has been so treated, is inflammation of the lungs, and the power which enables the body to bear such doses with impunity, is ascribed "to a peculiar diathesis which accompanies the disease and ceases along with it."

This practice has been pursued by Dr. Rasori, of Milan (*Edinburgh Medical and Surgical Journal*, xxii. 277), and by M. Laennec, of Paris (*Auscultation Mediate*, i. 493). It is said that

the same patients who, while the disorder continued, may take large doses without injury, are affected by them in the usual manner, if not rapidly lessened after the disease has begun to give way. Laennec gave as much as two grains and a half every two hours, till twenty grains were taken daily; he once gave forty grains in twenty-four hours, by mistake, without bad effect; vomiting and diarrhœa were seldom produced, and never after the first day. In reference to these extraordinary statements, Dr. Christison observes (*On Poisons*, Art. *Antimony*), that his own observations corroborate them, except as to the effects of large doses during convalescence, of which he has had no experience; and that he has seen from six to twenty grains, when given daily in several doses of one or two grains, check bad cases of peripneumony and bronchitis, without causing vomiting or diarrhœa after the first day, and also without increasing the perspiration. He, however, states that he has twice seen the first two or three doses excite so violent a purging, and pain in the stomach and bowels, as to deter him from persevering in the remedy. "The preceding facts," he says, "unless Rasori's explanation be admitted, are very perplexing, and completely at variance with the facts previously quoted in support of the poisonous effects of tartar-emetic. On a full consideration of the whole circumstances, however, I conceive the conclusion which will be drawn is, that this substance is not so active a poison as was till lately supposed; that in the dose of four, six, and ten grains, it may cause very severe symptoms, but it is very uncertain in its action; and that, although there appears to be some uncertainty in the effects of even much larger doses, such as a scruple, yet, in general, violent irritation will then be induced, and sometimes death itself."

The opinions which I have elsewhere expressed, on this subject, may properly find place here. "The physician who has not made a trial of the antimony in this manner, with a view to its directly antiphlogistic or counterstimulating operation, irrespective of and even unaccompanied by evacuations, either by vomiting, purging, or sweating, will be agreeably surprised at its effects, and the extent to which the stomach will tolerate it, so long as vascular excitement is maintained. It is more especially in inflammation of the fibrous or serous system, or in acute articular rheumatism and pleurisy, that I hold tartar-emetic, given in large doses frequently repeated, to be a valuable therapeutical aid. The time for wonderment at the possibility of the patient being able to take full and repeated doses of this medicine without its vomiting him, and of speculative doubts or objections from analogy, as to the safety of the practice, is now past. Experience in the Italian, Swiss, and French hospitals, and in private practice, is so conclusive as to show that, with the precautions always required in the administration of a remedy of any activity, tartar-emetic may be not only safely, but very advantageously given in various phlegmasiæ, as auxiliary to the use of the lancet; and in cases where

doubts exist as to the propriety of the latter, it will take its place" (*Stokes's and Bell's Lectures on the Theory and Practice of Physic:* Lecture on Rheumatism). The first full and formal annunciation of the Italian doctrine of *counter*, or *contrastimulus*, to the medical profession in the United States, was made by me in a paper on the subject, inserted in Dr. Chapman's *Medical and Physical Journal*, Vol. III. I had even before then satisfied myself, by clinical trials, of the safety and efficacy of the practice recommended above, both in rheumatism and pleurisy, and subsequent experience has confirmed my first favourable impressions.

It is hardly necessary to quote here the supposed cases of the efficacy of emetic tartar in extremely minute doses, such, for instance, as a grain dissolved in a gallon of water, and used as common drink; yet in such proportion it has been recommended as allaying febrile excitement, and diminishing irritability, in the early stages of phthisis. In the dose of one-eighth to one-sixth of a grain, in conjunction with hemlock, it has no doubt proved serviceable.

As an *emetic*, the potassio-tartrate of antimony is, perhaps, best administered in sufficient and repeated doses till it operates.

℞ Antimon. Tartarisat. gr. iij.; Mistur. Camphor. f℥ix. M. sumat quartam partem singulis horæ quadrantibus, donec vomitus excitatus sit.

In this way considerable nausea is produced, and the evacuation of the stomach may be completely effected by the aid of warm water or chamomile tea. It is an effective emetic at the commencement of many febrile diseases, and the action upon the skin must be maintained by diluents and keeping in bed. Where, however, a certain and expeditious emetic is required, the following is the common form:—

℞ Antim. Potassio-Tartratis gr. j.; Ipecacuanhæ pulver. ℈j.; Aquæ Menthæ f℥j. Misce pro haustu emetico.

Or the following emetic mixture:—

℞ Ipecac. pulver. ℈ij.; Antimon. Pot.-Tart. gr. ij.; Syrupi Scillæ f℥ss.; Aquæ Pimentæ, Aquæ destillat., āā f℥iijss. Fiat mistura cujus sumantur cochlearia quatuor majora quamprîmum, et cochlearia duo sextâ quâque horæ parte donec supervenerit vomitus.

As an external application, emetic tartar is occasionally employed, in the form of ointment, as a means of producing irritation and a pustular eruption upon the skin, which it does very effectually. The proportion of tartarised antimony to that of lard, or common white ointment, is from one to two drachms of the former to one ounce of the latter; the salt should be reduced to a very fine powder and very perfectly triturated with the grease.

The following is the formula recommended by Dr. Jenner, in his *Essay on the Influence of Artificial Eruptions on Certain Diseases*, who considers the effect not merely limited to superficial irritation, but as extending more deeply; and hence, in certain cases, more effective than cantharides, and similar vesicants:—

℞ Antimonii Potassio-Tartratis ʒij. tere in pulverem subtilissimum, et adde, Unguenti Cetacei ʒix.; Sacchari albi ʒj.; Hydrargyri Bisulphureti gr. v. Misce ut fiat unguentum.

The sugar is here supposed to prevent the ointment becoming rancid.

The application of these ointments to the region of the stomach, has been recommended in hooping-cough, but independently of its painful, and often troublesome consequences, such treatment, more especially in children, should be adopted with extreme caution, for severe symptoms have in some cases followed the inunction of emetic tartar, arising from its absorption into the system; and a case is related in the *London Medical Repository* (xvi. 357), in which it is supposed to have caused death. The subject was a child two years old, who, soon after the spine had been rubbed with the ointment, was seized with sickness and fainting, which, in forty-eight hours, proved fatal. Indeed, in all cases of the treatment of infants and children, too much circumspection cannot be insisted upon, in reference to the use of powerful and uncertain remedies.

A liniment composed of a drachm of tartar-emetic and an ounce and a half of boiling water, allowed, after the solution, to cool, is a neater form than the ointment. It is to be rubbed at intervals on the skin until an eruption appears. Ten to thirty grains of the salt on a Burgundy pitch plaster is a common application in chronic phlegmasia of internal organs, as well as in chronic rheumatism and neuralgia. Duparcque (*Diseases of the Uterus*) recommends highly, after venesection, friction of the inside of the thighs with antimonial ointment (one part tartar-emetic to six parts hog's lard) in inflammation of the uterus, and in chronic engorgements of the organ; but without producing eruption and ulcerations on the skin.

It is said, that emetic tartar will affect a child through the medium of the milk of the nurse; it is of course difficult to obtain evidence upon this point, but a case is stated in the *London Medical Gazette* (xiii. 496), upon the authority of Dr. Minaret, a French physician, of a young woman who was taking it for pleurisy, and whose infant was attacked with vomiting every time that it sucked the breast.

Compound Powder of Antimony. — Take of Sesquisulphuret of Antimony, in powder, one pound, horn shavings, two pounds; Mix, and throw them into a crucible white-hot in the fire, and constantly stir till vapour no longer ascends. What remains, rub into powder, and put into a fit crucible. Then apply fire, and slowly augment it, that it may be white-hot for two hours. Rub the residue into a very fine powder.

This powder has a place in the Pharmacopœia, from its supposed identity with the celebrated nostrum known under the name of *James's powder*, which, according to Mr. Phillips, consists of 56 of antimonious acid, and 44 of phosphate of lime; while two samples of this *pulvis antimonii compositus* afforded respectively 38 and 35 *per cent.* of antimonious acid, and 62 and 65 of phosphate of lime.

There is, however, a greater discrepancy in different samples of this preparation than these analyses establish, and this uncertainty of composition renders it so indefinite in its effects that it is now properly falling into disuse; various combinations of emetic tartar may, in fact, in all cases, be satisfactorily substituted for it.

APERIENTS (from *aperio, I open*). Mildly-acting purgatives.

APOCYNUM ANDROSÆMIFOLIUM. *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Apocynaceæ. *Radix.* The root of the Dog's Bane.

This plant is indigenous; it is lactescent, and in this as well as in its botanical characters, shows its affinity to other more noted members of this natural family, such as the Nux-vomica, Upas Tienté, the Wooraly, and the Tanghin poisons. The root has an unpleasant and intensely bitter taste, and it contains, according to Dr. Bigelow, a bitter extractive matter, a red colouring matter soluble in water, but not in alcohol; a volatile oil and caoutchouc. "It operates on many persons as an emetic in *doses* of *one* or *two scruples*, and in smaller quantities is tonic and stomachic." By some country practitioners it has been used occasionally as a substitute for ipecacuanha, and hence it is frequently called *Ipecac.* It is important for those who propose to employ it, to be aware that its strength is apt to be lost by keeping.

APOCYNUM CANNABINUM. *Radix.* The root.

Akin to the preceding in its physiognomy and localities, is this species, the *Indian Hemp*, as it is called, on account of its fibrous and tough cortical portion being fitted to serve, after maceration, as a substitute for hemp. It acts powerfully on the depurating organs; being emetic and cathartic as well as diuretic, and aiding the lungs to expectorate, and occasionally, as might be inferred, exerting a diaphoretic operation. It would seem to have a sedative effect independently of the nausea and sickness to which it gives rise. There are not wanting instances of cures of dropsy being performed by its agency. A dose of from *fifteen* to *thirty grains* of the root in powder will generally produce free vomiting and purging. But, as in the case of most of our indigenous emetic-cathartic roots, the decoction will be found to be a more convenient form. It is directed to be prepared "by boiling half an ounce of the dried root in a pint and a half of water to a pint; of which, from one to two fluid ounces may be given two or three times a day, or more frequently if requisite. The watery extract, in doses of three or four grains three times a day, will generally act on the bowels." — *U. S. Dispensatory.*

AQUA. Water (probably derived from *Æquus, smooth*, or *level*). Our word *water* is of Saxon origin; whence also the German word *wasser.*

The importance of water as a dietetic, medicinal, and pharmaceutical agent, is too obvious to need comment. In its ordinary state, it is always more or less impure; but it may be easily obtained free from foreign matter, by careful distillation.

Pure water is transparent, colourless, inodorous, and tasteless, and leaves no residue after evaporation. It is a *protoxide of hydrogen*, being composed of

	Atoms.	Equivalents.	Per Cent.	Volumes.	Sp. Grav.
Hydrogen .	1	1	11·1	1·0	0·0694
Oxygen .	1	8	88·9	0·5	0·5555
Water .	1	9	100.0	1	0·6249

The two last columns show that a volume of the *vapour of water*, or of *steam*, is constituted of one volume of hydrogen and half a volume of oxygen; and hence the specific gravity of aqueous vapour compared with that of air, is as 0·6249 to 1·0000, for the specific gravity of hydrogen (compared with air) is 0·0694, and half the specific gravity of oxygen is $\frac{1{\cdot}1111}{2}$=0·5555; hence, ·0694 + ·5555 =·6249.

Water is a powerful refractor of light, and a bad conductor of heat, and of electricity. It exhibits a curious anomaly in respect to its maximum of density, which, instead of being just at its point of congelation, as in other fluids, is about eight degrees of Fahrenheit's scale above that point; so that water attains its greatest density or specific gravity, at about 40°; and as it expands equally on either side of that point, by heat or cold, it follows that water at 32° and at 48°, will be of the same density.

Water is employed as the unit, or standard of comparison, to which the densities of liquids and solids are referred (*see* Specific Gravity). At the temperature of 60°, a cubic inch of water weighs almost exactly 252·5 grains, and the cubic foot 998·217 ounces avoirdupois; now this last number is so near 1000, that the specific gravity of any substance in reference to water, is almost exactly the weight of one cubic foot of such substance, in avoirdupois ounces. The specific gravity of gold, for instance, is, 19300 (that of water being assumed as 1000), and of mercury 13500; and a cubic foot of gold weighs very nearly 19300 avoirdupois ounces, and a cubic foot of mercury 13500. Water is about 815 times heavier than air.

At the temperature of 32°, water, under ordinary circumstances, concretes into *ice*, the specific gravity of which is only 0·94 (water being 1·00), so that water, in the act of congelation, expands; and it does this with such force as to burst thick and strong vessels in which it is confined, with irresistible violence; of this, the rupture of iron and leaden water-pipes is a familiar example.

Exposed to heat, in open vessels, water boils, or is rapidly changed into the state of vapour, at the temperature of 212°, but this *boiling point*, as it is called, varies with the pressure of the atmosphere upon the surface of the water; hence, at the top of a high mountain, water boils at a much lower temperature, and in the shaft of a deep mine, at a higher temperature than at the level of the sea; at the top of Mont Blanc, water boils at 184°; and by diminishing or increasing the pressure to a greater extent by other means, a greater variation in the boiling point is observed; so that,

in the vacuum of a good air-pump, water will boil at 70°, and under a pressure of 50 atmospheres, at about 510°. In regard to the natural barometrical changes of the atmosphere, the following table shows the relative boiling points :—

Boiling point, in degrees of Fahrenheit.	Barometric pressure, in inches of Mercury.
208°	27·74
209°	28·29
210°	28·84
211°	29·41
212°	29·80
213°	30·60

So that, for every inch of barometric variation, the boiling point varies 1·76° ; or a rise or fall in the barometer of 0·1 inch, elevates or sinks the boiling point 0.176°.

Water is absorbed by many porous and pulverulent substances, to a greater or less extent ; and when they abstract aqueous vapour from the surrounding atmosphere, they are said to be *hygrometric,* they part with this water in dry states of the air, and may in most cases be dried by exposure to a heat of 212°. But water also enters into combination with solids, in definite proportion ; where it thus contributes to the regular form and transparency of crystallized bodies, it is called *water of crystallization ;* where this is not the case, the compound is usually termed a *hydrate ;* crystals of sulphate of soda, for instance, contain 55·6 *per cent.* of water of crystallization ; and caustic potash (hydrate of potassa) contain 16 *per cent.* of water, retained by so powerful an affinity as not to be expelled by a red heat.

Water which has been exposed to the atmosphere, always contains more or less air, which it gives off when boiled, or where exposed under the exhausted receiver of the air-pump. Hence it is that pump water often displays a number of air bubbles, in consequence of drawing it from a deep well. Water retains this air with much obstinacy, so that long boiling is requisite entirely to separate it ; and water which has been thus deprived of air, soon again acquires it, either by mere exposure, or by pouring it a few times from one vessel into another. It absorbs oxygen in preference to atmospheric air or nitrogen ; and when the air in common water is expelled by boiling, the last portions contain more oxygen than those which are first evolved. But a portion of the air given off by common water, is generally carbonic acid. Dr. Dalton obtained from 100 cubic inches of spring water, two cubic inches of air, which consisted (after the abstraction of from 5 to 10 *per cent.* of carbonic acid) of 38 *per cent.* oxygen, and 62 nitrogen. From one hundred cubic inches of the water of a deep spring, Dr. Henry obtained 4·76 cubic inches of air, of which 3·38 were carbonic acid, and 1·38 atmospheric air. But the aëriform contents of common spring water vary in quantity and quality ; they also importantly affect the quality of the water ; hence that which has been *boiled,* is flat and vapid ; and pump water, which

has lost some of its included air by exposure, is less agreeable to the palate than that recently drawn from the well.

Distilled Water.—Take of Water, ten gallons; Let two pints first distil, which being thrown away, let eight gallons distil. Keep the distilled water in a glass bottle.

Any volatile impurities which water is likely to contain, would pass over with the first two pints, which are therefore rejected; the other impurities remain in the residue. The transparency of distilled water should not be disturbed, either by lime water, chloride of barium, nitrate of silver, oxalate of ammonia, or hydrosulphuric acid; the first is a test of carbonic acid, the second of sulphuric acid and sulphates, the third of hydrochloric acid and chlorides, the fourth of lime and its salts, and the fifth of lead and many other metallic impregnations; from all these, pure water should, of course, be free; but when distilled, as it generally is, in a copper still with a pewter worm, traces of copper and of lead are not unfrequently discovered in it, and especially the latter, so that it should always be tested in the ordinary way, by hydrosulphuric acid. If common distilled water be evaporated to an eighth or tenth of its bulk, and then tested, it is seldom that some metallic impregnation will not be evident, but the quantity is almost always too small to deserve serious attention. The *octarium*, or pharmaceutical pint, of distilled water, weighs, at the temperature of 62°, 8750 grains, or ℔j.℥vj ℥j. ℈ijss., which is ten grains less than 18¼ ounces *troy-weight*.

Distilled water is employed in all those pharmaceutical preparations and medical formulæ in which the impurities of common water are objectionable; it is vapid to the taste, in consequence chiefly of the absence of air; but some persons have been induced to substitute it for common water, under the idea that the latter, preserved as it usually is in leaden pipes, cannot be free from that pernicious metal. The truth, however, is, that distilled water is more apt to be so contaminated, than rain or spring water, the saline contents of which prevent the solution of, or action upon, lead; whereas the joint action of air and *pure* water soon effect its oxidizement. This important subject, in a medical and medico-legal point of view, has been ably discussed by Dr. Christison (*Treatise on Poisons*, Art. *Lead*), to whom I must refer. Some difference of opinion exists, as to the nature of the white powder which thus forms, and is deposited during the joint action of air and pure water on clean metallic lead. It appears to be a mixture of the hydrated oxide and of carbonate of lead; and as the hydrated oxide is to a small extent soluble, the filtered water affords to sulphuretted hydrogen, and to carbonic acid, a brown and a white cloud; but carbonate of lead is insoluble, so that the oxide dissolved in pure water, if exposed to air, soon becomes carbonated and insoluble. This is the reason why we detect lead in solution, when it has even been for a few minutes in contact with distilled water containing air; but that, after exposure, *dissolved* lead is no longer discoverable. But all common water contains minute portions of certain

salts, which, generally speaking, are effective preventives of the action which ensues in pure or distilled water; thus, water containing a two-thousandth part of common salt, or a four-thousandth of sulphate of lime, is for some time without action upon clean lead; at length the surface becomes covered with a whitish film of carbonate of lead, which is insoluble, and no further change is observed, nor can any salt of lead be detected, either dissolved in, or diffused through, the water. It therefore fortunately happens, that the impurities, or usual saline ingredients, of river and spring water, prevent its contamination by our leaden cisterns and pipes; but that distilled water, or any water of extreme purity, would, under such circumstances, become impregnated.

There is another way in which lead is occasionally acted upon by water, and to which attention was first directed by Dr. Paris; it is in consequence of galvanic action, and in cases where iron and lead are in metallic contact, as often happens in the employment of iron bars to strengthen and support leaden cisterns, and in the introduction of iron pumps under similar circumstances; in these cases, though the lead is rendered electro-negative, and so far protected from acid reaction, it becomes more susceptible of, and exposed to, the agency of electro-positive elements, among which are alkalis and alkaline earths, and these exert considerable solvent power over it. So that all such combinations of lead and iron, zinc, &c., should be cautiously avoided.

Lastly, there is another source of contamination of water by lead, which is this; leaden cisterns have often leaded covers, and the water, spontaneously evaporating from the cistern, is condensed (now in the form of *pure*, or *distilled* water) upon the lid, upon which it exerts its usual energetic action, and drops back into the body of the cistern, contaminated by lead: so that wood, not leaded, should be used in all cases for covering leaden reservoirs.

Rain Water.—This is one of the purest forms in which water can be obtained: when collected in the open country, inland, and upon surfaces over which it exerts no solvent power, it contains air, and carbonic acid; near the sea, it shows traces of chlorine; and of organic matter, ammonia, and various other impurities, when obtained in or near large towns. It is, however, extremely soft, and its specific gravity scarcely exceeds that of distilled water, for which it is, in almost all cases, the best substitute. *Snow water* is also very pure; it is said to contain more oxygen than rain water; this is also said to be the case with *dew*.

Spring Water.—The water of natural springs is in some cases extremely pure; in others so loaded with foreign matters, as to be unfit for common use, and then usually designated *mineral water*. As, therefore, they vary in purity between these two wide extremes, and as they may hold in solution one or more of all the soluble materials of the strata of the globe, together with various gaseous and organic impregnations, it is impossible to give any general statement of their contents. A certain analogy, however, com-

monly pervades the spring waters of the same district; thus, the superficial springs in and about London, generally contain sulphate of lime, common salt, carbonate of lime, and smaller portions of some other salts, and are generally so *hard*, as to be unfit for washing, and culinary and domestic uses, such, especially, as making tea; while the deeper springs of the chalk and its adjacent sands, are more pure, and frequently extremely *soft*. This distinction of water into *soft* and *hard*, is derived from its effect on soap, which is perfectly soluble in pure water, but is decomposed by the salts of that which is impure, and with which, insoluble saponaceous compounds are formed; hence the value of an *alcoholic solution of soap*, as a test of the relative softness or hardness of water; or, in other words, of its fitness for washing. The purer the water, the less the turbidness which is produced on dropping into it this test; if it only renders the water slightly opalescent, such water may be termed *soft;* but if it occasions a decided milkiness, or white cloud, it is *hard*. But, in addition to its saline or natural impurities, the *well water* of London is sometimes contaminated by organic matters, the source of which, especially in the pump water of churchyards, is sufficiently obvious; and such is usually the place selected for the parish pump. This disgusting source of water should be avoided; and the disgraceful system of burying the dead in the streets of the metropolis should be authoritatively discontinued. Of this nuisance, abundant instances occur to every one who walks about London; the churchyard of St. Clement's, in the Strand, is a fair specimen; and there are many infinitely worse. In these, the same graves are repeatedly opened, and the coffins thrust in one upon another, according to a most inexplicable system; and it is beneath this superstratum that the waters of the adjacent wells flow, in some instances, perhaps, deep enough to avoid direct contamination, but never free from the suspicion of the oozings of the vicinity.

River Water, being a mixture of spring and rain water, is generally of intermediate purity, except, as in the case of the Thames in London, which receives the whole of the miscellaneous filth of the metropolis, and is liable to many consequent peculiarities. River waters also generally contain a considerable quantity of impurities in mechanical suspension, from which they are freed, either by deposition or by filtration.

The average saline contents of filtered Thames water amount to about twenty grains in the imperial gallon, and are as follows:—

Carbonate of Lime	14·5
Sulphate of Lime	4·0
Common Salt	1·5
	20·0

Traces of magnesian and ammoniacal salts, and of organic matters, are also found, together with other substances, resulting from local contaminations by sewers, gas-works, and various manufactories, which it is impossible to specify, and which, together with suspended

and insoluble particles, often render Thames water, in particular places, quite unfit for use.

Much difference of opinion exists as to the relative salubrity of different kinds of water; but, generally speaking, where the amount of foreign matters is not such as to give any decided characters to the water, and to constitute it a *mineral water*, or to interfere materially with its colour, flavour, or transparency, and when these are not of a noxious quality, the saline contents cannot be considered as injurious to health; indeed, it would seem not improbable, that the extreme purity of the water which supplies the valleys of some great mountainous districts, and is chiefly derived from ice or snow, is a cause of glandular affections; on the other hand, we have no evidence that calculous disorders are, as has sometimes been supposed, more prevalent in districts which are watered by rivers loaded with calcareous matter.—*Brande.*

ARALIA SPINOSA. *Cl. 5. Ord. 5. Nat. Ord.* Araliaceæ. *Cortex.* Bark of the Angelica tree.

This Aralia is a native arborescent shrub with a prickly stem, common in the southern states, but cultivated in the gardens as far north as Boston. The watery infusion of the fresh bark is represented by Mr. Elliott, in his Southern Botany, to be both emetic and cathartic,—and the watery extract to be decidedly cathartic. The bark is pungent and heating, and is employed in the southern states, both in the form already mentioned and in tincture, as a remedy for rheumatism and certain cutaneous affections.—*Dr. Bigelow's Treat. on Mat. Med.*

ARCHIL, *see* Lacmus.

ARGENTUM. *Silver.*

Pure silver is a white and very brilliant metal, fusible at a bright red heat, approaching to a white heat, =, according to Daniell, to 1873° F. It resists the action of air and water; when heated to intense whiteness, as in a flame urged by the oxygen blowpipe, it gradually evaporates. When suddenly cooled, it crystallises in the act of congelation, throwing up superficial excrescences, from the escape of oxygen; this metal having the curious property of absorbing and retaining oxygen whilst liquid, and suddenly giving it off in the act of congelation. When alloyed with 5 *per cent.* of copper, it no longer possesses this property. The equivalent of silver is 108. It forms one salifiable oxide only, which may be obtained by dissolving the metal in nitric acid, precipitating by baryta water, thoroughly edulcorating the precipitate, and drying it at 212°. It consists of

	Atoms.	Equivalents.	Per Cent.
Silver	1	108	93·10
Oxygen	1	8	6·90
Oxide of Silver	1	116	100·00

This oxide is of a dark olive colour, tasteless, insoluble in water, and easily reduced at a dull-red heat to the metallic state. When moist, it combines with ammonia, and forms fulminating silver.

A characteristic property of solutions of silver is that of yielding

a white curdy precipitate with chlorine, hydrochloric acid, and the soluble chlorides, which precipitate is insoluble in nitric acid, but soluble in ammonia ; it becomes brown, and ultimately black, when exposed, in a moist state, to the action of light ; it is a *chloride of silver*, composed of

	Atoms.	Equivalents.	Per Cent.
Silver	1	108	75
Chlorine	1	36	25
Chloride of Silver	1	144	100

The only pharmaceutical use which is made of metallic silver is, for the occasional purpose of silvering pills, which, so enveloped, may be swallowed without being tasted. For this purpose, the recently-made pills are put into a spherical box, with a few silver leaves, and shaken till they acquire a superficial metallic coating.

Two preparations of silver are directed in the London Pharmacopœia ; namely, Cyanuret or Cyanide of Silver, and Nitrate of Silver. The former has a place, as a source of hydrocyanic acid.

Nitrate of Silver consists of

	Atoms.	Equivalents.	Per Cent.
Oxide of Silver	1	116	68·23
Nitric Acid	1	54	31·77
Nitrate of Silver	1	170	100·00

The solution of nitrate of silver ʒi. to water ℥i. is used as a test for detecting the presence of chlorine, which it does with extreme delicacy, as above stated.

The chief employment of nitrate of silver is in surgery, as a caustic ; it kills the parts to which it is applied ; being much less soluble than pure potassa, and not deliquescent, it is easier of application, and less apt to spread. As it is soluble in water, it may be used in any state of dilution, and is a valuable application in many cases of ulcerating sores, in the proportion of from one to five grains to the ounce of distilled water. The part may be touched twice or thrice a day, with a camel-hair pencil dipped in this solution, which should be of such strength as to occasion smarting. In fistulous sores it is sometimes used as an injection, and it has been recommended as a mouth-wash in scorbutic affections of the gums, and aphthæ of the fauces.

As an internal remedy, nitrate of silver has gained much and apparently deserved credit in the treatment of epilepsy. In this disease it has been administered in doses beginning with an eighth of a grain, and carried up to four or six grains, three or four times a day ; it is generally formed into pills with bread-crumb, and the best dose appears to be half a grain thrice a day, gradually increased to a grain and a half or two grains. It is questionable whether the nitrate is affected by the small quantity of salt in the bread. Under this treatment, the fits often decrease at first in violence, and then in frequency ; where the bowels are moderately

acted upon, the efficacy of the remedy appears most certain (*Medico-Chirurgical Transactions*, ix. 254). There is a very disagreeable effect which often follows this use of nitrate of silver, which is the discoloration of the *rete mucosum*, so that the surface of the body, and especially those parts most exposed to light, acquire a leaden-gray colour (*Albers and Roget; Med.-Chir. Trans.*, vii. 284). Various means have been resorted to with a view of preventing this effect, or of removing it when it has taken place, but hitherto without success. Dr. Johnson (*Med.-Chir. Rev.*) asserts that this discoloration will not take place if the remedy be not continued more than three months. It is curious that excessive acidity at the stomach is a frequent concomitant of epilepsy, and that Dr. Prout's experiments (*Phil. Trans.*, 1823), have shown that the free acid of the stomach is the hydrochloric, an acid which would decompose the nitrate of silver.

Nitrate of silver has also been employed in other diseases attended by morbid nervous excitement and debility; in certain convulsive affections; in chorea; and in *angina pectoris*.

In over-doses it operates as a corrosive poison; the best *antidote* is *salt and water*, by which chloride of silver will be formed, a compound nearly, if not quite, inert. Orfila's results, however, in reference to this counter-poison, were not very satisfactory (*Traité des Poisons*, i. pt. 2, p. 46). It appears to act as a local irritant, and not to be absorbed into the system.

ARSENIC. *Arsenicum* (from αρσενικος, *strong, powerful;* in allusion to its strength as a poison).

The arsenical compounds in the *London Pharmacopœia*, are, *Acidum Arseniosum sublimatione paratum:* Arsenious acid prepared by sublimation; and, among the "preparations," *Liquor potassæ arsenitis:* Solution of arsenite of potassa.

Arsenic is an extremely brittle metal, of a steel-gray colour: its specific gravity is 5·8. When heated in a sealed tube under the pressure of its own vapour, it may be fused; but in an open tube it rises in vapour at a temperature of about 360°, without entering into fusion. Heated in the air, it easily takes fire, burning with a blueish flame, and producing abundant fumes of its oxide. When long exposed to a moist atmosphere, or when boiled in water, it becomes encrusted with a gray powder, which is an imperfect oxide. Its equivalent number is 38. It has been found *native*, in Saxony, Hanover, Bohemia, France, and Cornwall, generally in the form of nodules of a foliated or lamellar texture.

Arsenic forms two definite compounds with oxygen, both of which have acid characters, and have therefore been termed *arsenious* and *arsenic* acids.

Arsenious acid, or *white arsenic* (the *acidum arseniosum sublimatione paratum* of the Materia Medica), is generally met with in white semitransparent brittle cakes or masses, of a vitreous fracture, but gradually becoming opaque and pulverulent by ex-

posure to air. Its specific gravity is 3·72. It is nearly tasteless, but is a virulent poison. By slow sublimation, it may be obtained in tetraedral and octoedral crystals, and also in hexangular tables derived from a rhombic prism. It is volatile at 380°, and its vapour is inodorous, when perfectly free from metallic arsenic; but when heated on metal, or in contact of flame, or anything affording charcoal, or inflammable matter, it smells strongly of garlic. According to Klaproth, 1000 parts of water at 60° dissolve from two and a-half to three of arsenious acid; and 1000 parts of water at 212° dissolve rather more than 77 parts, of which about 30 parts are retained in permanent solution. According to Mr. Phillips, "A thousand parts of water, at mean temperature, are said to dissolve 9·6 parts of transparent, and 12·5 of opaque arsenious acid in 36 hours; the same quantity of boiling water dissolves 97 parts of the transparent kind, of which 18 are retained on cooling, and 79 deposited in the state of small crystals, the form of which is the regular octoedron."

The aqueous solution of arsenious acid slightly reddens litmus, but renders syrup of violets green. Eighty parts of alcohol at 60° dissolve one part of arsenious acid. It is also soluble in oils, and in the greater number of acids; and during its crystallisation from a solution in dilute hydrochloric acid, sparks and flashes of light are occasionally perceived. It dissolves in alkaline solutions, and combines with salifiable bases, forming a class of salts termed *arsenites*. Those of ammonia, potassa, and soda are soluble and crystallisable; those of lime, baryta, strontia, and magnesia, are difficultly soluble, and may be formed, together with many others, by precipitation. It is found native. It consists of—

	Atoms.	Equivalents.	Per Cent.
Arsenic	1	38	76
Oxygen	1½	12	24
Arsenious Acid	1	50	100

Arsenious Acid is entirely sublimated by heat. Mixed with charcoal and exposed to heat, it exhales an alliaceous odour. It is soluble in boiling water; and on the addition of hydrosulphuric acid, deposits a yellow precipitate; but on the addition of lime-water, a white precipitate.

Arsenic acid is not included in the *London Pharmacopœia*. It is obtained by distilling nitric acid off powdered metallic arsenic; or by distilling a mixture of four parts of hydrochloric acid, and 24 of nitric acid, off eight parts of arsenious acid, gradually raising the temperature to dull red heat. Arsenic acid is white, sour, deliquescent, and uncrystallisable. Its specific gravity is 3·4. It is soluble in 6 of cold and 2 of boiling water. The *binarseniate of potassa*, formed by heating to redness in a Florence flask a mixture of equal parts of nitre and white arsenic, dissolving the product in water, and crystallising it, has occasionally been used in pharmacy under the name of *Macquer's arsenical salt*.

Arsenic acid consists of

	Atoms.	Equivalents.	Per Cent.
Arsenic	1	38	65·5
Oxygen	2½	20	34·5
Arsenic Acid	1	58	100·0

Arsenite of Potassa. Fowler's Solution.—Take of Arsenious acid, rubbed into small pieces, Carbonate of Potassa, of each eighty grains; Compound Tincture of Lavender, five fluid drachms; distilled water, a pint; boil the arsenious acid and the carbonate of potassa with half a pint of water in a glass vessel, till they are dissolved. To the cold solution add the compound tincture of lavender. Lastly add, besides, of distilled water as much as may be sufficient, that it may accurately fill a pint measure.

Uses and Effects of Arsenic.—Arsenious acid is employed medicinally as a tonic, in the cure of obstinate intermittents; for this purpose it has long been used in Hungary, and in the fenny districts of Lincolnshire, under the name of *tasteless ague drop*. The only form in which it is advisable to administer it internally, is the preceding *Liquor arsenitis potassæ*, known under the name of "Fowler's Mineral Solution," from having been employed in the treatment of agues and intermitting headache, by Dr. Fowler, of Stafford. When carefully administered, it is generally regarded as an efficacious and safe remedy; but this may admit of doubt: at all events, its effects should be cautiously watched, and if it produce soreness or itching of the eyelids, tenderness of the mouth, cough, headache, dyspepsia, restlessness, or a quick pulse, or paucity of urine and strangury, it is to be discontinued. Dr. Thomson states that he has given it with decided advantage after cupping and purging, in threatened apoplexy, when the strength was little and the complexion pale; and he sanctions its employment in lepra, in chronic rheumatism, in intermittent hemicrania, or *megrim*, in schirrus, and in some painful affections of the ends of the bones, cartilages, and ligaments. It has been prescribed in epilepsy. It is said that the East Indians are in the habit of administering arsenic in large doses, after the bites of venomous animals; and it would appear from Mr. Ireland's observations (*Medico-Chirurgical Transactions*, II. 397), that it is sometimes an effective remedy. There can, however, be no doubt as to the impropriety of prescribing any form of arsenic, except in cases where other metallic tonics of a less dangerous character have failed, and that it should then be used with the utmost circumspection. Dr. Paris says, "That it is capable of accumulating in the system, I can aver from my own personal experience, and this, in certain habits, may predispose the patient to serious diseases." (*Pharmacologia.*)

The *dose* of arsenious acid has been variously stated: from *a sixteenth of a grain*, to *a grain*, or even more, every four or six hours, and this in the solid form, made into a pill with bread-crumb. The solution of the arsenite of potassa is, however, a more manageable and infinitely preferable form, and as it is not pretended that

it is in any case less effective than the free acid, it seems the only arsenical formula that requires notice; of this, the fluid ounce contains four grains of arsenious acid, and the fluid drachm half a grain, and from *four* to *fifteen minims* twice a day is said to be a dose. It certainly should not be administered in quantities containing more than an eighth of a grain of the arsenious acid, till its effects upon the patient are fully ascertained; there are, however, cases in which it has been pushed to a much greater extent. The arsenite of potassa is best administered in some simple aromatic water; it may be given, in intermittents, in the intervals of the febrile paroxysms, three or four times daily.

℞ Liquoris Potassæ Arsenitis, minima sex; Aquæ destillatæ f℥j; Spiritus Cinnamomi, Syrupi Zingiberis, āā f℥j. Misce fiat haustus sextâ quâque horâ sumendus.

When it gripes the bowels and irritates the stomach, it may be conjoined with aromatics, and with small doses of opium.

℞ Confectionis Aromat. ℈j.; Aquæ Anethi f℥j.; Tincturæ Opii, Liquoris Potassæ Arsenitis, āā ♏ vj. M. fiat haustus ter quotidie sumendus.

Out of more than three hundred cases of intermittents which I have had to treat, I did not prescribe arsenic in six of them, and these few were in the early period of my professional life.

As an external application, arsenic requires equal caution in its use. It has long been an empiric as well as regular remedy in the treatment of cancer. *Plunket's ointment* is said to consist of arsenious acid, sulphur, and the powdered flowers of the *Ranunculus flammula* and *Cotula fœtida*, levigated and made into a paste with the white of an egg. *Davidson's remedy* is a mixture of arsenious acid and powdered leaves of hemlock; and the *Pâte arsenicale* of the French surgeons is composed of 72 parts of cinnabar, 22 of *Sanguis draconis*, and 8 of arsenious acid, made into a paste with saliva at the time of applying it. These and similar formulæ have in some instances improved the characters of the sore, but whether in any real case of cancer a cure has been effected, seems very doubtful, and the absorption of the arsenic is stated not unfrequently to have occasioned much mischief. The following are formulæ preferable to the above, where arsenic is thus required:—

℞ Acidi Arseniosi, Potassæ Carbonatis, āā grana viginti; tere simul et solve in Aquæ destillatæ, octario. Fiat lotio.

℞ Acidi Arseniosi, ℥j, tere in pulverem subtilissimum, et adde gradatim Olei Amygdalæ, f℥ij. Unguenti Cetacei ℥xij. Misce accuratissime ut fiant unguentum.

It must be remembered, in reference to all these applications, that arsenic is as fatal in its effects when applied to a wound, as when administered internally; it has even been known to produce poisonous effects when applied to the unbroken skin; and further, that it may accumulate in the system, and suddenly show itself with fatal violence. Dr. Paris quotes a case related by L. di Capoa, of a child killed by the violent vomiting and purging arising from a slight wound in the head made by a comb, wet

with oil in which arsenic had been infused for the purpose of killing vermin; and another recorded by Desgranges, in which an arsenical pomatum, used for the same purpose, killed a chambermaid. M. Roux has noticed the case of a girl who was killed by the application of arsenical paste to an ulcer on the breast; and other analogous cases are recorded in which violent and even fatal effects have followed when arsenic has been applied externally, even in small quantities, and not incautiously. They are, at all events, sufficient to suggest the question, whether the employment of arsenic is in any case justifiable?

Toxicology.—We may now advert to the toxicological history of arsenic: to the symptoms which it produces, the mode in which it acts, the treatment to be adopted, and the tests by which it is recognised. Upon these subjects we must refer the reader to authors who have expressly discussed these matters, and more especially to the excellent chapter upon the subject in Dr. Christison's treatise, a few of the leading details in which we shall here endeavour to abridge.

It is generally presumed that arsenic has a two-fold action upon the system; one partly irritant, by which it induces inflammation in the alimentary canal, and elsewhere; and the other indirect, and evinced upon parts and organs remote from its immediate seat of application: the latter is the most generally fatal, for in some cases no symptoms of inflammation occur, and in others, death ensues before any material organic injury has been effected. How this remote action is brought about is still undecided; but the general opinion is, that it is through the blood; it has, however, not been satisfactorily detected there, though, as Dr. Christison remarks, the want of conclusive facts to prove the presence of arsenic throughout the body need not excite surprise, considering the minute quantity in which poisons operate, and the difficulty of detecting such quantities in the blood.

The nature of the remote or indirect action of arsenic, is also imperfectly understood; it is sometimes called a disorder of the general nervous system, but the symptoms are rather those of depressed action of the heart; though, in the advanced stage of lingering cases, the brain and nerves appear to be the principal seat of derangement.

Sir Benjamin Brodie, and other physiological experimentalists, have shown that arsenic belongs to those poisons which act nearly with the same energy, whatever be the organ or texture to which they are applied; according to Jaeger, however, it is most active when applied to a fresh wound, or injected into a vein, or introduced into the peritoneal sac; it is less powerful when taken into the stomach; still less when introduced into the rectum; and quite inert when applied to the nerves. But, whatever be the texture to which it is applied, it almost always produces inflammation of the stomach; and in some instances of death caused by its outward application, the inflamed appearance of the stomach has even been greater than when it had been swallowed.

Of the different preparations of arsenic, those which are most soluble appear to be the most active; but in this respect, arseniuretted hydrogen probably exceeds all others. Gehlen died on the ninth day after accidentally inhaling a small portion of it, under the usual symptoms of arsenical poisoning. The smallest actually fatal dose of arsenious acid upon record, is four grains and a half; the subject was a child four years old, and death occurred in six hours. The next smallest dose, cited by Dr. Christison, is thirty grains; the subject, an adult, died in six days. Hahnemann says, that in circumstances favourable to its action, four grains may cause death within twenty-four hours, and that one or two grains may prove fatal in a few days; but he refers to no actual cases. Renault found that a single grain killed a large dog in four hours.

The tendency of habit to modify the action of arsenic is very questionable, and when taken in medicinal doses, *the effect is the reverse of familiarising the stomach to it.*

The symptoms of arsenical poisoning may be considered under three heads:—

1. There are symptoms of great irritation in the alimentary canal, with excessive general depression, but no distinct disorder of the nervous system. These, which are the most common cases, generally prove fatal, the person seldom surviving more than three days. In the mildest examples, recovery takes place after a few attacks of vomiting, and slight general indisposition for a day or two. The ordinary progress of the symptoms are, faintness, sickness, burning pain at the stomach aggravated by pressure, vomiting of greenish matter sometimes streaked with blood, incessant thirst, hoarseness, and difficulty of speech. There is generally diarrhœa, or tenesmus, and the burning pain increases, and sometimes extends the whole length of the alimentary canal. The breathing is painful; the urinary passages are more or less affected; and convulsive tremors or twitches ensue, accompanied by cramps of the legs and arms. Soon after the vomiting sets in, the pulse becomes small and quick, and often imperceptible, the countenance anxious and collapsed, the eyes red, and aphthæ break out on the velum and palate. Delirium and stupor ensue. Death in general comes on calmly, but is sometimes preceded by convulsions. Such are the commonest symptoms of poisoning by arsenic; they vary as to violence, and are not all present in every instance.

2. The second variety of arsenical poisoning includes those in which death ensues in five or six hours, and in which the prevalent symptoms are those of *narcotism.* The pain and vomiting are slight. There are occasionally convulsions and stupor; and the inflammatory symptoms are the least striking. This modification has only been observed when the dose of the poison was large, when it was in little masses, or when it was in a state of solution. It is not common, and indeed not generally known; Dr. Christison has, however, given an abstract of twelve such cases, which

suffice to correct the erroneous opinion, that arsenic *always* produces painful and violent symptoms.

3. The third modification of arsenical poisoning illustrates its occasional action on the nervous system. It occurs chiefly in persons who, from having taken a small quantity, or vomited soon after, are eventually saved; but it has also been met with where death has followed protracted illness. In these cases, the first symptoms are those of the inflammatory variety; and when these begin to recede, various nervous affections follow, of which, the most formidable is coma; the least, a paralysis of the arms and legs, resembling that produced by lead; sometimes epileptic fits, tetanus, or a species of hysteria, or mania, are observed.

Lastly, we may mention the symptoms of *chronic* arsenical poisoning, which occasionally succeed to the acute form, and which are sometimes the result of the long-continued administration of arsenic in very small doses, and have been quoted by some as consequent upon its medicinal exhibition. Of these, the principal are, dyspeptic irritability of stomach, emaciation, fever, desquamation of the cuticle, falling off of the hair, languor, loathing of food, watchfulness, and gradual extinction of the vital energies. Similar to these were the effects of the celebrated *acqua Toffana*, or *acquetta di Napoli*, as enumerated by Hahnemann; namely, a gradual sinking of the powers of life, without any violent symptom; an indescribable feeling of illness, failure of the strength, slight feverishness, want of sleep, lividity of the countenance, and an aversion to food and drink, and all the other enjoyments of life. Dropsy closes the scene, along with black miliary eruptions, and convulsions, colliquative perspiration, and purging. In some cases there are complete, if not regular remissions, of all the morbid and painful symptoms.

The morbid appearances on dissection, in cases of death by arsenic, are sometimes comparatively insignificant, especially where it is rapid in its action, and where the symptoms are rather narcotic than inflammatory; but in ordinary cases, they also vary considerably. The most usual are, redness of the œsophagus, and especially of the villous coat of the stomach, which is often soft, and easily separable by the nail, or thickened and corrugated, or even actually in places destroyed; and, where death has been protracted beyond two days, it is sometimes ulcerated. In some rare cases the stomach has been perforated. "Destruction of the coats of the stomach, as produced by arsenic," says Dr. Christison, "has been variously described by authors, under the terms erosion, corrosion, dissolution, ulceration; but the correct mode of describing it appears to be by the terms gelatinization, or ulceration, according to the nature of the diseased action by which it is induced. At all events, it is necessary to beware of being misled by the terms erosion, corrosion, and the like, which all convey the idea of a chemical action, while it is well ascertained that a chemical action either does not exist at all between arsenic and the animal tissues, or, if it has existence, tends to harden

and condense, rather than dissolve or corrode them. Arsenic is not a corrosive."

The mucous secretion of the inner coat of the stomach is almost always increased in quantity; and another common appearance is a sanguinolent fluid, or even actual blood. Sometimes also, arsenious acid is itself detected, its sparing solubility and adhesion to the stomach having prevented its total evacuation by vomiting: in such cases it may also, of course, be found dissolved in the contents of the stomach. When in solid particles, they are enveloped in mucus, or blood; and sometimes imbedded in little ulcers. They are also, in some instances, rendered yellow by superficial conversion into sulphuret. In all cases, care, however, must be had, not hastily to consider every white powder found in the stomach as arsenic.

Signs of inflammation sometimes pervade part of the intestine, but seldom below the extremity of the duodenum, and rarely reaching the colon; the rectum, however, is occasionally much inflamed; and cases are recorded in which the inner membrane of that gut has been abraded, ulcerated, and redder even than the stomach. In lingering cases, excoriation of the anus, and even gangrene, have been produced. The colon is sometimes in a remarkably contracted state, a circumstance which admits of obvious explanation, for whatever completely empties it, will have the same effect. With regard to the thoracic viscera, redness and congestion of the lungs, and redness of the pleura, of the inner surface of the heart, and of the lining membrane of the windpipe, have at times been observed. The conjunctiva of the eye frequently presents spots of extravasation, and morbid vascularity.

It is sometimes stated, that after death by arsenic, the blood remains fluid, and the body passes with extraordinary rapidity into a state of putrefaction; in other cases, no particular effect of this kind has been observed; and in others, especially where the poison was retained in the body, it has exerted an evident antiputrefactive or preservative power, so that bodies under such circumstances have been exhumed and satisfactorily examined, at periods in which, under ordinary circumstances, they would have been in an advanced state of decomposition.

So well established is the conservative property of arsenic, that it is now used preferably, by many anatomists, for injections, to preserve the subject from decomposition.

Treatment of Poisoning by Arsenic. — Notwithstanding the incredulity of some writers, among whom Mr. Brande is one, respecting our having found an antidote to arsenic, the numerous cases, recorded in medical journals within the last five years, of successful results after the use of the *hydrated sesquioxide of iron* by persons who had taken arsenic in poisonous doses, require a notice of the remedy and its mode of preparation.

The hydrated sesquioxide, or peroxide as it was first called, of iron, is prepared by dissolving sulphate of iron in water, with a little sulphuric acid, adding nitric acid till the solution is fully oxygenated;

then precipitate the hydrated sesquioxide by excess of ammonia. The product is a deep reddish-brown, which should be carefully washed with boiling water, until most of the sulphate of ammonia is dissolved, then dried cautiously at 180° F.: it retains still 18 *per cent.* of water and a small portion of ammonia, which last may be driven off by exposure to heat. It is best as an antidote when kept in a moist state—a magma—and excluded from the air, as it absorbs carbonic acid. This preparation of iron will remove arsenic from its solution in water,—by adding 12 grains of oxide (in magma) for every grain of the arsenic. The dry oxide does not thus act, unless in quite large doses,—sixty grains to twelve of the magma. The sesquioxide forms with arsenic an insoluble and an inert compound. It is much better fitted for removing arsenic when precipitated by ammonia than by potash, and answers best, as already stated, when it is in a moist state.

From thirty-six parts of sulphate of iron, twelve of the sesquioxide are procured.

In a case of poisoning with arsenic, we should begin the treatment with an emetic, the sulphate of zinc, whilst we are procuring the antidote. Even if there has been free vomiting caused by the poison, it will still be well to procure a more complete evacuation by an emetic, which, in such a case, might be of ipecacuanha. So soon as the stomach is evacuated, it is desirable to introduce into it semifluids which will envelop, by their coagulation or viscidity, the particles of the poison; and, with this view, white of egg diffused in water, milk, mucilage of linseed, thick gruel, arrow root, and the like, should be preferred to warm water. Milk, as readily obtainable, will answer, and it may be given, both before and after vomiting. As soon as the antidote can be procured, after free vomiting, or, without waiting, if this latter operation is slow or difficult to be brought on, we should administer it every two or three minutes in dessert or tablespoonful doses, mingled with a little water, or syrup, or mucilage. If the antidote is vomited up, which frequently occurs, it should be given until the vomiting and other bad symptoms disappear. The quantity of the antidote is to be regulated by symptoms, rather than the amount of arsenic.

If the sesquioxide cannot be procured readily, the rust of iron should be had recourse to. It comes near the former as an antidote.—*Dr. M'Laganan, Ed. Med. and Sur. Jour.* 1840; *Lancet*, 1840, p 46; and *Eclectic Jour. of Medicine*, Vol. IV. 1840.

In the farther treatment of the disease, caused by the ingestion of the arsenic, which has been measurably arrested by the means already indicated, we must not be imposed on by the symptoms of gastritis and gastro-enteritis, so far as to make us rely on venesection and the antiphlogistic course exclusively. Leeches over the epigastrium may be advisable; but later experience renders it probable that the sedative and tonic, or moderately stimulating plan, should be had recourse to much earlier in cases of poisoning than in those of gastritis and cerebral disease from other and more common

causes. The general debility, the slight paralytic affections, and the broken-down health of persons who survive the immediate effects of arsenic, are afterwards to be encountered by mild tonics, warm and cold sea-bathing, nervine stimulants, and a close attention to diet, which should be nutritive, but light; milk and farinaceous substances being generally preferable to animal food. Wine and spirituous liquors must be avoided; but ale and beer, in these and similar cases, are often admissible. Particular affections of the stomach and bowels, protracted diarrhœa, and obstinate forms of dyspepsia, must be treated as individual cases may require.

Of the Tests for the Discovery of Arsenic.—It would be irrelevant to our object here, to enter in detail into the entire chemical history of arsenic, without which the various tests by which its presence in different states are recognised, can neither be explained nor understood; for these we must refer to chemical works; and it is highly desirable that the medical student should make himself practically acquainted with the requisite manipulations in reference to this subject, which are few, simple, and easily attained.

The following are the least equivocal tests of the presence of arsenious acid in solution:—

1. *Ammonio-nitrate of Silver.*—This is made by dissolving one part of nitrate of silver in ten parts of water, and gradually dropping in liquid ammonia till the precipitate which first falls is nearly but not quite redissolved. The clear solution is then poured off. It gives a characteristic *lemon-yellow precipitate* of arsenite of silver, in a very dilute solution of arsenious acid, provided no excess either of acid or of ammonia be present.

2. *Ammonio-sulphate of Copper.*—It is prepared by adding liquid ammonia to a solution of one part of sulphate of copper in eight of water, till the resulting precipitate is almost entirely redissolved. The clear solution gives an apple or grass-green precipitate, in a very dilute aqueous solution of arsenious acid; the precipitate is arsenite of copper, and sulphate of ammonia remains in solution. Excess of acids and of bases, and even excess of neutral salts of ammonia, must here be avoided.

3. *Hydrosulphuric Acid* (sulphuretted hydrogen).—When a current of sulphuretted hydrogen is passed through a weak aqueous solution of arsenious acid, a yellow cloud gradually falls, which is sulphuret of arsenic. Any excess of alkali interferes with or prevents the effect; and excess of acid must also be avoided, lest sulphur be thrown down. When the quantity of arsenic present is very minute, the solution will acquire a yellow tint, but no precipitate will ensue till the excess of sulphuretted hydrogen has been expelled by boiling.

It must always be recollected in regard to evidence founded upon these tests, that they are not individually or separately to be relied upon; but that where they occur, they certainly prove the presence

of arsenic, for no substance or combination is known which similarly affects each of them. But, to avoid all possibility of doubt, the respective precipitates should be collected, and having been carefully washed and dried, should be heated upon a strip of metal held in the flame of a spirit-lamp, when the characteristic garlic-like odour of metallic arsenic will become perceptible. Lastly, this metallic arsenic should be collected, and further identified. Although it is a highly valuable and correct indication, it is possible that a somewhat similar odour may arise from the evolution of phosphorus. Where paper, candles, and other carbonaceous bodies have been stated to produce alliaceous fumes on burning, arsenic has probably been present; but, at all events, the test should be carried to its final result, in order to avoid all possibility of doubt, and the pupil may easily attain the requisite dexterity in effecting this, by practising upon minute portions of white arsenic.

When very small quantities are operated upon, Dr. Christison observes that the proper material for *reduction* is freshly ignited charcoal, by which the whole of the arsenic is disengaged; whereas, with black flux, only part of the metal actually present is evolved. When, however, the quantity of material is considerable, black flux, or a mixture of charcoal and carbonate of soda, is more convenient, as it is not apt to be projected up the tube on the first application of heat. The further directions are abridged from Dr. Christison (*On Poisons*, Art. *Arsenic*). If the quantity operated on is large, it should be mixed with the charcoal or flux before introduction into the tube; if small, it should be dropped into the tube, and covered with charcoal. In the latter case, the best form of tube is that represented in the margin, and the sides of the tube should always be preserved clean.

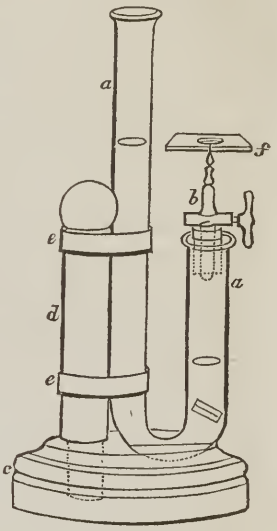
A spirit-lamp is the best source of heat; and the upper part of the material should be first heated, so that any moisture may be expelled and cleaned out by a small roll of filtering paper; sufficient heat is then applied to sublime the metal, which condenses in the form of a metallic crust, looking much like polished steel. Dr. Turner observes, that additional evidence may be procured by re-converting the metal into arsenious acid, so as to obtain it in the form of resplendent octoedral crystals. This is done by holding that part of the tube to which the arsenic adheres about three-fourths of an inch above a very small spirit-lamp flame, so that the metal may be slowly sublimed; as it rises in vapour it combines with oxygen, and is deposited in crystals within the tube. The character of these crystals is so well marked, that an experienced eye may identify them when their weight does not exceed the hundredth part of a grain. This experiment does not succeed, unless the tube be quite clean and dry.

To the other tests for arsenic many objections have been raised, which it is not requisite to enumerate here, as we have already insisted upon the necessity of the ultimate proof by reduction. It

is obvious that where mere *colour* of a precipitate is relied on, numerous causes may make any single test fallacious, though the concurrent results of several such tests may be valid evidence.

Another mode of detecting and identifying arsenic has lately been suggested by Mr. Marsh, of Woolwich, which must be considered as a highly valuable contribution to this important branch of chemistry. It consists in presenting to the arsenic, hydrogen gas in its nascent state, the first action of which is to reduce its oxidized compounds to the metallic state, and then to combine with the metal to form arseniuretted hydrogen, which is detected by its odour, and by depositing metallic arsenic during its combustion.

The requisite apparatus is described by Mr. Marsh as follows:—"*a a* is a glass tube open at both ends, and about three-quarters of an inch in its internal diameter. It is bent into the form of a siphon, the shorter leg being about five inches, and the longer about eight inches in length. A stop-cock *b*, ending in a jet of fine bore, passes tightly through a hole made in the axis of a soft and sound cork, which fits air-tight into the opening of the lower bend of the tube, and may be further secured, if requisite, by lute. To fix the apparatus when in use, in an upright position, a hole is made in the wooden block *c*, for the reception of the lower part of the pillar *d*, and a groove is cut in the top of the same block to receive the bend of the tube *a a*. Two elastic slips *e e*, cut from the neck of a common bottle of India rubber, keep the tube firm in its place."



A still more simple arrangement for making the desired experiment is pointed out by Mr. Marsh. Sulphuric acid and zinc being procured, it will be sufficient to get a two-ounce vial, with a cork and a piece of tobacco pipe; or a bladder fixed to its mouth might, in cases of extreme necessity, be employed with success for this purpose.

"The matter to be examined, if not in the fluid state, such as pastry, pudding, or bread, &c., must be boiled with two or three fluid ounces of clean water for a sufficient length of time. The mixture so obtained must then be thrown on a filter to separate the more solid parts: thick soup, or the contents of the stomach, may be diluted with water, and also filtered: but water-gruel, wine, spirits, or any kind of malt liquor, and such like, or tea, coffee, &c., can be operated on without any previous process.

"When the apparatus is used, a bit of glass rod, about an inch long, is dropped into the shorter leg, and this is followed by a piece

of clean sheet zinc, about an inch and a half long and half an inch wide, bent double, so that it will run down the tube till it is stopped by the piece of glass rod first put in. The stop-cock and jet are now inserted, the cock being left open. The fluid to be examined, having been previously mixed with from a drachm and a half to three drachms of dilute sulphuric acid (1 acid and 7 water) is poured into the long leg, till it stands in the short one about a quarter of an inch below the bottom of the cork. Bubbles of gas soon arise from the zinc, which are *pure hydrogen, if no arsenic be present ;* but, if the liquor holds arsenic in any form in solution, the gas will be *arseniuretted hydrogen.* The first portions are allowed to escape, that they may carry with them the small quantity of common air left in the apparatus; after which the cock is to be closed, and the gas will accumulate in the shorter leg, till the liquor has descended below the piece of zinc, when all further production of gas will cease. When the stop-cock is opened, the gas will be propelled through the jet, and, on igniting it, and then holding horizontally a piece of crown or window-glass, *f*, over it in such a manner as to retard slightly the combustion, the arsenic (if any be present) will be deposited in the metallic state on the glass : if no arsenic be present, the jet of the flame has a very different appearance; and, although the glass becomes dulled by the deposition of water, yet such is the heat produced, that in a few seconds it becomes perfectly clear, and frequently flies to pieces.

"When certain compound liquors are operated on in this apparatus, froth is thrown up, which may choke the jet. The means I adopt to prevent this, is to oil the interior of the short limb of the apparatus before introducing the substance to be examined, or to put a few drops of alcohol or sweet-oil on its surface previously to introducing the stop-cock and its appendages. I have, however, found, if the tube be ever so full of froth in the first instance, that, in an hour or two, if left to itself, the bubbles burst, and the interior of the tube becomes clear without at all affecting the results."

Water gently poured into the vessel through the tube will prevent undue effervescence. Hydrogen gas should be disengaged in no larger quantity than to procure a flame of three or four lines in breadth. If the flame be too great the arsenic is volatilized in proportion as it is disengaged, and will not be visible on the glass, or what is still better, a small porcelain capsule.

With this apparatus, Mr. Marsh states that he has obtained distinct metallic crusts, when operating on so small a quantity as one drop of Fowler's solution of arsenic, which only contains one-120th part of a grain; and that the presence of arsenic in artificial orpiment and realgar, in Scheele's green, in sulphuret of antimony, &c., may be readily shown, when not more than half a grain of any of those compounds is employed.

The only ambiguity that can arise in this mode of operating is, that some samples of the zinc contain arsenic; it is therefore necessary to determine its purity; and this is easily done by put-

ting a bit of it into the apparatus, with dilute sulphuric acid; the gas thus obtained is to be set fire to as it issues from the jet; and if no metallic film is deposited on the bit of flat glass, and no white sublimate within an open tube, the zinc may be regarded as in a fit state for use.

It only remains to observe, in regard to Mr. Marsh's apparatus, that the presence of antimony may give rise to appearances somewhat resembling those of arsenic; that metal should, therefore, be excluded; or the characters of the deposited arsenic minutely attended to.

When the contents of the stomach, or different articles of food, are to be examined by any of the above methods, the organic substances which they contain often interfere with the tests, and should be removed, if possible, before they are applied. This may sometimes be done by filtration; but if this is inadmissible, they may be evaporated to dryness, avoiding too high a temperature towards the end of the process, and redissolving anew by the action of repeated portions of distilled water, boiled upon the residue.

Orfila has lately ascertained that arsenic exists in small quantity in the bones of a healthy human subject. In cases of poisoning he has detected it in the blood, viscera, and tissues.

ASARUM. *Asarabacca* (from α, *priv.* and σαρειν, *to adorn;* because it was not admitted into the ancient coronal wreaths). *Asarum Europæum. Folia. Cl.* 11. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Aristolochiæ.

The leaves, when dried with little heat, and not kept too long, retain much of their acrimony; they entered into the composition of the *pulvis asari compositus* of former Pharmacopœiæ, which, applied to the nostrils after the manner of snuff, considerably augments the nasal discharge, and has been recommended in ophthalmia and headache, under the name of *herb snuff.* Emetic and cathartic effects follow the internal use of asarabacca leaves, but they are limited in medicine to the former application. The leaves were much used in England, as an emetic, prior to the introduction of ipecacuanha; but since then, owing to their operation being very violent occasionally, they have fallen into disuse.

The root of asarum contains a crystallisable volatile oil, resembling camphor, which has been termed *asarin.*

The *pulvis asari compositus* of the *Edinburgh Pharmacopœia* consists of 3 parts of asarabacca leaves, 1 of marjoram leaves, and 1 of lavender flowers.

ASARUM CANADENSE. *Radix.* The root.

This plant, called also *Wild Ginger*, resembles in its botanical character the preceding: it is found in various parts of the United States. "It has an agreeable aromatic taste intermediate between that of the *Aristolochia serpentaria* and ginger. The root, according to my experiments," continues Dr. Bigelow, "contains a volatile oil, fecula, and mucus. It is used by country practitioners, and occasionally

kept in our druggists' shops, as a warm diaphoretic and stimulant; and may be given in *doses* of from *one to two scruples* in powder, or in infusion, like that of the serpentaria, which medicine it resembles in properties."

ASCARIS (from ασκειν, to move about). A genus of intestinal worms. Those which infest the human body are the *Ascaris vermicularis*, the thread or maw-worm, which is about half an inch in length, and very slender; and the *Ascaris lumbricoides*, or *round worm*, which is about the size of a goose-quill, and a foot in length.

ASCLEPIAS TUBEROSA. *Cl.* 5. *Ord.* 2. *Nat. Ord.* Asclepiadaceæ. *Radix.* The root of the Butterfly Weed.

The plants of this order are for the most part acrid; in large doses emetic and cathartic; in smaller, expectorant, diaphoretic, and alterative. The roots are the part usually employed in medicine. This brief sketch applies very nearly to the description of the *Asclepias tuberosa*, which is found from Maine to Georgia, and is distinguishable from the *Asclepias incarnata* and the *A. Syriaca* by its bright orange-coloured flowers. The root when dry is brittle and easily reduced to powder. Its taste is moderately bitter, and its chief soluble portions are extractive matter and fecula. In large doses it operates as a purgative, but it is administered generally in smaller doses with a view to procuring its diaphoretic and expectorant action. Hence it is a favourite with some practitioners as a remedy in catarrh, bronchitis, subacute pneumonia, and in phthisis as a palliative. Its use for these purposes has acquired it the popular name of *Pleurisy root*. One of its effects is alleged to be diaphoresis with less previous excitement than attends the stimulating diaphoretics generally.

It is easy from analogy to extend the employment of the *A. tuberosa* to various other diseases in which diaphoresis without much excitement is desired; and accordingly we find that it has been directed with good effect in rheumatism and dysentery. The *dose* is *twenty* or *thirty grains*, three times a day, or a gill of the infusion prepared like that of the *Aristolochia serpentaria;* in the proportion of an ounce of the root to a quart of water. Its diaphoretic operation is of course best procured in the form of an infusion or a decoction.

ASPARAGIN. A peculiar crystallisable principle contained in the common asparagus. (*Asparagus officinalis*, from ασπαραγος, a young shoot, before the leaves are unfolded.)

It was discovered by Vauquelin and Robiquet (*Ann. de Chimie*, LVII.), and was shown by Plisson to be identical with a substance found by Robiquet in liquorice root, which was called *agedoite*, and with the *althein* of the marshmallow root. It is best obtained by evaporating the expressed juice of asparagus to the consistency of syrup; on cooling, this substance is deposited in transparent crystals, which, when purified, are hard, brittle, of a cooling and slightly nauseous taste, and neither acid nor alkaline. Asparagin is said to be diuretic,

and confers upon the urine the peculiar odour which it emits after persons have eaten boiled asparagus. It has also been found in the *Ornithogalum*, and in *Symphitum officinale*. By Broussais and some other French physicians it has been lauded as a sedative in hypertrophy of the heart.

ASPIDIUM (from ασπις, a *shield*). *Aspidium Filix Mas. Rhizoma.* The root-stock of the Male Fern. *Cl.* 2. *Ord.* 1. Cryptogamia Filices. *Nat. Ord.* Filices.

The dried fern root-stock (or, as it is commonly called, root) has a bitter flavour, accompanied by a mucilaginous sweetness, and has been long used, in doses of about two drachms, as a vermifuge. It is customary to follow it up with a brisk purge of calomel and gamboge, which is probably the most effectual part of the treatment; but we have many better anthelmintics. If used, it should always be freshly dried and powdered; it is scarcely ever found in the shops fit for use.

According to Peschier, the root, when taken up at the proper season, namely, in summer, contains a volatile oil, which he assumes to be the active principle, finding that thirty drops of it killed a tape-worm: but probably any other volatile oil would have the same power.

Madame Nouffers' celebrated specific for the tape-worm consisted of two drachms of powdered fern root, and a calomel and gamboge pill: the former was taken in a cup of water, early in the morning, and the pill was administered two hours afterwards, and was aided in its operation by a subsequent dose of salts. Nothing but broth was allowed during the day, and if the worm was not expelled, the same series of remedies were repeated on the following day.

ASSAFŒTIDA (from the Hebrew word *Asa*, to heal). *Gummi resina.* The gum resin of the *Ferula Assafœtida. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

This gum resin is obtained from the root of the plant, which, when fully grown, is of a large size, and abounds in milky juice: another species, the *Ferula Persica*, is also sometimes resorted to.

The *Ferula assafœtida* is a native of the south of Persia, where and in India it is used as a condiment; it is said to afford the best juice when about four years old. When the leaves and stem decay, they are cut off at the root, and the exudation that takes place at the section being scraped away, a fresh section is made, and so on, till the root has yielded its entire produce. In its recent state it is white and semifluid, but by exposure to the sun it gradually hardens, and assumes a reddish colour.

The best assafœtida is imported in boxes or casks; and we find it in trade in large lumps, made up of irregular agglutinated masses, of a tough consistence, and motley appearance, from the mixture of white drops or tears with others of a violet, red and brown tint. An inferior kind is full of sand, very fetid, and said to be a compound of garlic, sagapenum, turpentine, and a little real assafœtida.

Assafœtida is stated by pharmaceutical chemists to contain more gum than resin, and to afford about 10 *per cent.* of highly odorous, volatile oil, on distillation with water; so that it deteriorates considerably when kept for a long time. Its taste is acrid, and strongly resembles that of garlic. Its specific gravity is 1·327. It imparts its virtues to alcohol and ether. We have several analyses of assafœtida. Dr. A. T. Thomson obtained from it 10 *per cent.* of essential oil, 30 of resin, and 60 of gum.

The preparations of assafœtida are,

Spiritus Ammoniæ fœtidus (see p. 41),

Pilulæ Galbani compositæ (see GALBANUM);

And, the following mixture:—

Mixture of Assafœtida. — Take of Assafœtida, five drachms; water, a pint. Rub the assafœtida with the water gradually dropped upon it, till they are intimately mixed.

Assafœtida is chiefly employed as a stimulant and antispasmodic in hysteria, hypochondriasis, flatulency, various nervous diseases, and spasmodic cough, especially the hooping-cough; as an expectorant in asthma; as a carminative in colic. It has, also, in common with garlic, been extolled as an anthelmintic. It may be considered as the most efficacious of the fetid gum resins; but its strong and diffusive odour is much against its general use. It may be combined with expectorants in coughs; and with chalybeates and aloetics in hysteria and chlorosis. The following formula will sometimes allay obstinate attacks of spasmodic cough, and has been found useful in hooping-cough:—

℞ Assafœtidæ ʒj. tere cum Liquoris Ammon. Acet., Aquæ destill., Aquæ Pulegii āā ʒij.; Syrupi papaveris ʒij. M. cap. cochl. duo pro dosi.

Either of the following are good anti-hysteric, or nervous mixtures; and it is curious that these remedies are often effectual in direct proportion to their bad odour:—

℞ Misturæ Camphoræ fʒiij.; Misturæ Assafœtidæ fʒij.; Tinct. Valerianæ, Spiritûs Ammoniæ Aromat., Spiritûs Ætheris Sulph. compos. āā fʒij. M. fiat mistura, cujus sumantur cochlear. duo ampla subinde.

℞ Spirit. Ammon. fœtid., Tincturæ Valerianæ comp. āā fʒiij.; Mistur. Camphoræ fʒvjss.; Syrupi Croci fʒiij. M. Cochlearia tria ampla subinde pro dosi.

In cases of muscular atony of the alimentary canal, Dr. Paris prescribes as follows:—

℞ Ammoniæ Sesquicarbonatis gr. v.; Assafœtidæ gr. iv. tere simul et adde Spirit. Armoraciæ compos. fʒij.; Decocti Aloes compos. fʒx. Fiat haustus.

For the relief of colic of the lower bowels, in worm cases, in flatulent colic, and in the convulsions attending dentition, as also those of hysteria, an enema of assafœtida is sometimes used.

ASTRAGALUS, *see* TRAGACANTHA.

ATROPA (from Ατροπος, one of the Fates), *see* BELLADONNA.

ATROPIA, the alkaloid of the *Atropa Belladonna.*

AURANTIUM (from *aurum*, from its golden colour). *Citrus aurantium. Cl.* 18. *Ord.* 3. Polyadelphia Icosandria. *Nat. Ord.*

Aurantiaceæ. *Fructus.* The fruit of the orange tree. *Aurantii Flores.* The flowers. *Aurantii oleum. Oleum a floribus destillatum.* The oil distilled from the flowers.

AURANTII CORTEX. *Citrus vulgaris.* The Seville orange. *Fructus cortex exterior.* The outer rind of the fruit.

This beautiful tree is a native of India, but has long been cultivated in the warmer parts of Europe, and latterly in the southernmost portions of the United States; it will ripen its fruit in our conservatories. We chiefly derive our supplies of oranges from Spain and Portugal, and the West Indies.

As far as the fruit is concerned, the China, or sweet orange, is preferred, but the rind of the Seville orange is most bitter and aromatic. Orange peel is a very useful stomachic, and as such is added to a variety of bitter and aromatic infusions. It should be thin, bright-coloured, free from the white part, and from mouldiness. The unripe fruit, or berries of the orange tree, commonly called *Curaçoa oranges*, are bitter and aromatic; infused in brandy, they impart flavour to the celebrated Dutch liqueur called Curaçoa. The *Baccæ aurantii* are occasionally used in issues, for which purpose they are generally turned into *peas* in the lathe. Water distilled off orange flowers is a very agreeable perfume, and is sometimes employed in prescriptive pharmacy. It is usually imported from Italy, and often contaminated to a serious extent by lead, derived from the vessels in which it is kept, and adulterated with rose and elder-flower water.

The essential oil of orange flowers, which now has a place in the Materia Medica, is imported from Italy under the name *Oleum Neroli:* its odour is very inferior to that of the fresh flowers, and rather sickly. It is chiefly used to perfume soap. It becomes brown and viscid by age.

The following are some of the preparations of orange peel; it is also added to tinctures and other infusions, to give them a pleasant flavour, and to cover that of nauseous and bitter remedies:—

Confection of Orange. — Take of recent Orange Peel, separated by a rasp, a pound; Sugar three pounds. Pound the peel in a stone mortar with a wooden pestle; then, having added the sugar, pound it again until it becomes an uniform mass.

This forms rather an agreeable vehicle for powders which are to be given in the form of electuary, but it loses flavour and becomes hard when kept, and is seldom found in apothecaries' shops in a state of perfection; nor is it often employed. It may be thinned by the addition of syrup of orange peel or of syrup of ginger, as in the following electuary of oxide of iron, a remedy which is sometimes prescribed in large doses in cases of neuralgia:—

℞ Ferri Sesquioxidi, Syrupi Zingiberis āā ℥ss.; Confectionis Aurantii ℥jss. M. fiat electarium, de qua sumatur nucis moschatæ molem bis vel ter quotidie.

Compound Infusion of Orange. — Take of Dried Orange Peel, half an ounce; Fresh Lemon Peel, two drachms; Cloves, bruised, one drachm; Boiling distilled Water, one pint. Macerate for a quarter of an hour in a lightly covered vessel and strain.

This infusion furnishes an agreeable vehicle for small doses of sulphate of magnesia, of ammonia, and of bitters.

AVENA (from *aveo*, I covet; because cattle are so fond of it). *Avena sativa. Cl.* 3. *Ord.* 2. Triandria Digynia. *Nat. Ord.* Graminaceæ. Common oat. *Semina integumentis nudata.* The decorticated seed, generally called grits.

Oats contain about 74 *per cent.* of nutritive matter, 64 of which may be called starch, and the remainder gluten, with a small proportion of sugar. The straw of oat leaves when burned an ash which abounds in silica.

The importance of *water-gruel* as an article of the diet of invalids is well known; it may be made either with grits or with oatmeal. Grit gruel is made as follows: put three ounces of washed grits into four pints of water, and boil slowly till the water is reduced to one-half; then strain the gruel through a hair sieve.

Dr. Kitchener's receipt to make oatmeal gruel is as follows:— "Ask those who are to eat it, if they like it thick or thin; if the latter, mix well together, by degrees, in a pint basin, *one* tablespoonful of oatmeal with three of cold water; if the former, use two spoonsful. Have ready in a stewpan a pint of boiling water, pour this by degrees to the oatmeal you have mixed, return it into the stewpan, set it on the fire, and let it boil for five minutes, stirring it all the time to prevent the oatmeal from burning at the bottom of the stewpan; skim, and strain it through a hair sieve.

"To convert this into *caudle*, add a little ale, wine, or brandy, with sugar; and if the bowels are disordered, a little nutmeg or ginger grated.

"Plain gruel is one of the best breakfasts and suppers that we can recommend to the rational epicure; is the most comfortable soother of an irritable stomach that we know; and particularly acceptable to it after a hard day's work of intemperate feasting, when the addition of an ounce of butter, and a teaspoonful of Epsom salt, will give it an aperient quality, which will assist the principal viscera to get rid of their burden."

For children brought up, as it is called, by hand, equal parts of gruel and cow's milk, form the best substitute for the food which nature intended for them; but the greatest attention should be paid to the freshness both of the milk and gruel: in warm weather, or in a warm room, the latter becomes acescent in twelve hours, and will then invariably be mischievous, if not dangerous; the cleanliness of the vessels in which the food is kept and prepared, must also be most strictly looked after; for it often happens that the bowel complaints, and other disorders to which children under such circumstances are liable, arise from inattention to these apparent trifles.

The gruel made with Indian cornmeal is generally preferable— as the meal can always be procured fresh in nearly all parts of the United States.

AZEDARACH. Melia Azedarach. *Cl.* 10. *Ord.* 1. De-

candria Monogynia. *Nat. Ord.* Meliaceæ. *Radicis Cortex.* The bark of the root.

This is a flowering tree, introduced, says Dr. Bigelow, into the southern parts of our country from the eastern continent, and commonly called *Pride of India* or *of China.* The bark of the root has both emetic and cathartic properties, and produces some symptoms of narcotism, if the dose be large. Its principal use is as a vermifuge: and its chief preparation is a decoction made of four ounces of the recent root in a quart of water boiled till it becomes of a dark colour. The dose is half a fluid ounce every two or three hours till it operates on the bowels or displays its expected effect in procuring the expulsion of the worms. In this, as in the case of most anthelmintics which do not, of themselves, display a uniform purgative operation, and especially if they evince any narcotic property, it is a better plan to give them in adequately full doses, once or twice a day, to the patient fasting; and then to administer castor oil, or the compound powder of jalap, or calomel and jalap; which last combination is, itself, a good vermifuge.

BALSAM (from *Baal-samen*, Hebrew, *the prince of oils*). This term is applied to many liquid resins; they generally are compounds of resin and volatile oil, such as *Canada Balsam*, *copaiva balsam*, &c.; or like *Peruvian* and *tolu balsam*, they contain benzoic acid.

BALSAMUM PERUVIANUM. *Balsamum liquidum;* BALSAMUM TOLUTANUM; *Balsamum concretum.* The liquid and the concrete balsams of the *Myroxylon Peruiferum.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Leguminosæ.

The tree which affords these balsams grows in the warmest parts of South America, blossoming in August, September, and October; it has a smooth trunk, covered with a gray coarse bark, and abounds in resin.

Peruvian balsam is obtained by boiling the twigs in water: it has a deep brown colour, considerable consistency, a fragrant aromatic smell, and a pungent bitterish flavour. When distilled, it affords benzoic acid, and a resinous matter remains. It is nearly entirely soluble in pure alcohol, leaving a small portion of brown extractive.

The *spontaneous* exudation of the *M. Peruiferum* is pale-coloured, and of a more purely balsamic odour; it is sometimes called *white Peruvian*, or *Indian balsam*, or *Opobalsamum.* From Tromsdorff's analysis of this variety, it closely resembles tolu balsam.

The medical uses of Peruvian balsam are not very important, and there is much difficulty in obtaining it genuine. It has been prescribed in doses of from half a drachm to a drachm, as a stimulant in chronic rheumatism, and it appears to have been effectual in some obstinate cases. In chronic asthma and old dry coughs it is said to have proved a serviceable expectorant. The best form for its administration is the following:—

℞ Balsami Peruviani ʒss.; Mucilaginis Acaciæ ʒij.; tere simul, et adde Aquæ Cinnamomi, Aquæ Destillatæ, ãã fʒss. M. fiat haustus ter die sumendus.

Dr. Paris combines it with aloes, in sluggish states of the intestinal canal:—

℞ Bals. Peruviani ʒij.; Ovi unius vitellum, tere simul et adde Aquæ Cinnam. fʒvjss.; Tinct. Aloes comp. fʒiij.; Syrup. Croci fʒij. Fiat mistura. Dosis fʒiss. bis quotidie.

Mixed with twice its weight of spermaceti ointment, and applied to indolent ulcers, it will sometimes improve and cleanse them. ʒj. of *unguentum cetacei*, made with almond instead of olive oil, and fifteen drops of Peruvian balsam, well mixed by trituration, form an elegant lip-salve. Dr. Thomson observes, that a mixture composed of ʒj. of the balsam and ʒiij. of ox-gall, is useful when dropped into the ear every day, after syringing with solution of soap, in fetid discharges from that organ.

Balsam of Tolu was considered as the produce of a distinct tree, till the publication of Mr. Lambert's *Illustrations of the Genus Cinchona*, in which it is stated, upon the authority of Don H. Ruiz, to be obtained from the *Myroxylon* above described; it flows from incisions made in the bark of that tree, and is collected in mats, and occasionally in gourd-shells, where it acquires consistency; so that it is identical with the *opobalsamum* of old pharmacy. It is of variable quality, and comes into the drug market chiefly in kegs, jars, or canisters.

In cold weather, tolu balsam is brittle, but when kneaded in the warm hand it becomes tenacious. It has a pleasant balsamic smell and taste; when heated, it fuses, inflames, and dispefses an agreeable benzoic odour. Distilled with water, it yields a little volatile oil and about 10 or 12 *per cent.* of benzoic acid, and 80 to 90 of resin. When dissolved in solution of potassa, Mr. Hatchett found that it acquired a very peculiar and fragrant odour, resembling that of the clove-pink.

Tolu balsam is placed by writers on the Materia Medica among the stimulating expectorants, and as such has been employed in dry chronic coughs, unattended by inflammatory action, in doses of from five to twenty grains. The chief use now made of tolu balsam is to impart a pleasant flavour to lozenges. It forms an ingredient in the *tinctura benzoini compositi* of the Pharmacopœia, and is the basis of the following preparation:—

Syrup of Tolu. Balsam.—Take of Balsam of Tolu, ten drachms; Boiling Water, a pint; Sugar, two pounds and a half. Boil the balsam in the water for half an hour in a lightly covered vessel, occasionally stirring, and strain the cold liquor; then add the sugar, and dissolve it.

The preceding *syrup* has a slight flavour derived from the fragrancy of the balsam, and is an elegant adjunct where sugar is required.

BARIUM. The metallic base of *Baryta* (from βαρυς, *heavy*). *See* the next Article.

BARYTÆ CARBONAS. *Carbonate of Baryta.*

This mineral was originally discovered in Lancashire, by Dr. Withering, and was known to mineralogists under the name of

Witherite; it occurs in other parts of Britain, either crystallised or massive; the latter variety has a radiated structure; its specific gravity is 4·3. *Carbonate of baryta* is thrown down on the addition of the carbonates of the alkalis to the soluble barytic salts, or by passing carbonic acid through baryta water. It is nearly insoluble in water, and is poisonous. It dissolves with effervescence in dilute hydrochloric and nitric acids. It consists of

	Atoms.	Equivalents.	Per Cent.
Baryta	1	77	77·7
Carbonic Acid	1	22	22·3
Carbonate of Baryta	1	99	100·0

The only pharmaceutical use of baryta is as a source of chloride of barium.

Barium is said to be a white metal, highly attractive of oxygen, and burning, when gently heated, into baryta or oxide of barium, which consists of

	Atoms.	Equivalents.	Per Cent.
Barium	1	69	89·6
Oxygen	1	8	10·4
Baryta	1	77	100·0

Baryta is of a gray colour, poisonous, alkaline, and evolving much heat when sprinkled with water, after which it crumbles down into a white *hydrate*, which dissolves in 20 parts of cold and 3 of boiling water.

The soluble barytic salts are valuable tests of the presence of sulphuric acid, and of the soluble sulphates, with which they afford a white precipitate of *sulphate of baryta*, insoluble in water and in dilute acids, and consisting of

	Atoms.	Equivalents.	Per Cent.
Baryta	1	77	65·8
Sulphuric Acid	1	40	34·2
Sulphate of Baryta	1	117	100·0

Sulphate of baryta is an abundant and natural product. It may be converted into carbonate of baryta, by heating it red-hot in a silver crucible for half an hour, intimately mixed with three parts of carbonate of potassa; the fused mass, after having been well washed with boiling water, is chiefly carbonate of baryta. By ignition with charcoal, sulphate of baryta is converted into sulphuret of barium.

The only officinal barytic preparation is the *chloride.*

Solution of Chloride of Barium.—Take of Chloride of Barium, a drachm; Distilled Water, a fluid ounce. Dissolve the chloride of barium, and filter.

The composition of *chloride of barium* is shown in the following table:—

	Atoms.	Equivalents.	Per Cent.
Barium	1	69	65·8
Chlorine	1	36	34·2
Chloride of Barium	1	105	100·0

The crystals of chloride of barium include two atoms of water, and are therefore composed as follows:—

	Atoms.	Equivalents.	Per Cent.
Chloride of Barium	1	105	85·4
Water	2	18	14·6
Crystallised Chloride of Barium	1	123	100·0

Chloride of barium (the olden *muriate of barytes*) was first used medicinally by Dr. Crawford, as a remedy for scrofula and cancer; in the latter disease it is utterly useless; but in scrofula, attacking highly irritable organs, such as the eyes, it has been recommended by Hufeland; and others have extolled its efficacy in cutaneous eruptions. It was at one time supposed to possess antisyphilitic virtues, but its powers over any form or symptoms of that disease are extremely uncertain and doubtful. It is said to increase the flow of urine and perspiration, and to improve the tone of the system; but it must be administered with caution, as, in over-doses, it produces vertigo, nausea, vomiting, and diarrhœa.

The dose of the above *liquor barii chloridi*, is from *five to twenty*, or even *thirty minims*, two or three times a day; and it is generally proper to combine it with some aromatic, and occasionally with opium. It must be remembered, that sulphuric acid, and all the sulphates, render it inert, and that the phosphoric acid, and the greater number of the vegetable acids, form with it compounds which are of difficult solubility.

Baryta, and the greater number of its salts, are powerful poisons; they possess a two-fold action, one local and irritating, the other narcotic. Sir Benjamin Brodie found that ten grains applied to a wound in the back of a rabbit produced palsy, convulsions, and coma; and half an ounce of the solution injected into the stomach of a cat proved fatal in an hour, although vomiting ensued (*Phil. Trans.* 1812). Orfila injected five grains into the veins of a dog, and death ensued in five minutes, preceded by convulsions (*Toxicologie Générale*). Gmelin found that it produced slight inflammation of the stomach, and strong symptoms of action on the brain, spine, and voluntary muscles, which were destitute of contractility immediately after death, though the heart continued its action. Dr. Christison states, that he has known violent vomiting, gripes, and diarrhœa, produced by a quantity of the chloride not much exceeding the usual medicinal doses. It is curious, that the carbonate is little less active than the more soluble compounds, probably in consequence of its solubility in the acids of the stomach. In fine powder, it is commonly employed as a poison for rats. Orfila found that a drachm of it killed a dog in six hours; vomiting, signs of pain, and an approach to insensibility, preceded death: marks of inflammation were found in the stomach. It is also fatal when applied to wounds. Dr. Wilson has stated a case in which a large dose of the carbonate nearly proved fatal in the human subject. In two hours the patient (a female) complained

of headache, double vision, and tinnitus, followed by cramps, vomiting, and purging: the symptoms continued for some days, attended by palpitation (*Medical Gazette*, xiv. 487).

The antidotes to the barytic poisons are, sulphate of soda, or sulphate of magnesia, which should be speedily administered in adequate doses, and which render the poison inert, by converting it into an insoluble sulphate.

BEER. See Fermentation.

BELLADONNA (Ital. *Bella Donna; a handsome lady:* because used to improve the complexion). *Folia. The leaves* of the *Atropa Belladonna*, or *Deadly Nightshade. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ

The leaves of belladonna have a nauseous, bitterish taste, and retain their activity when dried.

The whole of the plant is poisonous, but the seeds and the root are probably the most active parts; it ranks among the narcotico-acrid poisons. The symptoms which it produces are very remarkable; in small quantity, whatever be the part to which it is applied, it causes dilatation of the pupil of the eye. When this effect is produced by its external application, vision is not impaired; but when it is the consequence of its internal administration, the sight is generally obscured. In large doses the symptoms are, dryness in the throat, dilated pupil, delirium, and coma. Convulsions are rare, and, when present, slight. Cases of the poisonous effects of belladonna have been not unfrequently witnessed from the berries having been eaten, though they are perhaps the least active part of the plant. Three or four grains of the powder of the dried root generally produce dangerous consequences; the extract is of variable efficacy, but when carefully prepared, two or three grains of it give rise to alarming symptoms.

In cases of poisoning by belladonna, the pupil is dilated and generally insensible. Another remarkable symptom is delirium, accompanied by immoderate laughter, violent gestures, and sometimes constant talking; but in other cases the voice is lost. Sometimes the state of mind resembles somnambulism. The lethargy which follows is sometimes long in appearing, and variable in degree, and the symptoms are altogether of a protracted character; they have continued for some days, and blindness has remained after the disappearance of the mental aberration. Nervous affections, such as vertigo, imperfect vision, and tremors, may even remain for three or four weeks. Symptoms of excitement, or irritation, are of comparatively rare occurrence; dry and sore throat, difficult deglutition, strangury, and pain of stomach and bowels, have, however, followed large doses, and nausea and vomiting are not unfrequent.

Fatal cases of poisoning by belladonna are rare; as delirium is the most prominent symptom, it excites attention, and emetics may be administered before the poison has been absorbed in sufficient quantity. The treatment consists in evacuating the stomach and

bowels, by emetics of sulphate of zinc, and purgatives of an active character. The appearances after death from this poison have been but imperfectly described. Dr. Christison quotes a case from Gmelin (*Geschichte der Pflanzengifte*), the subject of which was a shepherd, who died comatose, twelve hours after eating the berries; but, although the body was examined twelve hours after death, putrefaction had begun; the skin was covered with dark vesicles, and the brain soft. The bloodvessels of the head were gorged, and the blood everywhere fluid, running from the mouth, nose and eyes.

The treatment is the same for poisoning with opium. After evacuants, vegetable acids appeared to give relief.

As the husks and seeds of the berries are very indigestible, some of them will generally be found in the stomach after death; and during life, evidence of the cause of the symptoms may be obtained by the presence of the seeds, husks, or even entire berries in the evacuations. The black husks have been brought away in the stools by laxatives, at least thirty hours after having been swallowed. (*See* CHRISTISON, chap. XXIII.)

The existence of a distinct alkaloid (*atropia*) in belladonna was first shown by Brandes, in 1819, and the process for obtaining it was afterwards improved by Mein, in consequence of the discovery of the destructibility of some of those substances by the fixed alkalis which had been inadvertently used in their separation. The root of belladonna, thus treated, furnishes about three-thousandths of its weight of pure atropia.

Atropia forms colourless, silky prisms, soluble in alcohol and ether, and very sparingly in water; the solution is disagreeably bitter, and even when largely diluted, and applied to the eye, occasions dilated pupil. It fuses at a high temperature, and burns with a yellow flame. It forms definite combinations with acids, the acetate and the sulphate having a greater tendency to crystallise than the hydrochlorate or the nitrate. The solutions of these salts give a precipitate of atropia with pure potassa and ammonia; and an abundant precipitate with infusion of galls. Atropia is decomposed by weak solutions of potassa and of soda, and even by lime-water. In contact of water and air, atropia loses its property of crystallising at common temperatures; hence the crystals, when formed, disappear; the solution acquires a yellow colour, and leaves, on evaporation, an uncrystallisable residue, soluble in all proportions of water, and of a nauseous narcotic odour; it is, however, as poisonous as before.

The value of the belladonna, as a remedial agent, is of a doubtful character. When administered in small doses, it often induces dryness of the fauces, and, if persevered in, vertigo, imperfect vision, and even delirium succeed. It has been used as a sedative diaphoretic in chronic rheumatism, in gout, in hooping-cough; some have extolled its powers in schirrus, cancer, paralysis, amaurosis, scrofula, and even in hydrophobia. *One grain* of the dried

and powdered leaves or of the extract has been given in the form of pill twice or thrice a day, gradually increasing the dose till some sensible effect ensues. An infusion of 20 grains of the dried leaves in 8 ounces of water has also been employed in doses of from 1 to 2 ounces daily. There is, however, much doubt whether any decided benefit has been obtained by the internal use of belladonna, whilst its occasional mischievous influence is such that there must be difference of opinion as to the propriety of its administration.

In the treatment of neuralgia, belladonna is employed both internally and externally. To be successful it requires in many cases to be persevered in until dryness of the throat, dilatation of the pupil, and some disorder of the vision are produced.

As an external application, belladonna may be more safely employed, but even then it requires attention and management. The *emplastrum belladonnæ*, or an ointment consisting of equal weights of lard and of the powder of the recently dried leaves, is often of effectual service in the relief of local pains arising from chronic disease or rheumatism. The ointment, rubbed upon the perineum, alleviates chordee and spasmodic stricture of the urethra; and it has been rubbed on the rigid *os uteri* in tedious labour and puerperal convulsions, — and on the tumour of hernia to relax the muscles of the abdomen; and the powdered leaves, sprinkled upon the part, or an infusion of them employed as fomentation, have proved effective in allaying the pain of unhealthy sores. Half a drachm of the dried leaves to half a pint of water furnish an infusion which, when dropped into the eye, causes a dilatation of the pupil that endures for many hours; a circumstance of which oculists sometimes avail themselves, as facilitating the operation for the depression of cataract; and which, by admitting the rays of light more extensively upon the retina, enables persons suffering from incipient cataract to enjoy a temporary improvement of vision.

The only officinal preparations of belladonna in the *London Pharmacopœia*, are the *extract*, which is prepared in the same manner as that of *aconite*, and the following *plaster*. The extract, however, is always of very uncertain powers, a circumstance which the chemical peculiarities of atropia, above stated, will sufficiently explain.

Plaster of Belladonna.—Take of Plaster of Resin, three ounces; Extract of Belladonna, an ounce and a half. To the plaster, liquefied in a water-bath, add the extract, and mix.

BEN, *Oil of.* The oil expressed from the nut of the *Moringa pterygosperma*. It is insipid and inodorous, and may be long kept without becoming rancid; hence it is used in the extraction of the odorous principle of tuberose, jasmin, narcissus, and some other delicate perfumes. *Lignum nephriticum* is the wood of the same plant; it is employed in America as a diuretic and tonic.

BENZOIC ACID. (*See* the next Article.)

BENZOINUM. *Balsamum.* The Balsam of the *Styrax Benzoin. Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Styraceæ.

This tree is a native of Sumatra.

Benzoin is obtained by annually wounding the bark of six-year old trees. The best benzoin has an amygdaloidal or mottled appearance. Its specific gravity is 1·063; its colour is pale-brown, with white spots. It is of a resinous aspect and fracture, fragrant when warmed, and affording, upon the further application of heat, a sublimate of benzoic acid. It is totally soluble in alcohol. An inferior article is found in the market, indistinctly mottled, of a darker colour, and abounding in impurities.

Benzoin forms an ingredient in some articles of perfumery, and in fumigating powders and pastiles. It was formerly esteemed as an expectorant in asthmatic affections and dry cough, but has fallen into disuse.

The compound tincture of benzoin is chiefly employed as a stimulating application to languid ulcers; it is commonly known under the name of *Friar's Balsam.* Its effects are mischievous when applied to recent wounds. It has been prescribed internally in the dose of ten minims to a drachm in old asthmatic cases, and in chronic bronchitis. It requires to be mixed with water through the medium of mucilage, honey, or yolk of egg.

Two drachms of simple tincture, or alcoholic solution of benzoin, added to a pint of rose water, forms a mixture which is sometimes used as a cosmetic under the name of *virgin's milk.*

Benzoic acid, as it usually occurs, is in soft flocculent crystals, of an agreeable aromatic odour, sparingly soluble in cold water. Boiling water dissolves about one twenty-fifth of its weight, and deposits it copiously as it cools. Its taste is more pungent than acid, but it reddens delicate vegetable blues.

When benzoic acid is perfectly free from empyreumatic oil, it is inodorous: it may be obtained in long and delicate prismatic crystals, by the slow evaporation of its alcoholic solution. There is an acid closely resembling the benzoic, contained in the urine of horses and cows; it has been termed *hippuric* acid, and is precipitated from such urine by muriatic acid. When perfumed by sublimation with a little benzoin, it is said to be substituted, as an article of commerce, for genuine benzoic acid, and is sold at a comparatively low price.

The equivalent of anhydrous benzoic acid is 113.

It has been before stated, that when the oil of bitter almonds, deprived of hydrocyanic acid, is exposed to air, it becomes converted into benzoic acid: that oil is regarded by Liebig and Wöhler (*Ann. de. Ch. et. Ph.* LI. 273) as the hydruret of a base which they have termed *benzule.*

The utility of benzoic acid in medicine is questionable; it was once used as a pulmonic stimulant, in certain catarrhal and asthmatic affections, in doses of from ten to twenty grains. The only compound into which it enters in the present Pharmacopœia, is the

Tinctura camphoræ composita, in which there is the same quantity of opium, so that the benzoic acid cannot be considered as possessing any efficacy in the doses in which it can there be administered. The best form for its administration is that of pills or electuary. Dr. Paris says, that in certain cases of tracheal irritation, a pill composed of two grains of benzoic acid and three of extract of poppy has been serviceable; or the following:—

℞ Acid. Benzoici gr. iij.; Myrrhæ Pulver. gr. x.; Pulver. Tragac. compos. gr. xij. Fiat pulvis ex melle sumendus.

BEZOAR. This word is of Persian origin, and implies *destroyer of poison*. The intestinal concretions of animals were formerly celebrated for their medicinal virtues, and were termed *bezoar-stones*, being distinguished by the names of the countries whence they were derived. The oriental bezoars were most esteemed; such as have been examined are either phosphate of lime and ammoniomagnesian phosphate (these being probably urinary calculi), or they consist chiefly of inspissated bile and cholesterin, being biliary calculi; or they contain hair, fungus, woody fibre, and other analagous substances; three bezoars, sent by the King of Persia to the Emperor Napoleon, were chiefly agglomerated vegetable fibre.

In old collections of the Materia Medica, bezoar-stones, set in silver frames, so as to be suspended round the neck, are not uncommon; they were regarded as charms against infection, bore a very high price, and were sometimes let out at a considerable sum by the day. Bezoar-stone was an ingredient in various powders and preparations formerly employed as antidotes and alexipharmics, which hence acquired the name of *bezoardics*. *Gascoign's powder* and *balls* were of this description; and many of them included musk and civet. The term *bezoardicum minerale* has been applied to peroxide of antimony or antimonic acid, obtained by deflagrating sulphuret of antimony with nitre.

BISMUTHUM. *Bismuth* (Wismuth, *German*).

Bismuth is of a brittle reddish-white metal, of a specific gravity of 9·8. It fuses at 476°, and acquires a crystallised texture in cooling. If it contain copper, the solution in nitric acid becomes blue by excess of ammonia. Exposed to heat and air, bismuth becomes covered by a fusible white oxide, and it burns brilliantly under a jet of oxygen upon ignited charcoal, throwing off copious fumes of oxide. The equivalent of bismuth is 72, and the *oxide* consists of

	Atoms.	Equivalents.	Per Cent.
Bismuth	1	72	90
Oxygen	1	8	10
Oxide of Bismuth	1	80	100

When bismuth is dissolved in a mixture of two parts of nitric acid and one of water, the solution yields prismatic crystals of *nitrate of bismuth*, composed of

	Atoms.	Equivalents.	Per Cent.
Oxide of Bismuth	1	80	49·7
Nitric Acid	1	54	33·5
Water	3	27	16·8
Crystallised Nitrate of Bismuth	1	161	100·0

The crystals of nitrate of bismuth are soluble in a small quantity of water, but by large dilution they are resolved into a soluble supernitrate and an insoluble subnitrate, which, when duly edulcorated, forms the *trisnitrate of bismuth* of the Pharmacopœia.

This compound is white, tasteless, and nearly insoluble in water. If it be adulterated with carbonate of lead or of baryta, dilute sulphuric acid renders its nitric solution turbid. It is called a *trisnitrate*, but, according to Grouvelle, it consists of

	Atoms.	Equivalents.	Per Cent.
Oxide of Bismuth	4	320	81·7
Nitric Acid	1	54	13·8
Water	2	18	4·5
Subnitrate of Bismuth	1	392	100·0

It is the *Spanish white, pearl white*, and *magistery of bismuth* of old pharmacy; it blackens by sulphuretted hydrogen, and, unless perfectly free from silver, which is said to be seldom the case, it is discoloured by the action of light. It has been used as a tonic and antispasmodic, especially in dyspepsia attended by pain and spasm, unaccompanied by inflammation. It may be combined with small doses of opium, of hydrochlorate of morphia, of extract of hops, or of henbane. Dr. Paris says, that in pyrosis, and spasmodic gastrodynia associated with acidity and other signs of depraved indigestion, it furnishes the practitioner with a very valuable resource; he prescribes it as follows:—

℞ Bismuthi Subnitratis gr. viij. Mucilaginis Acaciæ f℥ij. tere simul; et adde, Mistur. Amygdal. f℥j. M. fiat haustus.

In large and even medicinal doses it will disorder the digestive organs, and sometimes affect the nervous system, producing giddiness, insensibility, cramps of the limbs, &c. Hence it is better to begin with a dose of two or three grains, and if it does not nauseate, to increase it to eight or ten grains. An ointment composed of a drachm of subnitrate of bismuth, mixed with six drachms or one ounce of spermaceti cerate, is a good application to irritable and excoriated surfaces.

From the observations of Orfila, it would appear that, in large doses, this substance proves an acrid poison: he repeats the improbable assertion, that the English bakers whiten their bread with it.

Dr. Christison quotes the following case of poisoning by this compound, from the *Bulletin des Sciences Médicales*. A man subject to water-brash took two drachms of the subnitrate, with a little cream of tartar, by mistake for a mixture of chalk and magnesia; he was immediately attacked with burning in the throat, brown vomiting, watery purging, cramps, coldness of the limbs,

and intermitting pulse; then with inflammation of the throat, difficult swallowing, dryness of the membrane of the nose, and a constant nauseous metallic taste; on the third day, with hiccup, laborious breathing, and swelling of the hands and face, together with suppression of urine, which was then discovered to have existed from the first. On the fourth day, swelling and tension of the belly were added to the pre-existing symptoms; on the fifth day, salivation; on the sixth, delirium; on the seventh, swelling of the tongue, and enormous enlargement of the belly; and on the ninth he expired. The urine continued suppressed till the eighth day. On inspection of the body, it was found that from the back of the mouth to the rectum there were but few points of the alimentary canal free of disease. The tonsils, uvula, pharynx, and epiglottis, were gangrenous; the larynx spotted black; the gullet livid; the stomach very red, with numerous purple pimples; the whole intestinal canal red, and here and there gangrenous, especially at the rectum. The inner surface of the heart was bright red; the kidneys and brain were healthy.

No chemical antidote is known.

BISTORTA. *Bistort.* The root of the *Polygonum bistorta.* *Cl.* 8. *Ord.* 3. Octandria Trigynia. *Nat. Ord.* Polygonaceæ.

The root of bistort is astringent; it is sometimes used in combination with aromatics, in the cure of intermittent fevers, but has fallen much into disuse, and is omitted in the present Pharmacopœia of the London College. In Iceland the root is said to be eaten raw, and also made into a kind of bread.

BITUMEN (from πιτυς, *the pine tree*, whence πισσα, *pitch*), *see* PETROLEUM.

BOLETUS IGNARIUS. *The agaric of the oak.* *Cl.* 24. *Ord.* 13. Cryptogamia Fungi. *Nat. Ord.* Fungaceæ.

This fungus is found upon decayed trunks of oak and ash; the spongy parts are selected for use; they are well beaten, by which they become soft and leathery. Thus prepared, it has been employed as a styptic. When soaked in a solution of nitre, or of lead, and dried, it forms a good tinder.

BORAX. *Sodæ Biboras.* Biborate of Soda. (The term *borax* is derived from the Arabic *buruk*, which signifies *brilliant.*)

This salt is chiefly imported from India in an impure state, under the name of *tincal;* it is purified by gentle calcination, solution, and crystallisation. It has also been made by combining soda with native boracic acid, imported from the south of Italy, where it occurs as a volcanic product, and in mineral springs.

Borax forms irregular hexaedral prisms; it has a styptic and alkaline flavour, and is soluble in about 12 parts of water at 60°. When heated, it loses water of crystallisation, and swells up into a light porous mass (*calcined borax*), which at a higher temperature fuses into a transparent glass, which soon finds its way through earthen crucibles.

Crystals of *boracic acid* (*see* Boron) are thrown down upon the addition of sulphuric acid to a hot concentrated solution of borax.

The salt consists of

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	16.85
Boracic Acid	1	68	35.80
Water	10	90	47.35
Crystallised Borate of Soda	1	190	100.00

Borax is a good detergent application in the thrush of children; the *Mel Boracis* of the Pharmacopœia may be conveniently used in these cases, but it generally requires dilution with an equal portion of clarified honey; about an eighth part of tincture of myrrh is a good addition.

The following gargle and mouth-wash is a pleasant application to the throat and gums when under the influence of mercury :—

℞ Boracis Pulver. ℥ij.; Aquæ Rosæ f℥vij.; Mellis Despumat., Tincturæ Myrrhæ, āā f℥ss. M.

Honey of Borax.—Take of Borax, powdered, one drachm; Honey, one ounce. Mix.

One part of borax to two parts of loaf sugar, incorporated together into a fine powder, form a good detergent to ulcerated mouth; and a saturated watery solution of borax, with a little alcohol added, is a good lotion for sore nipples, and also for certain discolorations of the skin, such as *cloasma*, or hair spots, to which fair-haired children and young women are subject. An aqueous solution has been used in leucorrhœa and gonorrhœa with success: and in the form of ointment it has been applied to inflamed and painful hæmorrhoidal tumours.

Internally borax has been used, says Pereira, to diminish the secretion of uric acid; to act as a diuretic in dropsical cases: and under the idea of its promoting uterine contractions, it is recommended by Copland, in conjunction with ergot, to facilitate the progress of labour. The *dose* is from *half a drachm to a drachm.*

BORON. This substance is the base of *boracic acid;* it was discovered by Davy, in 1807, who obtained it by heating boracic acid with potassium, which combines with the oxygen of the acid, and sets the boron free. It is dark olive, infusible, tasteless, and a non-conductor of electricity. Its specific gravity exceeds 2. It is not acted on by water, but when heated in the air, or in oxygen, it burns difficultly into boracic acid; it is more readily oxidized by nitric acid.

Boracic acid was discovered by Homberg, in 1702, and was used in medicine under the name of *sedative salt.*

BOSWELLIA, *see* Olibanum.

BROMINIUM. *Bromine. Brome* (from βρωμος, *a stench*).

Note.—*Bromine.* It evaporates by a gentle heat with an acrid odour. It is sparingly dissolved by water, more copiously in rectified spirit, best in ether. Its specific gravity is 3·0.

Bromine was discovered by M. Balard, of Montpelier, in 1826.

It is contained in extremely minute proportion, in sea-water, and can only be procured by the evaporation of large quantities, which leave, after the chloride of sodium has been separated, an uncrystallisable residue called *bittern*, in which the bromine is contained.

Bromine is a dark, reddish-brown liquid, of a penetrating and peculiar odour and acrid taste. It corrodes organic substances, and tinges them yellow. It is an acrid poison; a single drop put upon the beak of a bird kills it. The specific gravity of bromine is 2·96. According to Balard it does not freeze at 0°. At 4° below 0° Serullas states that it suddenly concretes into a brittle solid. It is extremely volatile, producing a deep reddish-brown vapour in the bottles in which it is preserved. It boils at 115°. Its vapour extinguishes flame. It is little soluble in water, more so in alcohol, and most soluble in ether. It is very sparingly soluble in sulphuric acid, and hence that acid, floating upon bromine, may be used to prevent its evaporation. It slowly acts upon olive oil; it destroys the blue of litmus and of indigo. It acts energetically upon many of the metals; tin and antimony burn in its vapour, and it combines with explosive violence with potassium, forming *bromide of potassium*, which is the principal officinal form of bromine hitherto employed. The equivalent of bromine is 78.

Bromine has been used in the same diseases with the *bromide of potassium*. It is most conveniently given in solution of common or aromatic water. An aqueous solution, composed of one part by weight of bromine and forty parts of water, may be prescribed in *doses of five or seven drops* properly diluted, and flavoured with syrup. Externally, the solution has been used as a lotion, in glandular and other enlargements.

Bromide of potassium is most readily procured by adding a solution of pure potassa to bromine, till the colour disappears, evaporating to dryness, and fusing the residue, which may then be redissolved and crystallised; or bromide of zinc may be decomposed by carbonate of potassa, in the same way as the bromide of iron.

Bromide of potassium is a colourless anhydrous salt, crystallising in cubes, readily soluble in water, and slightly so in alcohol; it has an acrid bitterish taste, decrepitates when heated, and at a higher temperature fuses. When chlorine is added to its aqueous solution, bromine is evolved, and a brown tint produced, the affinity of chlorine for potassium being greater than that of bromine. It should be purchased in crystals.

With respect to these tests of the purity of bromide of potassium, the non-action upon vegetable colours shows the absence of free acid and alkali; the non-action of chloride of barium indicates the absence of sulphates.

If a larger quantity of nitrate of silver than 14·28 grains be required for the decomposition of the salt under examination, the presence of chloride of potassium, or of chloride of sodium, may be suspected. The bromide of potassium, however, prepared according to the present formula, is apt to contain iron, as is also the case with the iodide obtained by a similar process.

Of the medical powers of bromide of potassium, little is at present known, for it has not been long in use. Dr. Williams, of St. Thomas's Hospital, has used it with great success in cases of enlarged spleen, and Dr. A. T. Thomson has found it of service in improving the secretion of the liver; it has been given for hypertrophy of the heart, and as a tonic, stimulant, and deobstruent, in cases analogous to those in which *iodide of potassium* has been employed. Dr. Williams, also, gave it with success in a case of ascites, and Magendie thinks highly of it as an anti-scrofulous remedy. The *dose* is from *three to ten grains* twice or thrice a day, and it may be administered in solution in common or aromatic water. *Bromide of iron* has been used in the same cases as the iodide of that metal (*see* Iodinium).

The toxicological history of bromine is as yet imperfect, and it is a very unlikely source of medico-legal inquiry. It appears from the experiments of Dr. Butske (*Christison*, chap. iv.), that free bromine is infinitely more virulent than its compounds. One drop, in half an ounce of water, produced a sense of heat in the mouth, œsophagus, and stomach, and subsequent colic; and two drops and a half in an ounce of mucilage, excited, in addition to the foregoing symptoms, great nausea, hiccup, and increased secretion of mucus. It would appear, therefore, that bromine is an active irritant poison.

Barthez gave half a drachm of bromide of potassium to a dog, which only produced dullness and depression, but no other bad effects. When these and other things are injected into the blood, or when their ejection from the stomach is prevented by a ligature upon the gullet, no satisfactory or useful evidence can be drawn from the results, as applicable to the symptoms or treatment. He recommends magnesia as an *antidote*.

BROOM, *see* Scoparius.

BRUCIA. A vegetable alkaloid associated with *Strychnia* (*see* Nux Vomica).

BUBON. The officinal *galbanum* was formerly stated to be the produce of the *Bubon galbanum*. In the present Pharmacopœia it is referred, upon the authority of Mr. Don, to the *Galbanum Officinale* (*see* Galbanum).

BUCK BEAN, *see* Menyanthes.

BUCKTHORN, *see* Rhamnus.

BUCKOO, or BUCHU, *see* Diosma.

BURGUNDY PITCH, *see* Abietis Resina.

CADMIUM. A metal discovered by Stromeyer, in 1817; it is generally associated with zinc. It much resembles tin, but is harder and more tenacious. Its specific gravity is 8·60. It fuses and volatilizes at a temperature below a red-heat. Its equivalent is 56. It has scarcely been employed in medicine, though, from the taste and character of its salts, it may be presumed that their effects would resemble the corresponding compounds of zinc. Dr. Burdash represents it as an irritant poison, in the state of sulphate.

CAFFEIN. A crystallisable principle obtained from coffee.

It is bitter, and has been supposed to possess tonic and narcotic qualities.

CAJUPUTI. *Oleum e foliis destillatum.* The oil distilled from the leaves of the *Melaleuca minor. Cl.* 13. *Ord.* 3. Polyadelphia Icosandria. *Nat. Ord.* Myrtaceæ.

This is a small tree or shrub, abundant in Amboyna and part of Borneo, whence the essential oil is imported.

The oil is but sparingly yielded by the distillation of the leaves. It is thin and limpid when newly drawn, and is said to be nearly colourless; but that which is most common in the market is of various shades of green. The colour is sometimes attributed to copper, derived, as it is presumed, from the flasks in which it was brought to Europe; but that imported in glass bottles is generally of the same tint, and none of the samples which have been examined have contained even a trace of copper.

The fragrancy of genuine cajuputi oil is best perceived when it is rubbed upon the hand; it resembles the mixed odour of camphor, cardamoms, and rosemary. Its specific gravity is about ·980, or, according to some, as low as ·947. Its taste is like that of oil of peppermint mingled with camphor. It is entirely soluble in alcohol. It should not smell or taste of oil of turpentine.

Oil of cajuputi is powerfully stimulant and diaphoretic in doses of from two to six or eight drops; and, in the East, has gained much celebrity in chronic rheumatism, spasmodic colic, and certain paralytic and nervous affections calling for rapidly-acting and diffusible stimuli. In these cases it is also applied externally as a liniment, either pure or diluted with olive oil. Put into an aching tooth, upon a piece of cotton, it quiets the pain more effectually than most other essential oils. It has been by some highly extolled in the treatment of Asiatic cholera; and during the prevalence of that disease in London, such was the demand for this oil, that its price rose from two to fourteen shillings the ounce.

Dr. Paris says of this oil, "It is a diffusible stimulant of great power, and from the experience I have had for many years of its effects, I might say that its carminative action upon the intestinal canal is of an almost specific nature. It not only stimulates its muscular structure, but imparts a tone which does not follow the use of other aromatics." The following are among the forms in which he administers it:—

℞ Olei Cajuputi ♏ij.; Sacchari albi gr. x. tere simul et adde Infusi Calumbæ f℥ix.; Aquæ Cinnam. ℥ss. Fiat haustus.

℞ Olei Cajuputi ♏iv.; Sacchari albi gr. x., tere simul et adde Tincturæ Myrrhæ f℥j.; Mistur. Camph. f℥x. Fiat haustus.

CALAMI RADIX, *see* ACORUS CALAMUS.

CALAMINA. *Carbonas Zinci impura. Calamine. Impure Carbonate of Zinc.* Several varieties of ores of zinc are known under the name of *Calamine*, or *Lapis calaminaris;* they consist chiefly of carbonate of zinc, but are generally intimately mixed with variable portions of other ores and stony matter; so that, on

account of this uncertainty, it is doubtful whether calamine should be retained in the Materia Medica. The best calamine, as it occurs in commerce, is usually in buff-coloured or reddish-gray fragments, of an earthy aspect.

Prepared calamine is only used externally, either as a digestive in the form of *Ceratum calaminæ*, or *Turner's cerate*, or in powder, to sprinkle upon ulcerating surfaces; it keeps the sore clean by absorbing the secretion, very rarely irritates, and does not otherwise interfere with the healing process: hence it is often a useful application to venereal sores, keeping them cleanly, and not interfering with the influence of mercury upon their healing process. The *Ceratum calaminæ* is omitted in the present Pharmacopœia, *Unguentum zinci* being probably intended as a substitute; when made of *good* calamine, it is, however, occasionally useful; we accordingly subjoin the old formula: —

Take of prepared Calamine, Yellow Wax, of each half a pound; Olive Oil, a pint. Mix the oil with the melted wax, then remove it from the fire, and when it begins to thicken, add the calamine, and stir assiduously till it is cold.

See the article Zinc, for an account of the other pharmaceutical preparations of this metal.

CALCIUM. The metallic base of *Lime*. When lime is electrized in contact with mercury, an *amalgam* is formed, which decomposes water, and which contains a white and highly inflammable metal; the further properties of *calcium* have not been ascertained, but *lime*, which is an oxide of calcium, consists of

	Atoms.	Equivalents.	Per Cent.
Calcium	1	20	71·4
Oxygen	1	8	28·6
Lime	1	28	100·0

Lime is generally obtained by heating certain limestones, or *carbonates of lime*, such as chalk, marble, &c., to a red heat, exposed at the same time to a current of atmospheric air; under these circumstances, the carbonic acid is expelled, and *caustic lime*, or *quicklime*, is obtained.

The want of effervescence with diluted acid shows that the whole of the carbonic acid has been expelled; and the absence of oxide of iron, alumina, and silica, is indicated by the transparency of the hydrochloric solution after caustic ammonia has been added. The following *Preparation of Calcium* is directed in the present London Pharmacopœia :—

Solution of Lime.—Take of Lime, half a pound; Distilled Water, twelve pints. On the lime, first slaked with a little of the water, pour the remaining water, and agitate them together; then immediately cover the vessel, and set it by for three hours; afterwards keep the solution, with the remaining lime, in stopped glass vessels, and when it is to be used, take from the clear solution.

This is the *Aqua Calcis*, or *Lime Water*, of former Pharmacopœiæ. According to Mr. Phillips, a pint of water at the temperature of 60° dissolves 11·6 grains of lime; whereas, at 32° the same quantity of water dissolves 13·25 grains, and at 212° only 6·7,

so that, unlike most other substances, the solubility of lime increases as the temperature of the water decreases, water at 32° taking up nearly one-seventh more lime than water at 60°, and nearly double the quantity that is dissolved by boiling water; the consequence is, that lime water becomes turbid when boiled, in consequence of the separation of a portion of the lime which, at the lower temperature, was retained in permanent solution.

Lime water is limpid, colourless, and has an acrid alkaline taste; when exposed to the air, a pellicle of carbonate of lime gradually forms upon its surface, which, when broken, is succeeded by others, till the whole of the lime is separated in the form of carbonate; hence the necessity of preserving lime water in well-stopped bottles, and hence, also, its value as a test of the presence of carbonic acid, and as an agent in the decomposition of the alkaline carbonates.

The medical uses of lime water are very limited; it is of course antacid, and therefore relieves those forms of dyspepsia attended by excessive acidity in the secretions of the stomach, but the dose required is large, and the remedy nauseous, unless it can be joined with milk or some aromatic water.

In calculous affections, large quantities of lime water have been occasionally prescribed, but in such cases it is an injudicious form of alkali. Its use has, however, been attended with great relief in persons of the uric acid diathesis. The other disorders in which lime water has found advocates, are diarrhœa, worms, leucorrhœa, and diabetes. Combined with milk it is a remedy against vomiting; and with gum-arabic and cinnamon water is useful in *cholera infantum*. The dose is from one to four ounces twice or thrice a day, and it has usually been given with milk. As an external remedy it has been applied to foul ulcers, and to some cutaneous eruptions, but always with doubtful success.

In the absence of more appropriate antidotes, lime water may be administered in cases of poisoning by the common mineral and oxalic acids.

Chalk, when pure, is a *carbonate of lime*, and, from its abundance and soft texture, it is a valuable form of that substance, applicable to a variety of useful purposes. It consists of

	Atoms.	Equivalents.	Per Cent.
Lime	1	28	56
Carbonic Acid	1	22	44
Carbonate of Lime	1	50	100

Prepared Chalk.—In medicine, prepared chalk is a useful antacid; and in common diarrhœa, after the bowels have been evacuated by a mild purge, chalk-mixture with aromatic astringents, and, if necessary, small doses of opium, is useful in quieting the bowels. Dose, ten grains to a drachm. The following are the cretaceous preparations of the Pharmacopœia:—

Mixture of Chalk.—Take of prepared Chalk, half an ounce; Sugar, three drachms; Mixture of Acacia, a fluid ounce and a half; Cinnamon Water, eighteen fluid ounces. Mix.

The proportion of chalk is only between 6 and 7 grains to a tablespoonful of this mixture. Eight instead of eighteen ounces of cinnamon water would be a better ratio.

Compound Powder of Chalk.—Take of prepared Chalk, half a pound; Cinnamon, four ounces; Tormentilla, Acacia, of each three ounces; Long Pepper, half an ounce. Separately powder these finely; then mix.

Compound Powder of Chalk with Opium.—Take of Compound Powder of Chalk, six ounces and a half; Powdered Opium, four scruples. Mix.

The chalk-mixture may be prescribed in diarrhœa, as follows :—

℞ Misturæ Cretæ f℥v.; Tincturæ Cinnamomi f℥vj.; Tincturæ Catechu f℥ij. Misce. Cochlearia tria pro dosi quartâ quaque hora.

℞ Confectionis Aromaticæ ℥ij.; Misturæ Cretæ f℥v.; Spiritus Cinnamomi f℥j.; Tincturæ Opii f℥ss. M. Sumantur cochlearia tria ampla post singulas sedes liquidas.

The *Compound Powder of Chalk* is well adapted for checking atonic diarrhœa; that *with opium* contains one grain of opium in two scruples of the powder: the dose of either is from five to thirty grains; and where opium, conjoined with aromatics, is required, the latter furnishes a convenient form for its subdivision. These powders are best administered as follows :—

℞ Pulv. Cretæ compos. ℥ss.; Misturæ Acaciæ f℥iij.; Aquæ Cinnamomi f℥vij. M. fiat haustus.

Chloride of Calcium—Muriate of Lime.—This compound occurs in sea water, and in some mineral waters.

Solution of Chloride of Calcium.—Take of Chloride of Calcium, four ounces; Distilled Water, twelve fluid ounces. Dissolve the chloride of calcium, and filter.

After having been fused, it is a hard gray substance, extremely deliquescent and soluble in water, and in alcohol. It has a bitter acrid taste, and consists of

	Atoms.	Equivalents.	Per Cent.
Calcium	1	20	25·7
Chlorine	1	36	64·3
Chloride of Calcium	1	56	100·0

Chloride of calcium has been used in scrofulous and glandular disorders, as a deobstruent tonic, and generally regarded as more efficacious and less irritating than chloride of barium; Hufeland, however, represents it as the more powerful remedy of the two. The dose is from twenty minims to a drachm of the above *solution*, in milk, or in water sweetened with a little syrup.

Calx Chlorinata. Chloride (*hyperchlorite*) *of lime* (under the name of *bleaching powder*), is so abundantly and well prepared by the wholesale manufacturer, that it might have safely been placed among the articles of the Materia Medica.

Chloride of lime is nearly colourless; it smells slightly of chlorine, and has a pungent taste. It is partially soluble in water, and the solution is termed *bleaching liquid.* Exposed to air it slowly evolves chlorine, and absorbs carbonic acid; ultimately a little chloride of calcium is formed, and it deliquesces. When heated, oxygen is evolved, and chloride of calcium is formed.

Chloride of lime is regarded as a valuable disinfectant; when exposed to the air, either dry, or in solution, it slowly evolves chlorine, which destroys the odour of putrefying animal matter, and decomposes infectious effluvia. Acted upon by dilute acids, chlorine is evolved with effervescence.

Chloride of lime has been employed internally by Dr. Reid in the epidemic fever of Ireland, in 1826; and also in pulmonary disorder from simple excitement. It was found to be valuable in dysentery. He used it by the mouth, and also by enema. The *dose* is from *one grain to five or six grains* dissolved in one or two ounces of water sweetened with syrup. Lozenges of chloride of lime have been used to destroy the unpleasant smell of the breath. When the evacuations from the bowels are very offensive, chloride of lime may be used in the form of enema. For this purpose, ten or fifteen grains may be added to the common enema. In certain forms of leucorrhœa and offensive discharges from the uterus, a solution of this substance by vaginal injection is useful. For external use, the chloride is employed either in the form of solution or of ointment, the strength of either of which will vary with the object to be fulfilled. The average proportions are from one drachm to half an ounce of the chloride to a pint of water, or one to two drachms to an ounce of lard or simple cerate. In old and indolent sores or wounds slow of healing, in lymphatic habits, the wash is preferable, applied by means of lint moistened with the fluid; but in erysipelatous sores or ulcers with red and irritable skin adjoining them, and chilblains which have ulcerated, I have found the ointment to be the more serviceable. Chaps and other abrasions of the skin, and chronic eruptions, (*scabies, tinea capitis,*) are often singularly benefited by the regular application of a chloride wash either of lime or of soda. In burns and scalds a lotion or ointment of the chloride of lime has been attended with very good effects: and in certain forms of ophthalmia, especially in conjunctivitis, by Varlez, Guthrie, and others, it is not a little extolled. The solution used by the former was composed of a scruple to three or four drachms of chloride in an ounce of water. In making a solution for this or other purposes it should be filtered, in order to separate the hydrate of lime. As a gargle in putrid sore throat, or in scarlatina, the solution has displayed good curative effects.

"Considered in reference to medical police," it is well remarked by Dr. Pereira, that "the power of the alkaline chlorides (hypochlorites) to destroy putrid odours and to prevent putrefaction, is of vast importance. Thus chloride of lime may be employed to prevent the putrefaction of corpses previously to interment, to destroy bad smells, and prevent putrefaction in dissecting rooms, and workshops in which animal substances are employed (as catgut manufactories), to destroy the unpleasant odour from privies, sewers, drains, wells, docks, &c., to disinfect (?) ships, hospitals, prisons, stables, &c. The various modes of applying it will readily suggest themselves. For disinfecting corpses, a sheet should be

soaked in a pailful of water containing a pound of chloride, and then wrapped round the body. For destroying the smell of dissecting rooms, &c., a solution of the chloride may be applied by means of a garden watering pot. When it is considered desirable to cause the rapid evolution of chlorine gas, hydrochloric acid may be added to chloride of lime."

The alleged property of the chlorides to destroy contagion and infection may well be doubted. It should ever be borne in mind, that the best and only certain disinfecting agent and diluter of contagion, so as to render it little effective, is atmospheric air freely introduced, and its passage through the hospital, house, or ship, encouraged by ventilation: with which view a fire is often of signal service, as in the hold of a ship, or cellar of a house. High heat is itself one of the most efficient disinfecters.

"Chloride of lime, or chloride of soda, is the best *antidote* in poisoning by hydrosulphuric acid (sulphuretted hydrogen), hydrosulphuret of ammonia, sulphuret of potassium, and hydrocyanic acid. It decomposes and renders them inert. A solution should be administered by the stomach, and a sponge or handkerchief soaked in the solution held near the nose, so that the vapour may be inspired. It was by breathing air impregnated with the vapour arising from chloride of lime, that Mr. Roberts (the inventor of the miner's improved safety lamp) was enabled to enter and traverse with safety the sewer of the Bastile, which had not been cleansed for thirty-seven years, and which was impregnated with hydrosulphuric acid. (*Alcock's Essay.*) If a person be required to enter a place suspected of containing hydrosulphuric acid, a handkerchief moistened with a solution of chloride of lime should be applied to the mouth and nostrils, so that the inspired air may be purified before it passes into the lungs."—*Pereira*, Vol. I., p. 353.

Treatment of poisoning with chloride of lime. Administer albuminous liquids (as eggs beat up with water) or milk, or flour and water, or oil, or mucilaginous drinks, and excite vomiting; combat the gastro-enteritis by the usual means. Carefully avoid the use of acids, which would cause the evolution of chlorine gas in the stomach. *Auct. citat.*

CALOMEL, *see* Hydrargyrum.

CALUMBA. *Radix.* The root of the *Cocculus palmatus. Cl.* 22. *Ord.* 10. Diœcia Dodecandria. *Nat. Ord.* Menispermaceæ.

This is the *Menispermum palmatum* of Willdenow; it is a native of the eastern part of Africa, growing abundantly in the forests of Mozambique, where the natives carry on a considerable trade in it. The roots are dug up in the month of March, and transported to Tranquebar, where it is an article of export with the Portuguese. It is not grown, as was once supposed, at Colombo, the capital of Ceylon. In 1805, a male plant was raised by Dr. Anderson, at Madras, from a root brought by M. Fortin; in 1825, the male and female plants were obtained by Captain Owen from Oibo, and carried to the Mauritius and Bombay.

Calumba root is imported in bags and cases. It is usually dried in slices, having a thick yellow bark, covered with an olive-coloured cuticle, and surrounding a browner and spongy central portion. The slices are generally mixed with longer pieces of the root, especially in samples which are not very select. It is almost always worm-eaten, but it should be selected as little so as possible, dense, and of a bright colour. It has a strong, bitter, and slightly pungent taste; and its aqueous infusion holds a considerable portion of starch and mucilage, and is very prone to decomposition in a warm atmosphere: it yields a copious blue precipitate with iodine. Calumba is said sometimes to be mixed with slices of briony root, which have been infused in quassia water and tinged with saffron.

Geiger observes that calumba deserves more accurate examination, as, according to Buchner, it appears to possess properties derived from the presence of menispermia (picrotoxia). More lately, however, Wittstock, of Berlin, has obtained from it a crystallisable principle, which he calls *Calumbin*, and to which its medicinal activity is probably due; he digests calumba in alcohol sp. gr. 835, and reduces the tincture, by distillation, to one-third, when crystals form in the residue: these, when purified, are very bitter, scarcely soluble either in water or in cold alcohol, not alkaline, and soluble in dilute acids and in alkalis. (*Journ. de Phar.*, Fev.,1831)

Infusion of Calumba.—Take of Calumba, sliced, five drachms; Boiling distilled Water, a pint. Macerate for two hours in a lightly covered vessel, and strain.

The *infusion* should always be used freshly prepared, as it becomes ropy and putrescent after it has been kept for a few days in a warm room: the dose is from one to two ounces.

Of the *powdered root* from five to twenty grains may be taken three times a day, and it may be conveniently formed into pills with a few drops of water only. Ten grains twice a day has been found efficacious in nervous headache.

Calumba is not only a very good simple bitter, but is generally more agreeable to delicate stomachs than other medicines of this class, especially in the form of infusion, conjoined, if necessary, with aromatics, in dyspepsia, in diarrhœa, and in the after-treatment of cholera morbus. Alkalis, acids, and saline aperients may also be administered with it. The following is a good formula where flatulency and heartburn are attending on a slightly gouty habit, with a red deposit in the urine:—

℞ Infus. Calumbæ f℥iv.; Aquæ Cinnam. f℥ij.; Ammoniæ Sesquicarbon. ℥ss. M. Fiat mistura; sumantur cochl. iij. ampla mane et meridie.

In lithic diathesis, we may prescribe as follows:—

℞ Magnesiæ Carb. ℈j., Infus. Calumbæ f℥j.; Aquæ Menthæ ℥ij. Fiat haustus.

As calumba is not blackened by preparations of iron, it is properly prescribed where it is desirable to administer them in conjunction with bitters.

℞ Infusi Calumbæ f℥xj.; Tincturæ Ferri Sesquichloridi ♏x.; Aquæ Cinnam. f℥ss. Fiat haustus bis die sumendus.

From a teaspoonful to a tablespoonful of the following mixture may be given, according to their age, to children who are troubled with diarrhœa occasioning debility during dentition; but care should be taken not to check such laxity of the bowels suddenly or unnecessarily, as it is often the comparatively harmless substitute of the more formidable evils that attend teething.

℞ Carui contus., Calumbæ contus., Rhæi contus., āā ℈j.; Aquæ ferventis f℥viij. Macera per horas duas et cola.

Or the following, as a tonic, in analogous cases:—

℞ Infus. Calumbæ, Aquæ Anethi, āā f℥vj.; Spiritûs Ammoniæ compos. ℥xx. Fiat mistura de quâ detur cochleare unum minimum tertiâ quâque horâ.

Dr. Thomson recommends infusion of calumba for restraining the nausea and vomiting which attend pregnancy.

CALX. *Lime.* *See* Calcium.

CAMBOGIA. *Gummi Resina.* The gum-resin of the *Hebradendron Cambogioides. Cl.* 22. *Ord.* 1. Polygamia Monœcia. *Nat. Ord.* Guttaceæ.

The term *gamboge* is derived from *Kamboia*, a river in Siam, in the vicinity of which the gum is said to be abundantly obtained; the tree is stated to be a native of the kingdom of Siam, and of Ceylon. A figure and description of it will be found in the *Companion to the Botanical Magazine*, Vol. II., p. 193. Gamboge is obtained by breaking the leaves and shoots, and by wounding the bark, when it oozes in the form of a viscid yellow sap, concreting in drops or tears, whence the name *gummi guttæ;* it is, however, commonly collected in cocoa-nut shells, and jars, and when to a certain degree indurated, is rolled into cakes or sticks, and wrapped in flag leaves, or sometimes cast in the joints of a bamboo. It comes to Europe in boxes, and is largely used as a water-colour, and an ingredient in some lacquers and varnishes. When broken, its fracture should be clean and conchoidal, and of a deep orange colour, rendered bright yellow when rubbed with a drop or two of water. It has little smell or taste, is opaque, brittle, and yields a yellow powder. When heated it fuses and burns with a white flame. Its specific gravity is 1·22.

Digested in alcohol or ether, gamboge yields orange-red tinctures (*solutions of gambogic acid*). This acid may be separated in the form of a bright yellow opaque film or scum, by dropping an ethereal tincture of the gamboge on water.

The following is the officinal formula in which gamboge is used:—

Compound Pills of Gamboge.—Take of Gamboge, in powder, a drachm; Aloes, in powder, a drachm and a half; Ginger, in powder, half a drachm; Soap, two drachms. Mix the powders with each other; then, having added the soap, pound all together till incorporated.

Gamboge was first introduced into the Materia Medica by Clusius, in 1603, as a purgative and hydragogue. It ranks among the drastic purges; but as it is apt to excite nausea and vomiting, and to gripe excessively, it is rarely used, except in very small

doses along with other cathartics. It is said to form an ingredient in many of the empirical compositions sold for the cure of tapeworm, in which, indeed, combined with calomel, it is very effectual, but less certain and more drastic than a large dose of oil of turpentine.

From four to six grains of gamboge is usually a very operative dose, but the addition of a grain to other purgatives is often useful in sharpening their activity. One or two grains rubbed up with sugar have been recommended in consequence of its tastelessness, as a purge for infants; but to them it should be given with much circumspection. A solution of gamboge in carbonate of potassa is said to be purgative and diuretic, and, as such, has been recommended in dropsical affections.

The *Pilulæ Cambogiæ compositæ* are sometimes prescribed in cases of obstinate constipation, in doses of ten or fifteen grains.

The combination of the readily soluble gamboge with the less soluble aloes is by some supposed to render the former more slow and mild in its action: be this as it may, these pills are effectively and often drastically purgative. They are occasionally conjoined with other cathartics, with calomel, for instance, and with compound extract of colocynth, but gamboge is rarely prescribed except as a hydragogue in ascites and anasarca.

Carbonate of potassa is said to diminish the violence of the topical action of gamboge.

CAMPHORA (Kanfur of the Arabians). *Concretum sui generis, sublimatione purificatum.* A peculiar concrete substance, purified by sublimation. It is the produce of the *Laurus Camphora. Cl.* 9. *Ord.* 1. Enneandria Monogynia. *Nat. Ord.* Lauraceæ.

The camphor laurel is a native of Japan and China; it is a large branching tree, with a smooth bark.

Camphor is also found in several other plants, and some of the camphor brought to Europe is the produce of the *Dryobalanops aromatica*, a tree common in Sumatra and Borneo. When purified by sublimation, we find it in commerce in cakes weighing about eight pounds each, sonorous when struck, white, translucent, and somewhat tough in consistency, but admitting of reduction to powder by the aid of a few drops of spirit of wine. Its odour is strong and agreeable to most persons; its taste cooling, and at the same time aromatic and pungent. Its specific gravity is 0·988. It fuses at about 300°.

It is very sparingly soluble in water, but copiously in alcohol, in oils, and in several acids. The alkalis scarcely act upon it. Camphor has been shown by Dumas to be an oxide of an hydrocarbon identical in composition with pure oil of turpentine; hence the term *camphogen*, or *camphene*, applied to that oil.

When nitric acid is repeatedly distilled off camphor, it converts

it into *camphoric acid*, which is a compound of one atom of camphor and four atoms of oxygen. Dr. A. T. Thomson states that he has formed camphor by passing a stream of oxygen gas through highly rectified oil of turpentine. It will be remarked that the leading characters of camphor are those of a concrete volatile oil.

The sparing solubility of camphor in water has led to the formula in the Pharmacopœia called *Camphor julep*, or *mixture;* and another useful pharmaceutical form of camphor is *Camphorated Spirit*, or, as it is not quite correctly termed in the present Pharmacopœia, *Tincture of Camphor.*

Mixture of Camphor (Camphor Water).—Take of Camphor, half a drachm; Rectified Spirit, ten minims; Water, a pint. First rub the camphor with the spirit, then with the water gradually added, and strain through linen.

Tincture (Spirits) *of Camphor.*—Take of Camphor, five ounces; Rectified Spirit, two pints. Mix, that the Camphor may be dissolved.

A camphor water rather stronger than the preceding, is made by the aid of carbonate of magnesia, as follows. Camphor gr. xii.; Carb. of Magnes. ʒss., Water fʒvi. Triturate the camphor and the magnesia together, adding the water gradually. A minute portion of magnesia is also dissolved, and hence this mixture has antacid properties; it is beneficial in the uric acid diathesis and irritations of the neck of the bladder.

In the *Mistura Camphoræ*, a very small quantity of camphor is held in permanent solution, yet, when it is properly filtered, it is not an inelegant preparation as a vehicle for antispasmodics, where the virtue of camphor is not immediately required. A camphor mixture or julep, preferred by some, may be made with less trouble by mixing half a fluid ounce of camphorated spirit with an equal quantity of rectified spirit, and adding the mixture at once to half a gallon of water, with which it must be thoroughly shaken.

Considerable difference of opinion exists as to the medical virtues of camphor; by some it is undeservedly condemned as inefficacious, and by others its powers are overrated. In small doses it acts as a sedative and diaphoretic, these effects being preceded by slight exhilaration; in doses, for instance, of from one to three grains; and persons who cannot procure rest except from large doses of opium will sometimes succeed by combining smaller doses with camphor. It produces little effect upon the pulse, except in large doses, when it softens it and renders it fuller. It is a useful adjunct to bark in typhoid diseases; to valerian, the fetid gums, volatile alkali, and ethereals, in hysteric and nervous complaints; and to antimonials, and other diaphoretics, in rheumatism and certain inflammatory disorders. In irritation of the urinary and genital organs, from cantharides, or from other causes, camphor is serviceable; sometimes, however, it causes micturition. The following formula may be used for the independent exhibition of camphor:—

℞ Camphoræ gr. iij. (ope alcoholis, in pulverem tritæ) Acaciæ pulv. ʒss. tere simul et adde, Misturæ Amygdalæ fʒiss. M. fiat haustus.

The following are Dr. Hooper's prescriptions for *Mistura Camphoræ fortior*. They are good forms for the exhibition of camphor.

1. ℞ Camphoræ gr. xxv.; Amygdales dulces decorticates vj.; Sacchari purificati, ℥iij.; Optime contere, dein adde gradatim Aquæ Menthæ viridis, f℥vijss.; ut fiat mistura; sit dosis cochlearia tria magna.

2. ℞ Camphoræ gr. xxv.; Spiritûs rectificat ♏v.; Fiat terendo pulvis; dein adde Pulveris Acaciæ, ℥iv.: Syrupi Limonum f℥ss.; Aquæ Menthæ viridis f℥vij.; ut fiat emulsio; sit dosis cochlearia tria magna.

In certain cases of febrile action, where the object is to allay irritation, promote perspiration, and induce sleep, either of the above mixtures may be employed. About *five grains* of camphor every four hours may be considered as a full *dose*, and as likely to produce all the advantages to be derived from the remedy; it has been given in doses of from twenty to thirty grains, and is then apt to produce vomiting, giddiness, and other deleterious effects.

Compound Tincture of Camphor.—Take of Camphor, two scruples and a half; Opium, in powder, Benzoic Acid, of each seventy-two grains; Oil of Anise, a fluid drachm; Proof Spirit, two pints. Macerate for fourteen days, and strain.

This is the *Paregoric Elixir* of old pharmacy, a favourite remedy in chronic asthma and some obstinate coughs, which are not rendered worse by moderate stimulants. As about a grain of opium is contained in each *half fluid ounce*, the dose must be adjusted accordingly; one or two drachms are commonly given in a wine-glassful of warm water. In cases of chronic bronchitis, after the inflammatory symptoms have subsided, the following will sometimes allay the cough:—

℞ Tincturæ Camphoræ compos. f℥ss.; Syrupi Croci f℥ij.; Misturæ Amygdalæ f℥iijss. M. Capiantur cochlear. duo ampla subinde.

Paregoric elixir, though a common, is not always a harmless remedy; it is often found in the nursery, especially for the cure of hooping-cough, but no preparation containing even the smallest quantity of opium should ever be given to infants; nor even to young children, without the most urgent necessity. In general, the anodyne and hypnotic effects of the paregoric will be procured, with less previous excitement, by simple laudanum.

Camphor is a valuable external stimulant, and as such, is often employed in rheumatic and other painful affections of the muscles and joints. Its solutions in oil and in spirit, and the *Linimentum Camphoræ compositum*, are good formulæ for these purposes. Twenty or thirty grains of powdered camphor added to a common poultice will sometimes relieve obstinate rheumatic affections of tendinous parts; and applied to the perineum, it is effectual in diminishing irritation in gonorrhœa and allaying chordee. In vapour it has cured rheumatism, applied to the skin.

The following are the officinal formulæ for the external application of camphor:—

Liniment of Camphor.—Take of Camphor, an ounce; Olive Oil, four fluid ounces. Dissolve the camphor in the oil.

This and similar oleaginous solutions of camphor are often effectual in the relief of chronic rheumatism, when diligently rubbed in upon the affected part; they also occasionally lead to the dispersion of glandular tumours; the camphor not only acts as a stimulant upon the absorbents, but much of the benefit is referrible to the friction. The above liniment is sometimes substituted with advantage for the pure olive oil in the *Linimentum Ammoniæ fortius.*

Compound Liniment of Camphor. — Take of Camphor, two ounces and a half; Solution of Ammonia, seven fluid ounces and a half; Spirit of Lavender, a pint. Mix the solution of ammonia with the spirit; then, from a glass retort, by a gentle fire, let a pint distil; lastly, in this dissolve the camphor.

This process, though somewhat circuitous, affords an elegant and useful liniment, applicable in the same cases as the liniments of ammonia generally, but having the advantage of not being greasy; it may be applied by friction or sprinkled upon flannel. Like other stimulating liniments, it sometimes induces erysipelatous inflammation.

Liniment of Soap. — Take of Soap, three ounces; Camphor, an ounce; Spirit of Rosemary, sixteen fluid ounces. Dissolve the camphor in the spirit, then add the soap, and digest in a gentle heat till it is dissolved.

This, which resembles the *Opodeldoc* of Paracelsus, is an excellent liniment in rheumatic affections and local pains: the soap is itself a stimulant, and prevents rapid drying upon the part; the camphor and spirit stimulate, and the oil of rosemary gives it a pleasant odour. It is a good addition to other liniments; mixed with tincture of cantharides it is rendered more effectively stimulant and rubefacient; and with the addition of tincture of opium it forms one of the best sedative liniments.

In paralytic and chronic rheumatic cases, the following may be prescribed as a stimulating liniment:—

℞ Tincturæ Cantharidis, Linimenti Saponis, āā f℥j. Fiat linimentum.

Or,—

℞ Linimenti Camphoræ compositi, Linimenti Saponis, Olei Cajuputi, āā f℥j. Fiat linimentum stimulans.

The following are the usually prescribed sedative liniments:—

℞ Tincturæ Opii f℥j.; Tinctur. Camphoræ f℥ij. Fiat linimentum anodynum.

℞ Tincturæ Opii f℥j.; Linimenti Saponis f℥iij. M. ft. linimentum opiatum.

Camphor, in the proportion of one drachm to an ounce of mercurial ointment, is a good discutient.

CANCER. The *Crab. Chelæ Cancrorum.* The *claws* of the *Cancer pagurus*, or black-clawed crab. *Lapilli* or *oculi cancrorum:* the concretions found in the stomach of the *Cancer astacus*, or crawfish, commonly called *crab's eyes.*

Mr. Hatchett found the crustaceous coverings of crabs and lobsters to consist of about 63 *per cent.* of carbonate of lime, 6 of phosphate of lime, with a little chloride of sodium and phosphate of magnesia, and 28 to 29 per cent. of animal matter, having the characters of indurated albumen. The crab's eyes are similarly composed; and

both these articles, when prepared by levigation, were formerly used as antacids and absorbents; they are now properly rejected, and prepared chalk is used as their substitute.

CANELLA. *Cortex.* The bark of the *Canella alba.* *Cl.* 11. *Ord.* 1. Dodecandria Monogynia. *Nat. Ord.* Meliaceæ.

The white, or laurel-leaved canella, is a tall straight tree, branched only at top; its bark is peculiarly whitish; the leaves stand alternately, and are placed upon short footstalks.

The bark of this tree is imported from the West Indies, generally in long-quilled pieces, of a pale-buff colour, an agreeable aromatic odour, and a warm pungent and somewhat bitter taste. The Materia Medica is already thronged with aromatics, and canella bark has nothing to recommend its preference. It contains volatile oil, bitter extract, and a portion of a peculiar saccharine matter which has been called *canellin.* In doses of ten grains to half a drachm, it is said to have been serviceable in cases of scurvy.

The only officinal preparation in which it forms an ingredient is the *Vinum Aloes.*

CANTHARIS. (Κανθαρις, Aristotle.) *Cantharis vesicatoria.* The Blistering Fly. Spanish Fly. Cantharides. The *Meloe vesicatorius* and *Lytta vesicatoria* of some writers.

We are chiefly supplied with cantharides from Astracan and Sicily, whence they are imported in casks and chests. They are, however, common in Italy and parts of France, being found on the privet, ash, elder, lilac, white poplar, and Tartarian honeysuckle; but it is only in warm climates that they attain perfection as vesicants, and their disagreeable odour and destructive habits are no inducements for their cultivation. Many are now brought to the United States by the way of St. Petersburgh, in Russia. They are collected early in the morning, by shaking the branches upon which they cluster, a service performed by men who are protected by masks and gloves; they are received upon cloths, and killed by exposure on sieves to the fumes of boiling vinegar; they are then dried in stoves.

Cantharides should be dry, and free from mould and dust, of a peculiar but not very strong nauseous odour, brilliant colour, and not mixed with other beetles, which is frequently the case to a great extent, especially with the *Melolontha vitis,* which may be distinguished by its black feet, and more square form. They may be kept for any length of time in a dry place, and secured from air; but they are very liable, notwithstanding their acrimony, to the attacks of small insects, which gradually reduce them to dust, without, however, materially affecting their activity.

When a watery extract of cantharides is digested in alcohol, a tincture is obtained, which, by slow evaporation, yields a resinous residue; if this be digested in ether, it forms a yellow solution; by spontaneous evaporation, it deposits crystalline plates, which are soluble in boiling alcohol, but precipitate as the solution cools. This, which is said to be the acrid principle of these insects,

is associated with other varieties of inert fatty matter, with uric acid, and the phosphates of lime and magnesia (*Robiquet, Journ. de Chim. et Med.*, iv. 354). Robiquet calls it *cantharadin.*

When taken internally, in doses not exceeding a grain, cantharides prove violently stimulant to the urinary and generative organs; their effects are usually sudden, and sometimes difficultly counteracted, and the diseases in which they have been administered often admit of a less objectionable system of treatment: to these effects we shall presently refer more in detail.

Applied externally, in the form of the *Emplastrum Cantharidis,* they stimulate and redden the skin, and afterwards excite a serous discharge from the exhalant vessels, which raises the cuticle in a blister: and this they do more certainly and effectually than any other substance. Though the application of blisters is often thought little of, some discernment is necessary in their use, for they sometimes excite irritation, restlessness, and fever, and prove more prejudicial than useful; sometimes they heal with difficulty, and have even produced troublesome and dangerous sores; sometimes the urinary organs are violently affected by absorption; and sometimes erysipelas is brought on to an alarming extent.

For the rules which ought to guide us in the employment of blisters in diseases, *see* Epispastics.

In applying blisters care should be taken to attach them to the part by a proper rim of adhesive plaster, for awkward accidents have sometimes happened from their changing their place; they should not, however, be bandaged down. A blister plaster should be removed as soon as the vesication is perfect, which usually requires from eight to twelve hours; and in children and females in less time. I have seen a perfect blister rise in two hours on a child. If urinary irritation is complained of, diluent and mucilaginous drinks of any kind should be freely administered.

Gauze, or silver paper which is preferable, should cover the blister and intervene between the latter and the skin; and so soon as a decided sense of smarting is felt the blister should be removed and dressed with cerate, or with bread and milk poultice.

It is not exactly known upon what the activity of the Spanish fly depends; its active constituents are dissolved both by alcohol and by water; hence the tincture of cantharides is often added to increase the energy of stimulating liniments.

The following are the preparations of cantharides in the London Pharmacopœia:—

Tincture of Cantharides.—Take of Cantharides, bruised, four drachms; Proof Spirit, two pints. Macerate for fourteen days, and strain.

This tincture is chiefly employed as an external stimulant and rubefacient, and with that intention is mixed with soap and camphor liniments. Dr. A. T. Thomson recommends a rag moistened with it as a useful application "in that peculiar species of mortification of the extremities which sometimes happens without any

apparent cause; and to frost-bitten parts." Diluted with water it has been used as an injection in the cure of fistulous sores. It is occasionally prescribed in the dose of from ten to thirty drops twice a day, in leucorrhœa, gleets, atonic dropsy, epilepsy, and in defective action of the *sphincter vesicæ*, but its internal use always requires great caution.

Plaster of Cantharides.—Take of Cantharides, in very fine powder, a pound; Plaster of Wax, a pound and a half; Lard, half a pound. To the plaster and the lard, melted together and removed from the fire, a little before they concrete, sprinkle in the cantharides, and mix all of them.

Cerate of Cantharides.—Take of Cantharides, in very fine powder, an ounce; Cerate of Spermaceti, six ounces. To the cerate, softened by fire, add the cantharides, and mix.

Ointment of Cantharides.—Take of Cantharides, in very fine powder, an ounce; Distilled Water, four fluid ounces; Cerate of Resin, four ounces. Boil down the water with the cantharides to one half; mix the cerate with the strained liquor; then let it evaporate to a proper consistence.

Of these preparations, the first has been sufficiently adverted to above; it is questionable whether the flies should be reduced to an extremely fine powder, as it is stated, upon practical authority, that when rather coarse than otherwise, the operation of the plaster is more certain, as a vesicant, and less apt to affect the urinary passages.

A neat and convenient preparation is an *ethereal extract of cantharides*, obtained by the action of sulphuric ether on the powder of cantharides. Portions of blotting paper of various sizes are imbibed with the extract, and form so many blisters. Blistered surfaces may be kept running by applying to them extract of cantharides mixed with yellow wax in the proportion of the former of $\frac{1}{10}$th to $\frac{1}{20}$th.

The *Ceratum Cantharidis* is intended as an active dressing to keep open the discharge from a blistered surface; and the *Unguentum Cantharidis*, in which the flies are not applied in substance, is a milder application for the same purpose; but when a blister is to be kept open, it should, if possible, be effected by some other irritant, such as savine ointment; or what is preferable, apply the blister to a fresh surface.

CANTHARIS VITTATÆ. Potato Fly.

This fly, called also *lytta vittata*, is found both in the United States and in South America, and also in the northern parts of Asia. Experience shows it to possess all the vesicating properties and the effects following the internal administration of the European fly, or that which is in common use. It is smaller than the latter, and its elytra, or wing cases, are black, with a yellow stripe and margin.

There is another variety of indigenous blistering fly, the *meloe Pennsylvanicus* of Linnæus, not more than half the size of that just described. Like it, however, the meloe lives on the potato vine, in which the animals are often found in large quantities in the month of August. The uncertainty of supply, varying as our

home cantharides do so much in quantity from year to year, must, at any rate for some time, until the habits of the animal are better known, prevent their supplanting the European kind in the market.

The quantity of cantharides likely to produce dangerous or fatal results, appears liable to much idiosyncratic uncertainty. In some instances, doses not exceeding those which are considered safe in its medicinal employment, have been followed by alarming consequences; and, on the other hand, a case has been quoted by Dr. Beck, in which six ounces of the tincture were taken without injury. At all events, the internal use of cantharides, whether in powder or tincture, requires the utmost circumspection, and should only be resorted to in cases of extreme necessity. The *treatment* of poisoning by cantharides may be summed up in a few words. Vomiting should be encouraged, or induced by emetics; the strangury should be relieved by demulcent and camphorated injections; leeches and bloodletting adopted, as may be required; the warm bath is a very useful auxiliary; oil and oleaginous mixtures are either useless or even injurious. Camphor and demulcents are preferable.

CAPSICUM (from καπτω, *I bite*). *Baccæ.* The berries of the *Capsicum annuum. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ.

This annual plant is a native of both the Indies, and common in our gardens, flowering in July. The fruit of the *Capsicum baccatum*, or *bird pepper*, is often substituted for it in pharmacy. It is more pungent; the pods are small, shrivelled, and of a dingy-red colour.

Capsicum has been introduced into the Materia Medica on account of its powerfully stimulating qualities. Many varieties of capsicum probably enter into the composition of *Cayenne pepper*, which consists of their powder, mixed with a very variable proportion, but often about half its weight, of common salt. Other adulterations are practised upon it, such as the addition of coloured saw-dust, and, according to some, of red lead; the latter fraud is very easily detected, by the rapidity with which it sinks in water through which the pepper is diffused, or by digesting it in dilute nitric or in acetic acid, and then applying to the filtered solution the usual tests for the detection of lead, such as sulphuretted hydrogen, and sulphate of soda — the former giving a black, and the latter a white precipitate.

A peculiar principle, called *capsicin*, has been procured from the capsicum by Bucholz.

The best form for exhibiting capsicum is in pills, mixed with bread crumb, and of the genuine pepper from three to eight grains may be called a dose. The complaint in which it is most useful is flatulent dyspepsia. It has of late years been used in yellow fever and in analogous states of the system, with prostration and irritable stomach. It is also considered as a good adjunct to cinchona, in the treatment of some forms of ague, and has been prescribed in the advanced stages of acute rheumatism. As a gargle, it furnishes

a valuable remedy in some kinds of sore throat, more especially in the milder forms of ulcerated sore throat. An infusion of the berries may be used as follows : —

℞ Capsici Baccarum contus. gr. x. ; Aquæ ferventis, f℥viij. Infunde per horas duas et cola.

℞ Colati Liquoris f℥vij. ; Mellis Rosæ, Tinctur. Myrrhæ, āā f℥ss. M. fiat gargarisma frequenter utendum.

An infusion, with the addition of common salt and vinegar, makes a good gargle.

A cayenne-pepper poultice is often used in the West Indies as a rubefacient, and as a counter-irritant in the delirium of fever, and persons who complain of cold feet have found comfort from wearing socks dusted with cayenne pepper.

CARBO ANIMALIS. *Carbo ex carne et ossibus coctus.* CARBO LIGNI. *Carbo e ligno coctus.* Animal Charcoal prepared from flesh and bones. Charcoal of wood.

The animal charcoal which is produced by the combustion of flesh, is comparatively pure with that obtained by burning bones ; the latter, however, is the article which usually occurs under the name of *animal charcoal ;* according to the kind of bone from which it has been procured, it contains more or less of earthy salts, chiefly phosphate of lime ; this may be removed by the action of hydrochloric acid, and when bones have been well burned in close vessels, and afterwards reduced to powder and digested in dilute hydrochloric acid, the remaining charcoal is sufficiently pure. There is, however, but little of it obtained, and flesh of any kind is too expensive to be extensively employed.

The *charcoal of wood* is procured by burning different kinds of wood with the imperfect access of air, and when the volatile matters are expelled, and the heap no longer emits smoke, the air-holes are closed, and the pile is allowed to cool. As wood of different size and quality is employed, common charcoal is of variable character, and often imperfectly carbonised ; its ash is always alkaline, from the presence of carbonate of potassa. There is also a large quantity of charcoal, generally of a superior quality, prepared by gunpowder-makers, and by the distillers of pyroligneous acid ; for these purposes, the carbonization is carried on in iron cylinders, and the volatile products, among which are tar, water, acetic acid, and acetic spirit, are carefully condensed.

Properties.—Among the most remarkable properties of charcoal, is its power of destroying the colour, smell, and taste of many organic products ; thus, when coloured infusions are filtered through it, they are not unfrequently rendered colourless, and hence its pharmaceutical applications in the preparation of some of the alkaloids and their salts (see *Aconitina*, *Morphiæ Hydrochloras*, *Quiniæ Disulphas*, &c.), and its use upon an extended scale in some of the arts, more especially in the refining of sugar. It also removes the disagreeable odour and flavour of putrescent substances, and restores, to a certain extent, their characters of

freshness. Foul water, filtered through charcoal, is rendered insipid and pellucid, — whence its use in filtering machines. These curious effects are more easily obtained by the use of animal than of vegetable charcoal, especially as relates to the destruction of colour, a difference depending, according to the experiments of Bussy (*Journal de Pharmacie*, Juin, 1822), on its porosity, no hard or brilliant charcoal being effective.

The *medical uses* of charcoal are not very important. It is placed by most writers among the *antiseptics*, and has been administered in the doses of twenty to sixty grains, to correct the offensive eructations that occur in some cases of dyspepsia. But these annoying eructations generally follow certain kinds of food only, and these should be avoided. It is recommended in dysentery. Mixed with the common poultice, it is said to be useful in foul and gangrenous sores. It is often recommended as an ingredient in tooth-powder, for which purpose it is mixed with chalk, and small portions of rhatany powder, or of kino or catechu. According to Dr. Paris, the article sold as a tooth-powder under the name of *prepared charcoal*, is prepared chalk rendered gray by the addition either of powdered charcoal, or of lamp-black. The objection to these otherwise harmless applications of charcoal, is its smuttiness, especially when it is used alone; otherwise it certainly well cleanses the teeth.

Charcoal or carbon, as a chemical element, is of the highest interest and importance; its identity with the diamond is proved by that of the results of their combustion in oxygen, both of them yielding, when pure, no other result than carbonic acid. The diamond, however, is probably the only known form of absolutely pure carbon. Carbon is an essential element of all organic matter, being associated with all forms of living beings. It forms *carbonic acid gas* when saturated with oxygen, as when burned with the free access of air, or in excess of pure oxygen gas; in certain cases of imperfect combustion, it yields a distinct and inflammable gaseous compound, *carbonic oxide*.

At all common temperatures and pressures, free carbonic acid exists as a gas; but, according to the experiments of Faraday, it is liquefiable at the temperature of 32° by a pressure equivalent to that of thirty-six atmospheres (*Phil. Trans.*, 1823), and it has been obtained in a concrete form by Thilourier (*Ann. de Chim. et Phys.*, LX., 427), by Dr. J. K. Mitchell, and others. The specific gravity of carbonic acid gas is to that of air as 152 to 100, and to that of hydrogen as 2200 to 100. The weight of 100 cubical inches, at mean pressure and temperature, is 47·3 grains. The equivalent of carbon is = 6: and assuming carbonic acid as constituted of 1 atom of carbon in combination with 2 of oxygen, the following will represent its composition:—

	Atoms.	Equivalents.	Per Cent.
Carbon	1	6	27·27
Oxygen	2	16	72·73
Carbonic Acid	1	22	100·00

Carbonic acid is often employed medicinally in the form of water impregnated with it, either alone, or with alkalis, as in the *Liquor Potassæ effervescens* and *Liquor Sodæ effervescens* of the Pharmacopœia (*see* POTASSA, and SODA). The effervescing saline draught is also a useful form of carbonic acid; and there are many of the sparkling mineral waters which derive much of their efficacy from the large quantity of free carbonic acid which they hold in solution. All these forms of carbonic acid are refreshing, exhilarating, and sedative to the stomach, and are often very effective in allaying nausea and vomiting, and relieving some of the most troublesome cases of dyspepsia. The highly carbonated waters, if drunk in excess, occasion giddiness and intoxication; and champagne, and similar sparkling wines, which are remarkably rapid in their inebriating effects, owe much of their power to free carbonic acid, for they are less active when the gas has escaped. In some morbid conditions of the urine, and in cases of phosphatic diathesis, water impregnated with carbonic acid may be advantageously used as common drink; it often agrees with the stomach, and relieves the symptoms when the more powerful acids irritate and disagree.

An important part of the medical history of carbonic acid, relates to its effects as a *poison*. When a person is immersed in an atmosphere of carbonic acid gas, he is suffocated; the glottis is spasmodically closed, and the access of air to the lungs as effectually prevented as by immersion in water. But when the carbonic acid is more or less diluted by air, and when the gas has actual access to the blood, the effects are perfectly distinct, and resemble those of a narcotic poison. Cases of the former kind occur in breweries, when persons inadvertently go into a vat from which the carbonic acid has not been expelled; and miners and well-diggers are sometimes suffocated in the same way, by incautiously descending shafts or wells in which the gas has been suffered to accumulate; the term *choke damp* is in these cases applied to this gas; and the simple precaution of letting down a lighted candle indicates the danger by its extinction, for no person can breathe where a candle will not burn.

The gradual poisoning by carbonic acid is also no uncommon occurrence. The most frequent cases are those occasioned by the employment of *brasiers*, or open charcoal fires, for the purpose of airing cold or damp rooms, where the ventilation is imperfect, or where there is no chimney. Even small chauffers of charcoal cannot be used without risk; and carbonic oxide, and carburetted hydrogen, the other occasional products of burning charcoal, are equally deleterious with carbonic acid. Oppressed respiration, palpitation, faintness, vertigo, tightness about the temples, and final insensibility, appear to be the symptoms which the respiration of diluted carbonic acid produces. Some have described an agreeable drowsiness as the first effect, followed by faintings. The following

abstract of a case, by Dr. Babington, is quoted by Dr. Christison, as illustrative of the advanced symptoms:—

"The waiter of a tavern, and a little boy, on going to bed, left a chauffer of burning coal beside it, and next morning were found insensible. The boy died immediately after they were discovered. The waiter had stertorous breathing, livid lips, flushing of the face, and a full strong pulse, for which affections he was bled to ten ounces. When Dr. Babington first saw him, however, the pulse had become feeble, the breathing imperfect, and the limbs cold; the muscles were powerless, and twitched with slight convulsions; the sensibility gone, the face pale, the eyelids closed, the eyes prominent and rolling, the tongue swollen, and the jaw locked upon it, and there was a great flow of saliva. The employment of galvanism at this time caused an evident amendment in every symptom; but it was soon abandoned, because each time it was applied the excitement was rapidly followed by a corresponding depression. Cold water was then dashed upon him, ammonia rubbed on his chest, oxygen thrown into the lungs, and, through these and other means, a warm perspiration was brought out, and his state rapidly improved. He was nearly lost, however, during the subsequent night, by hemorrhage from the divided vein; but next day he was so well that he could even speak a little. For two days afterwards the left side of the face was paralyzed, and his mental faculties were somewhat disordered."

Analogous to these cases of poisoning are those in which persons have been crowded together in a confined space. In the instance of the *Black Hole* at Calcutta, one hundred and forty-six individuals were imprisoned in a room twenty feet square, with only one small window, and before the next morning one hundred and twenty-three died under the most horrible sufferings. The oppressed respiration, faintness, and excessive anxiety, which delicate persons frequently experience in crowded rooms, where many lights are burning, and where the ventilation is insufficient, are the incipient symptoms of similar cause.

The *post mortem* examination of persons who have died from carbonic poisoning, generally shows fulness of the cerebral vessels, and occasional effusion of blood in some part of the brain. The countenance is described in most cases as pale and placid. Careful bloodletting from the arm or head, and occasional cold affusion, with active friction, is the leading plan of treatment, as respects the primary symptoms.

CARDAMINE. *Flores.* The flowers of the *Cardamine pratensis. Cl.* 15. *Ord.* 2. Tetradynamia Siliquosa. *Nat. Ord.* Cruciferæ.

This plant is known under the name of *Cuckoo Flower*, or *Lady's Smock;* the term *Cardamine* is said to be derived from καρδια, *the heart*, and to imply its cordial and strengthening qualities.

The flowers dried have been given in doses of from one to three

drachms, in several spasmodic and convulsive diseases; but they are of too doubtful efficacy to require detailed notice. The flavour of water-cress predominates in the whole plant, and the leaves are sometimes used in salad.

CARDAMOMUM. *Semina.* The seeds of the *Alpinia cardamomum.* *Cl.* 1. *Ord.* 1. Monandria Monogynia. *Nat. Ord.* Scitamineæ.

The cardamom tree is a native of India; it is about twelve feet high; it has a jointed, tortuous, fibrous root; the stems are round, smooth, and about an inch thick; the leaves alternate, sheathing, broad, green, and striated; they have an aromatic taste and smell; the flowers are in racemes, sent off from the root, and creep along the ground.

The seeds, contained in their capsules or pods, are imported from Bengal, in cases of about 1 cwt. each; those which are small, broad, and heavy, are preferable to the longer kinds, which contain fewer seeds, and less closely packed; the capsules are insipid, but the seeds (which are sometimes found in trade out of the capsules) are pungent and aromatic.

Martius obtained 76 grains of essential oil from four ounces of seeds. Their chief use is in combination with other remedies, especially cathartics and bitter tonics; thus we find them in the *Extractum Colocynthidis compositum*, and in the *Tinctura Rhei*, and *Tinctura Sennæ*, of the Pharmacopœia.

CARMINATIVES. (From *Carmen*, a verse or *charm.*) This term is generally applied to medicines which allay pain and flatulency of the stomach and bowels; they are chiefly aromatics.

CARUI. *Fructus.* The *fruit* of the *Carum Carui.* *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

What is here termed *Carui fructus*, is usually known under the name of *Caraway seed*, so called, it is said, from *Caria*, a province of Asia, whence it was first obtained.

The principal consumers of caraway-seed are the confectioners and gingerbread-bakers. Their agreeable aromatic warm flavour is derived from the presence of essential oil, which they yield, on distillation, in the proportion of about three per cent. They are usefully added to purgative remedies to prevent griping; and are sometimes administered in colic and flatulency, in the form of powder, the dose of which is from twenty to sixty grains. The distilled oil, spirit, or water, are, however, generally substituted for the seed in substance.

The *Aqua Carui* of the Pharmacopœia is directed to be prepared in the same way as *Aqua Anethi*, namely, by the distillation of a pound and a half of bruised seed, seven ounces of proof spirit, and two gallons of water; one gallon is to be distilled. It is a good vehicle for magnesia, or for sulphate of magnesia, in small aperient doses; it may also be used as a carminative for children who are troubled with flatulency—a tea or dessertspoonful being given occasionally, slightly sweetened.

The essential *oil of Caraway* has a place among the Olea Des-

TILLATA of the Pharmacopœia ; it is often added to cathartic pills, and occasionally to powders, in the dose of one or two drops.

CARYOPHYLLUS. *Flores nondum explicati, exsiccati.* CLOVES. The unexpanded flowers, dried, of the *Caryophyllus aromaticus. Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Myrtaceæ.

CARYOPHYLLI OLEUM. Oil of Cloves. *Oleum e floribus destillatum.* The oil distilled from the flowers.

The clove tree is a native of the Moluccas.

Cloves are imported from the Dutch settlement in India in chests and bags. They are of a rich brown colour, a very fragrant aromatic odour, and hot and acrid upon the tongue. A portion of oil exudes from their broken surface, when gently pressed by the nail. The inferior varieties are dark, shrunk, and less warm and odorous; they are said to be mixed with cloves from which the oil has been extracted. Good cloves yield, on distillation, about one-sixth their weight of essential oil ; but the proportion and quality of the oil varies with the quality of the spice.

According to Lodibert (*Journ. de Pharm.* XI., 101), a crystallisable substance is separable from the finest Oriental cloves, by the action of cold alcohol ; it is described under the name of *caryophyllin*, as a species of camphor.

The *essential oil of cloves* is largely distilled in many of our pharmaceutical laboratories ; in the Pharmacopœia it is placed in the list of the Materia Medica. It is pungent and aromatic, but wants the fragrancy of the clove itself.

Cloves are a good stimulating aromatic, and of frequent use as a condiment, improving the flavour of insipid food, and stimulating digestion ; they render bitter and aperient medicines more agreeable, both to the palate and stomach, and the simple infusion is a grateful stomachic in dyspepsia, chronic gout, and flatulent colic.

Infusion of Cloves. — Take of Cloves, bruised, three drachms ; Boiling distilled Water, a pint. Macerate for two hours, in a vessel lightly closed, and strain.

A distilled water of cloves has a place in some Pharmacopœiæ, but pimenta water may be in all cases substituted for it.

Oil of cloves is chiefly employed as an addition to purging pills and powders, preventing flatulency and griping ; one or two drops is a dose. It is also used to relieve toothache.

CASCARILLA. *Cortex.* The bark of the *Croton Eleuteria. Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Euphorbiaceæ.

This tree, from which the cascarilla bark of commerce is supposed to be obtained, is a native of the Bahama Islands, Jamacia, and St. Domingo. It is not more than twenty feet high, and branching at top. A viscid balsam oozes from the broken shoots.

Cascarilla bark is principally imported from Eleutheria, one of the Bahama Islands. It occurs in quilled and broken pieces ; it has a short and resinous fracture, and is of a deep brown colour in the interior. Its odour is aromatic ; it is easily inflammable, and

when burnt it exhales a strong, musky odour, which is very peculiar. Its taste is aromatic, warm, and bitter. Stale, inodorous, and merely bitter cascarilla, and that which is very small and dusty, is to be rejected.

Infusion of Cascarilla. — Take of Cascarilla, bruised, an ounce and a-half; Boiling distilled Water, a pint. Macerate for two hours, in a vessel lightly closed, and strain.

The term *Cascarilla* is the diminutive of the Spanish word *cascara*, or *bark*, and at one time a variety of barks employed in medicine were similarly designated. It was first employed in Germany as a febrifuge and general tonic, and as a substitute for cinchona in the cure of intermittents; but to such merit it has no claims; it is a very useful aromatic and stimulant bitter, and especially useful in atonic and flatulent dyspepsia, in the after-treatment of diarrhœa, and mild forms of dysentery, and cholera.

The *infusion* is by far the best form in which cascarilla can be administered. It may be employed as a vehicle for powdered Peruvian bark, and for small doses of sulphate of magnesia and sulphuric acid, in debility of stomach attended by constipation; and in acidity of the *primæ viæ*, for carbonate of ammonia.

The following are formulæ fulfilling these intentions :—

1. ℞ Infusi Cascarillæ f℥j.; Infus. Rosæ compos. f℥ss.; Magnes. sulphatis ℥j.; Acid Sulphur. diluti ♏v. M. fiat haustus bis die sumendus.
2. ℞ Infusi Cascarillæ f℥iss.; Cinchonæ lancif. pulv. ℈j. M. fiat haustus.
3. ℞ Infus. Cascarillæ f℥vss.; Spirit. Ammoniæ compos. ℥ij. M. Capiatur cochlearia iij. ampla pro re natâ.

CASSIA. *Leguminum pulpa.* The pulp of the pods of the *Cassia fistula.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Leguminosæ. (*Cathartocarpus fistula* of Necker.)

This species of cassia is a native of Egypt and of the East and West Indies, and flowers in June.

In sufficient doses it acts briskly upon the bowels, but is apt to gripe and create flatulency: from two to six or eight drachms is the average dose. It forms an ingredient in the *Confectio Sennæ* (*see* Senna), and in the following formula of the Pharmacopœia, which is sometimes administered as a laxative to children, in the dose of two or three drachms.

Confection of Cassia. — Take of Cassia (*pulp*), half a pound; Manna, two ounces; Tamarind (*pulp*), an ounce; Syrup of Roses, eight fluid ounces. Bruise the manna, then dissolve it in the syrup; afterwards mix the cassia and tamarind (*pulps*), and evaporate the moisture, till a proper consistence is attained.

CASSIA MARILANDICA. American Senna. *Folia.* The leaves.

This is a shrubby plant found in various parts of the United States, and is cultivated, says Dr. Thatcher, in gardens for medicinal purposes. "The stalks rise to four or five feet in height, and their summits are covered in July and August with brilliant yellow flowers. The Cassia Marilandica possesses nearly the same virtues as the Alexandrian, but is inferior to it in point of purgative properties, in the proportion of about one-third. The leaves, when

dried, are the part employed, and the form of administration is by infusion, in the proportion of half an ounce to a half pint of water, which may be considered as an average dose for an adult. There is the same deduction from its utility as in the case of the common kind of senna, viz., its tendency to gripe, which may be in degree prevented by the addition of the root of glycyrrhiza, or by some carminative seed. It may be used in combination with salts and manna, or with jalap."

The leaves of the American senna, according to Dr. Bigelow, abound in resin, and have also some extractive and volatile matter.

CASTOREUM. *Castor* (γαστωρ, a big-bellied animal). *Castor fiber. Concretum in folliculis præputii repertum.* A concrete found in the follicles of the prepuce of the beaver.

These follicles contain about an ounce and a half, or two ounces, of a brown, viscid, fetid substance; they are usually cut off and dried, when their contents become indurated and pulverulent.

Two varieties of castor are met with; one from Russia, Prussia, and Poland, and now scarcely to be obtained: the pods are large and firm, their contents dry, of a brown colour, pulverulent, of a peculiar odour, and a bitter taste; the other is imported from Canada, and is the only variety now found in the drug market: the pods are flatter and smaller than the former, and their contents are of a yellowish colour, of a resinous appearance, and faint nauseous odour; or sometimes soft, viscid, and fetid; sometimes black and insipid. The yellow resinous kind is usually preferred. But although castor has been extolled as an antispasmodic, its virtues have always been deemed equivocal, and the uncertain composition and quality of the article, as it now occurs in trade, should have rejected it from the Pharmacopœia.

The fat and the blood of the beaver were formerly highly esteemed on account of their supposed medicinal efficacy, but have long been disused; there can be no doubt that the nastiness with which the drug-trade now supplies the apothecary, under the name of castor, is equally inefficient. The dose in which this article is to be administered, is variously stated as from *five* to *twenty* or *thirty grains*, and half an ounce has been given with no other inconvenience than that of nausea.

Tincture of Castor. — Take of Castor in powder, two ounces and a half; Rectified Spirit, two pints. Macerate for fourteen days, and strain.

CASTOR OIL, *see* Ricini Oleum.

CATAPLASMA (καταπλασσειν, to spread over). A poultice, or cataplasm.

Poultices are for the most part emollient and soothing applications to inflamed and irritable parts; their action is often merely dependent upon warmth and moisture; in other cases it is of a more specific character, as when they contain sedative or stimulating ingredients. Common farinaceous poultices, such as bread softened by soaking in boiling water, or bread and milk, or linseed poultice, are the usual emollients of this class. The plain bread

and water poultice is scarcely tenacious enough to admit of convenient application, but the addition of a little flour and water, in the form of paste, or of a small quantity of linseed meal, renders it so. The bread and milk poultice is often a peculiar soothing remedy; it should be made with fresh milk, and renewed at least every twelve hours, though its occasional acescency is of little consequence. The following "cataplasmata" are retained in the late edition of the *London Pharmacopœia*:—

Cataplasm of Hemlock.—Take of Extract of Hemlock, two ounces; Water, a pint. Mix, and add Linseed, bruised, a sufficient quantity to produce a proper consistency.

This poultice sometimes allays pain in irritable ulcerating sores, and even in those of a cancerous character; but it occasionally proves rather irritating than otherwise, so that it requires caution in its application. It has also been applied to scrofulous glandular tumours.

Cataplasm of Yest.—Take of Flour, a pound; Yest of beer, half a pint. Mix, and apply a gentle heat, till they begin to swell.

The intumescence of this poultice depends upon the evolution of carbonic acid, to which the efficacy of the application is generally ascribed; it is represented as accelerating the sloughing of sores, and correcting the fœtor of foul ulcers.

Cataplasm of Linseed.—Take of boiling Water, a pint; Bruised Linseed, as much as may be sufficient to produce a proper consistence. Mix.

This poultice is frequently made with linseed meal, from which the oil has been expressed, and is then apt rather to irritate than to soothe; when prepared with freshly powdered seed, it is an oily and almost unctuous application, and of a good consistence.

Some surgeons regard poultices as nasty and useless if not injurious applications, and prefer warm and wet cloths to the part, covered with oil silk, to prevent the escape of moisture.

Cataplasm of Mustard.—Take of Linseed, Mustard seed, each, in powder, one pound; Hot Vinegar, a sufficient quantity to produce the consistency of a cataplasm.

In cases of apoplexy and coma, this stimulating poultice is sometimes applied to the soles of the feet or to the calves of the legs, with a view of producing a revulsion, or counter-irritation of those distant parts; it has been similarly used in the low stage of typhous fever, where oppression of the brain is indicated by stupor or delirium.

Owing to the uncertain strength of the mustard flower, it is better, in violent cases, to make the cataplasm of it alone, moistened with vinegar.

As an application to foul and fetid ulcers and gangrenous sores, the *Cataplasma Chlorinata* of the hospitals deserves a place among these formulæ. It is made by the addition of a properly-diluted solution of *chloride of lime*, or *chloride of soda*, to a cool bread and water poultice, thickened by a little linseed meal.

CATECHU (from *kate*, a tree, and *chu*, juice: Japanese).

Ligni extractum. The *extract of the wood* of the *Acacia Catechu.* *Cl.* 23. *Ord.* 1. Polygamia Monœcia. *Nat. Ord.* Leguminosæ.

This tree, which is a native of the mountainous parts of Hindostan, flowers in June; it is about twelve feet high, and one in diameter, and covered with a rough brown bark.

The extract of catechu, formerly called *Terra Japonica*, and considered as of mineral origin, is imported from Bengal and Bombay; it is termed *cutch;* two varieties are found in the drug market; one in cubic pieces, of a pale reddish-brown colour, pulverulent, and of an astringent taste, accompanied by a slight sweetness; the other resinous, brown, and more astringent and bitter. In composition these varieties closely resemble each other.

Catechu is almost entirely soluble in water, and in proof spirit, and is one of the best vegetable astringents of the Materia Medica. It is the basis of the following formula:—

Compound Infusion of Catechu. — Take of Catechu, in powder, six drachms; Cinnamon, bruised, a drachm; Boiling distilled Water, a pint. Macerate for an hour in a highly-covered vessel, and strain.

Catechu is available wherever astringents are indicated. In the treatment of common diarrhœa, connected with acidity in the stomach, after the administration of an aperient, two or three tablespoonsful of the following mixture, or one of the annexed powders, will prove effective:—

℞ Misturæ Cretæ f℥vss.; Tincturæ Catecheu f℥vj. Misce.

℞ Pulv. Cretæ comp. cum Opii ℈j.; Pulv. Catechu gr. x.; Misce: fiat pulvis post singulas sedes liquidas sumendus.

In cases of relaxed uvula, and as a preventive of hoarseness arising from local relaxation, catechu lozenges, or an infusion of catechu used as a gargle, may be advantageously resorted to; the former are especially useful to public speakers, and singers, who often suck a morsel of catechu itself for the purpose of clearing and strengthening the voice. Where the gums are spongy, Dr. Paris recommends the following as a tonic dentifrice:—

℞ Cinchonæ Lancifol. Pulv. Catechu Extract. Pulv. āā ℥ss.; Pulv. Myrrhæ ℥ij. M.

Dr. Thomson states that the following ointment is in great repute in India, as an application to ulcers:—Four ounces of powdered catechu, nine drachms of alum, four ounces of white resin, and ten ounces of olive oil, with a sufficient quantity of water. (*Lond. Disp.*)

CENTAURIUM. *Centaury* (from κενταυρος, *Centaur:* Chiron having cured wounds with it). *Erythræa Centaurium.* *Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Gentianeæ.

Centaury is inodorous, and bitter; the summits being, according to some, more bitter than the rest of the plant. It is an unnecessary incumbrance to the Materia Medica, being very rarely prescribed, and seldom found in the apothecaries' shops. It is a simple bitter, for which gentian may always be substituted. Its vermifuge qualities are imaginary.

The *American Centaury* (*Sabatia Angularis*,) is described by Dr. Chapman to be a purer and stronger bitter than the European species. It should be prescribed in strong infusion, of which repeated draughts are to be taken,—in the circumstances in which bitters are indicated; of these, we may mention dyspepsia, intermittent fever, and chronic rheumatism.

CERATA. Cerates. (From *Cera*, Wax.)

Cerates are unctuous preparations for external use, intermediate in consistency between plasters and ointments. They are mostly liable to become rancid by long keeping, and hence should always be used recently prepared.

The simple cerate (CERATUM) of the Pharmacopœia, which is made by mixing four fluidounces of olive oil with four ounces of melted white wax, is a good vehicle for other applications, and when spread on lint or soft linen, is an inert cooling dressing.

The other cerates are elsewhere described.

CEREVISIÆ FERMENTUM. The Yest of Beer. Barm.

The froth or scum which collects upon the surface of beer during the process of the fermentation of the wort is apparently derived from the albumino-glutinous parts of the grain, and is highly effective in promoting the vinous fermentation of saccharine liquors. It is generally used in its recent and moist state, but it preserves its qualities when carefully dried. It soon runs into putrefaction at common temperatures, absorbing oxygen, evolving carbonic acid, acquiring a fetid odour, and becoming sour from the formation of acetic acid. Its occasional bitterness is derived from the hop.

The *yest poultice* (see page 125) has already been adverted to; yest has also been administered internally as a tonic and antiseptic, but its virtues are of a very doubtful character.

CETACEUM (from *Cete*, a whale). Spermaceti. *Concretum in propriis capitis cellis repertum.* A concrete found in peculiar cells in the head of the spermaceti whale, *Physeter macrocephalus.*

This species of whale chiefly inhabits the Southern Ocean.

As an internal remedy, spermaceti is not more efficacious than the common fixed oils; it is occasionally administered in the dose of half a drachm to two scruples, rubbed down with the yolk of an egg, especially to women in childbed. Its principal use is as an ingredient in ointments.

CETRARIA. *Cetraria Islandica.* Liverwort. Iceland Moss. *Cl.* 24. *Ord.* 5. Cryptogamia Algæ. *Nat. Ord.* Lichenaceæ.

This species of lichen is abundant in Iceland, and more or less common over the north of Europe; it grows two or three inches high; the frond is dry, coriaceous, lobed and notched; the surface smooth, shining, and blistered; the margins are beset with minute rigid hairs; the colour yellowish and grayish-brown.

The active component parts of *Iceland moss* are a bitter matter, and a peculiar modification of mucilage. The former may be separated by digestion in cold water, or by boiling for a few minutes; then, by a continued decoction, the mucilage is extracted. These

ingredients render Iceland moss somewhat tonic and nutritive; and when freed from its bitterness, it is used in Lapland as an article of food; it cannot, however, be admitted as having any pretensions as a specific in phthisis pulmonalis, though it may be a good palliative, as relates to the cough and diarrhœa. It has also been found serviceable in various cases of debility and emaciation.

The following decoction is the only officinal form of Iceland moss; it is given in the dose of from one to three or four ounces daily, and is generally mixed with milk; it is, however, nauseously bitter. The lichen, previous to use, should be picked, to free it from other mosses with which it is generally mixed:—

Decoction of Cetraria. — Take of Cetraria, five drachms; Water, a pint and a half. Boil down to one pint, and strain.

CHENOPODIUM ANTHELMINTICUM. *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Chenopodiaceæ. *Semina.* The seeds.

The Chenopodium, called commonly wormseed, or *Jerusalem oak*, is indigenous both to North and South America. It has a strong odour dependent on its essential oil, which is yielded freely by the seeds. The chenopodium is regarded as one of our best vermifuges, particularly in the lumbricoides of children. Sometimes the expressed juice of the whole plant is given in the *dose* of a *tablespoonful* to a child two or three years old: more commonly, however, the seeds reduced to a fine powder and mixed with melasses or other syrup are administered, in doses of *one* to *two scruples*, (for a child two or three years old,) early in the morning, before breakfast. Still more efficacious and of more uniform strength is the essential oil, the dose of which to a child, of the age already specified, is from two to five drops well incorporated with sugar or mucilage.

The name wormseed is applied in Europe to the *Artemesia santonica*, a very different plant from that now under notice.

CHIMAPHILA. Winter Green. Ground Holly. Pipsissiwa. *Chimaphila corymbosa.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Pyrolaceæ.

The *leaves* of this plant, the *Pyrola umbellata* of some other Pharmacopœiæ, are officinal. The *Chimaphila corymbosa* is native in America, and is also found in several parts of Europe; it grows in moist shady places, preferring a sandy soil; it is about six or eight inches high, and flowers in June.

The leaves of this plant are astringent and bitter; they contain, according to Dr. Wolff, 18 *per cent.* of bitter extractive, 2·04 of resin, 1·38 of tannin, and 78·58 of woody fibre. Its medical virtues are tonic and diuretic; it has been successfully administered in ascites, in acute rheumatism, and in various intermittent disorders; it communicates a green tinge and slight odour to the urine, and is useful in a variety of cases of gravel, and consequent strangury, and in hæmaturia; exhibiting, in these respects, analogous effects

to those produced by uva ursi. The American Indians regard it as of universal efficacy. It was first brought into notice in this country by Dr. Mitchell in his Inaugural Thesis, in 1803, and in England by Dr. Somerville (*Medico-Chirurgical Transactions*, Vol. V.).

Externally, it has been used in the form of decoction, and a cataplasm of the leaves, in scrofulous tumours and ill-conditioned ulcers.

The best form for the administration of chimaphila is the *decoction*, which may be prescribed either alone, or in conjunction with other diuretics, and in the dose of one or two ounces.

The *extract* is given in doses of *ten* to *fifteen* grains.

Decoction of Chimaphila. — Take of Chimaphila, an ounce; Distilled water, a pint and a half. Boil down to one pint, and strain.

CIMICIFUGA. *Actæa Racemosa* of Willdenow. *Nat. Ord.* Ranunculaceæ. *Radix.* The Black Snake-root.

The root of the cimicifuga has obtained a reputation, which is on the increase, as a remedy in rheumatism, after preliminary depletion. It is also recommended in dropsy; and in various other maladies, in virtue of its diaphoretic, diuretic, and moderately tonic properties. Dr. Young first, and more recently Dr. Kirkbride, bear strong testimony in favour of this medicine in chorea. The mode of administration is generally by decoction: an ounce of the bruised root to be boiled for a while in a pint of water, and one or two fluidounces to be given for a dose, and to be repeated at intervals during the day. Dr. Young prescribed the powder of the root, in the quantity of a teaspoonful three times a day.

CINCHONA CORDIFOLIA. *Heartleaved Cinchona. Yellow Bark.*—Cinchona Lancifolia. *Lanceleaved Cinchona. Pale Bark. Quill Bark.*—Cinchona Oblongifolia. *Oblongleaved Cinchona. Red Bark. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Cinchonaceæ.

To these, several other species of cinchona might probably be added; and varieties not referrible to the above frequently occur in trade; but it is well to limit the officinal species to those retained in the present London Pharmacopœia, which are quite sufficient for medical use.

The derivation of the term *Cinchona* has been referred to the Countess del Chinchona, wife of a viceroy of Peru, who was cured of an intermittent fever by its use, and who introduced it into Europe, on her return to Spain in 1640. It is, however, more probably from *Kina*, or *Kinkina*, whence *Quinquina*, an American name applied to these barks. The above species of cinchona are natives of the central parts of America.

I. Cinchona Cordifolia, or *yellow bark*, is said to be the produce of the forests of Bolivia, in Upper Peru, and of the province of La Paz. It is exported from Lima and Buenos Ayres. The tree is found on the mountains of Loxa and Santa Fé de Bogota,

growing under the fourth degree of north latitude, on heights between 900 and 1440 toises, flowering from May to September.

The general characters of the cinchona barks are noticeable under the following heads: *cryptogamia*, or mosses and lichens, &c., found on them, *structure*, *quilling*, *colour*, *taste*, *odour*, and *fracture*.

Several varieties of *yellow* bark occur in the trade, but that which is preferred is chiefly in flat pieces, of a bright yellow-brown colour, and free, or nearly free, from epidermis; its fracture is somewhat fibrous, and its bitter flavour more pure and intense than that of the other varieties. Sometimes it is in large rolled or quilled pieces, partially covered with a brown or grayish epidermis. It is easily powdered, and is then of a brighter hue. It is occasionally mixed with fragments of other barks. The flat, thickish pieces, free from epidermis, have been found most abundant in quinia, of which the best samples yield, upon an average, about two *per cent.* The decoction of this bark is of pale yellow-brown colour, and gradually deposits a sediment of the same tint. It reddens litmus paper, acquires a dingy greenish-blue colour on the addition of a solution of sulphate of iron, and affords a precipitate with acetate of lead, with tartarised antimony, and with solutions of gelatine, and of tannin. The substances said to be contained in yellow bark are kinic acid and quinia, an oily and a yellow-colouring matter, tannin, kinate of lime, and woody fibre.

The preparations of yellow bark in the present Pharmacopœia are, a decoction, a tincture, and an extract; but the term *cinchona* is occasionally applied indiscriminately to the pale, as well as to the yellow bark (*see* CINCHONA LANCIFOLIA). Yellow bark is also the source of the Sulphate of Quinia (Quiniæ Disulphas) of the Pharmacopœia.

Decoction of Heartleaved Cinchona (Yellow Bark). — Take of Heartleaved Cinchona, bruised, ten drachms; Distilled Water, a pint. Boil for ten minutes in a lightly-covered vessel, and strain the liquor while hot.

QUINIA.—The active principle of yellow bark is the alkaloid *quinia;* it is contained in the bark in combination with a peculiar acid, the kinic, or cinchonic acid, and apparently in the state of an acid salt.

Mr. Phillips, in his translation of the Pharmacopœia says: "The different varieties of cinchona contain two vegetable alkalis, quina and cinchona; the *Cinchona Cordifolia*, or yellow bark, contains chiefly the former; the *Cinchona Lancifolia*, or pale bark, the latter; and the *Cinchona Oblongifolia*, or red bark, yields both of them. The quina exists in combination with a peculiar acid called kinic acid, forming with it kinate of quina, which is soluble to a certain extent in water, and is rendered more so by the sulphuric acid employed in the process, and perhaps by decomposing it."

Properties and composition of Quinia, and its Sulphates.— Quinia is best obtained by the decomposition of sulphate of quinia by ammonia; it falls in white flakes, which, when washed with cold water, and dried carefully on bibulous paper, are soft and

pulverulent; it is difficultly crystallisable; when heated it fuses, loses a little water, and concretes on cooling into a resin-like mass. It restores the blue of reddened litmus, tastes intensely and purely bitter, is very sparingly soluble even in boiling water, readily soluble in boiling alcohol and in ether, and forms distinct salts with the acids.

Disulphate of Quinia forms acicular crystals, soluble in about 740 parts of cold, and 30 of boiling, water. They are soluble in about 30 parts of cold alcohol (sp. gr. 850), and much more soluble in boiling alcohol. This salt fuses when heated, and burns in the air, producing a copious charcoal, which may be consumed without residue. It becomes phosphorescent and electric when gently heated. When triturated with dilute sulphuric acid, it forms a white magma, which afterwards dissolves in water, and yields prismatic crystals of a neutral sulphate, which is more soluble than the disulphate, and somewhat efflorescent in dry air.

	Atoms.	Equivalents.	Per Cent.
Quinia	2	324	89
Sulphuric acid	1	40	11
Anhydrous disulphate of quinia	1	364	100

	Atoms.	Equivalents.	Per Cent.
Quinia	2	324	74·3
Sulphuric acid	1	40	9·2
Water	8	72	16·5
Crystallised disulphate of quinia	1	436	100·0

The proportion of disulphate of quinine procured by Pelletier, in 1827, from 2000 quintals of yellow bark, was 90,000 ounces (French): this is about three drachms of disulphate for one pound of bark. Souberain states that one pound (French) of *uncoated yellow bark* yields three drachms, and from thirty to fifty grains (French) of disulphate of quinia, while the same quantity of coated yellow bark yields three drachms (French) of the disulphate. Dr. Pereira has been informed that one manufacturer has obtained from two lbs. of yellow bark one ounce of disulphate; but this, he adds, is beyond the average produce.

II. Cinchona Lancifolia, or *lanceleaved cinchona*, generally termed *pale*, *quilled*, and *crown* bark, is the variety which, previous to the discovery of the alkaloids, was most esteemed, especially in the cure of intermittents; it is now almost entirely superseded as a remedial agent by sulphate of quinia.

The *Cinchona lancifolia*, which furnishes the pale Peruvian bark, is a handsome, lofty, erect tree, from thirty to forty-five feet high, and from one to four feet diameter; it generally stands single.

This bark is imported in cases or chests of about 200lb. weight each, chiefly in rolled up pieces, or quills, of various dimensions, mixed with larger, coarser, and flatter pieces; these differences apparently depend upon the part of the tree from which it has been taken. In trade these varieties are found in sorts; the small, fine,

and clean quills being considered as most select, bear the highest price, and are called *crown bark.* The larger quills form another commercial variety; the flat, coarse, and broken pieces are the least esteemed, and sold at an inferior price.

According to Dr. A. T. Thomson, the following characters belong to select samples of this bark: "Water at 212° extracted all its active principles, affording an infusion which, when filtered, was of a pale yellow or straw colour, and had the odour and taste of the bark. The infusion reddened litmus paper; was instantly and copiously precipitated by solution of galls; and in a smaller degree and more slowly by solution of isinglass. A solution of tartar-emetic was rendered turbid and slowly precipitated by it; this effect was quickly and copiously produced by a solution of acetate of lead. Sulphate of iron changes its colour to bright olive-green, but is scarcely precipitated. Decoction afforded a more saturated solution, with a colour resembling the cold infusion of yellow bark, and a yellowish precipitate was deposited. The powder, macerated in sulphuric ether, afforded a golden-yellow tincture, which reddened litmus paper, and left a pellicle of bitter resin when it was evaporated on the surface of water, to which it gave the colour of the tincture. This coloured water had the flavour of the watery infusion, but differed from it in not precipitating the infusion of galls, nor the solution of tartar-emetic, and in throwing down a copious precipitate from the solution of sulphate of iron. With alcohol, the powder afforded a tincture of a deep orange hue, which precipitated sulphate of iron, tartar-emetic, and infusion of galls; became turbid when added to water, and let fall a light reddish precipitate."

The following are formula of the present *London Pharmacopœia*:—

Decoction of Lanceleaved Cinchona.—Take of Lanceleaved Cinchona, bruised, ten drachms; Distilled Water, a pint. Boil for ten minutes in a lightly-covered vessel, and strain the liquor whilst hot.

Infusion of (Lanceleaved) Cinchona.—Take of Lanceleaved Cinchona, bruised, an ounce; Boiling distilled Water, a pint. Macerate for six hours in a lightly-covered vessel, and strain.

The active principle of lanceleaved cinchona is the alkaloid *cinchonia;* it may be obtained by boiling the bark in water acidulated by sulphuric acid, precipitating by lime, drying the precipitate and digesting in alcohol. The cinchonia appears to be contained in the bark in combination chiefly with the kinic (or cinchonic) acid. It forms colourless prismatic crystals, almost insoluble in cold water, and very sparingly soluble in boiling water. They are slightly bitter, but acquire intense bitterness when a little acid is present. They restore the blue colour to reddened litmus; they are sparingly soluble in cold alcohol, ether, and fixed oils, but abundantly soluble in boiling absolute alcohol, and the solution deposits crystals on cooling, and becomes milky when dropped into water.

Neither cinchona, nor its salts, are much used in medicine, in consequence of the comparative cheapness, and as it is said greater

efficacy, of quinia and its salts. The salts of cinchona are crystallisable, and in many respects, as regards the action of reagents, they resemble the salts of quinia.

One pound of pale or Lixa bark, contains, according to Souberain, from one and a half to two drachms of sulphate of cinchonia. Others have obtained quinia and but little cinchonia from this bark.

III. Cinchona Oblongifolia. *Oblongleaved Cinchona.* This species of cinchona furnishes the *Red Bark.*

Red bark occurs in commerce in flat and quilled pieces, covered with a reddish-brown epidermis, and internally of a fibrous texture, and a rusty-red tint. It tastes more astringent but less bitter than the yellow bark, and has not the peculiar aromatic austerity of pale bark. It contains both cinchonia and quinia. It is brought from Peru in chests, which contain from 100 to 150lbs. each. Its powder is of a dull, brownish-red tint, and has a peculiar earthy odour. "Its aqueous infusion is red, astringent, and only slightly bitter. It reddens litmus, and is slowly precipitated by solution of galls, the supernatant liquor being colourless. A very light flocculent precipitate is produced by solution of gelatin. It is scarcely altered by tartarised antimony; more so by acetate of lead; the protosulphate of iron makes it assume a deep olive-green colour, but little is precipitated. The ethereal tincture is of the same colour, and exhibits the same appearances as the former species when similarly treated. The alcoholic tincture is of a very deep brownish-red colour; when diluted with water, a red flocculent matter falls down, and it precipitates the solution of sulphate of iron, and of tartarised antimony, the former of a black colour, and the latter red."—(Thomson's *Lond. Disp.*)

The activity of red bark is referable to the presence both of quinia and cinchonia, the former alkaloid being in the largest relative proportion; they are combined, as in the other barks, with cinchonic acid. According to Souberain one pound of deep red cinchona yields two drachms of sulphate of quinia, and one drachm of sulphate of cinchonia; and the pale red, a drachm and a half of the sulphate of quinia and one drachm of sulphate of cinchonia.

The officinal preparations of red bark in the present *London Pharmacopœia*, are, a *decoction* and an *extract*, which are directed to be prepared in the same manner as the corresponding preparations of yellow bark.

Medical Properties and Uses of the different species of Cinchona, and of the Sulphate of Quinia.—The discovery of the active principles or alkaloids contained in the three varieties of cinchona above described, has thrown an entire new light upon their medical applications, and led to new and more effective methods of administering them. Cinchona is either employed as a general, or as a specific tonic; in the former case, it is useful in all diseases of direct or indirect debility, as a strengthener and

restorative, and the pale, or lanceleaved variety is often preferable to the others; in the latter case, it is chiefly used in consequence of its peculiar and specific action in intermittent diseases, and more especially in agues and other intermittent or remittent febrile disorders. It has of late been the custom to substitute sulphate of quinia for the other preparations of bark, but where its virtues as a general tonic are required, and where it is not administered merely or principally as an antiperiodic, the infusions and decoctions of the pale and of yellow bark, and more especially the former, are often preferable to the sulphate of quinia; partly, perhaps, in consequence of the other proximate principles that are present, and partly from the nature of the salt of cinchona, or of quinia, which exists in the original bark; indeed, the salts of quinia, and cinchonia, with vegetable acids, seem to deserve more notice than they have hitherto obtained from medical practitioners.

As a tonic in idiopathic debility, or as a restorative after depletion, the decoction, infusion, and extract of bark, are properly resorted to, and the pale, or lanceleaved variety, is in many instances more effective and more agreeable to the stomach than the yellow bark. There is a manifest objection to the use of powdered bark, which is, the large relative quantity of inert woody fibre with which the stomach is unnecessarily encumbered, for the soluble matter of the finest and freshest cinchonas does not exceed 40 *per cent.*

The following analysis will furnish some idea of the compounds of this bark; but the quantity of soluble matter seems to be underrated:—

Acid cinchonate of cinchonia	1·54
Green fatty matter	0·79
Resin	2·18
Red extractive	9.09
Tannin	5·00
Gum	4·40
Lime combined with cinchonic acid	1·40
Woody fibre	75·69=100

Yet, *powdered bark* must not be rejected, for cases are not unfrequent in which it is highly effective, and in which the tardiness of its action, and its protracted tonic power in the stomach and bowels, render it peculiarly available. It frequently acts as a mild aperient, and sometimes purges, in which case small doses of opium, if not otherwise contraindicated, may be combined with it; if it constipate, the bowels must be kept open by laxative adjuncts, and great care must always be taken to avoid the accumulation of its inert and insoluble parts in the large intestines. The usual dose of powdered pale bark is half a drachm three or four times a day, and of powdered yellow bark somewhat less; red bark is scarcely used. Where a very mild tonic is required, the infusions either of the yellow or pale bark, as above directed, may be used, and they may be made the vehicles of small doses of the powder, and combined with the tincture, or strengthened by the addition of the extract,

or of sulphate of quinia. Two ounces of bruised bark to a pint of water, is a good proportion. A sense of weight at the stomach, slight nausea, and headache, and other similar symptoms, are frequent attendants upon the use of cinchona; they generally arise from giving it in too large doses; but it is often rendered more agreeable to the stomach by the addition of aromatics, such as cloves, or orange-peel, or cinnamon; and sometimes a few drops of dilute sulphuric acid will not only relieve nausea, but sharpen the appetite, and promote the tonic powers of the remedy. An infusion of Virginia snake-root is a useful medium for its administration.

The *extract of bark*, when carefully prepared, is a valuable and effective medicine; its desiccation should be cautiously performed at a temperature not exceeding 212°, and it should be so far dried as to be pulverisable. The average produce of dry watery extract from good lanceleaved bark is 30 *per cent.;* and of alcoholic, or, as it was formerly called, of *resinous* extract, about 24 *per cent.;* the latter preparation is, however, obsolete. From two or three, to eight or ten grains of the extract of bark, may be given either in the form of pill, or dissolved in the infusion or decoction, or in the compound infusion of roses of the Pharmacopœia. Dissolved in syrup of mulberries, or of orange-peel, it affords a good form for the administration of bark to children, when, as is usually the case, they refuse the other forms of this remedy.

℞ Extracti Cinchonæ Lancif. ʒij.; Solve in Syrupi aurantii fʒij. Capiatur cochleare unum minim. (fʒj.) pro dosi, secundâ vel tertiâ quâque horâ.

The above are the most effective forms of cinchona in cases of continued fevers, and more especially in those which assume the typhoid type; but its exhibition requires precaution, and in pure mixed typhus it can seldom be safely administered in effective doses whilst the skin is hot and dry, or until the increased excitement has been to a great extent subdued. In putrid sore throat, scarlatina, measles, and small-pox, bark often proves an admirable remedy, especially when combined with such adjuncts or other plans of treatment as the peculiarities of individual cases may require.

Much has lately been said respecting the free use of bark in acute rheumatism, after the bowels have been freely evacuated by antimonial purges. Dr. A. T. Thomson says that its efficacy in this disease is much increased by the addition of spirit of turpentine; but he observes that it can only be depended upon after calomel, emetic tartar, colchicum, and opium, have been liberally exibited, and when the pain has partially abated, or assumed an intermittent character, and the pulse has become softer.

"Bark," says Dr. Gregory (*Elements of the Theory and Practice of Physic*), "was introduced as a remedy in acute rheumatism with the highest encomiums, by Dr. George Fordyce and Dr. Haygarth; but, as far as my observation extends, it has not answered the expectations which might have been formed of it from the testi-

mony of those authors. It has appeared to me to be of use only in the latter periods of the disease, when considerable pain and stiffness of the joints are frequently found to exist, but with a *natural* state of the pulse and tongue."

There are many forms of chronic rheumatism in which bark may be properly prescribed, more especially those common and obstinate forms of the complaint which occur in debilitated constitutions. In certain cases of gout, also, the efficacy of this remedy is similarly obvious.

In phthisis pulmonalis, bark, if given in sufficient doses to produce any decided effect, should be very cautiously administered. Dr. A. T. Thomson's remark upon its use in this disease is correct and valuable:—"Bark is found beneficial," he says, "when the accompanying hectic puts on more of the intermittent form than usual, when the debility is considerable, and blood is mixed in the sputa: and in several cases of pneumonia, when, after repeated and large bleedings and evacuations, the pulse continued hard and thrilling, and the blood buffy, although the expectoration was free and the skin open, we have seen bark produce the happiest effects." —(*Lond. Disp.*)

If, however, we were to enumerate all the cases in which the eminent tonic powers of cinchona are available, or to mention the different disorders in which, at one period or other, it has been, and may probably be administered, we should go through nearly the whole catalogue of human maladies; it is certainly one of the most valuable tonics that can be resorted to in all cases of general debility of constitution, from whatever cause they may proceed; and the greatest advantage is derived from it by convalescents generally, even after inflammatory diseases, where copious bleeding has been necessarily resorted to. But it is in the treatment of intermittent fever, and in that variety of intermitting and remitting complaints, including the large class of neuralgic affections, that cinchona claims especial attention; and though it occasionally fails, even in cases which yield to other tonics (more especially those of mineral origin), its remedial powers are universally admitted as pre-eminent in these forms of disease. It has sometimes been asserted that the curative powers of cinchona are those of a simple bitter, and that several indigenous medicines of that class are equally effective; but the discovery of quinia and cinchonia, and of their almost specific action in the cure of intermittents, has shown that the claims of cinchona are of a distinct character.

Some doubts have arisen as to the best and proper time for the use of bark in cases of ague, namely, whether it is properly or preferably administered during the febrile excitement, or whether it should be exclusively employed as a preventive, during the intermission. Experience seems to have settled this question, and to have decided in favour of its use during the period of apyrexia; that is, in the intervals, instead of during the paroxysm. It requires to be used in adequate doses, and should be given at the shortest

intervals immediately before the expected attack, much depending upon the quantity administered in a given time.

Evacuation by vomiting or purging is a frequent and proper but not necessary condition for the administration of bark or its alkaline salts. The same remark applies to venesection.

It may be considered as proved, that the cinchonia and quinia, or their combinations with the peculiar acid of the bark, are the agents upon which its efficacy depends, and quinia appears more certain and active than cinchonia, and of this alkaloid the sulphate is an active and unobjectionable form; and as in it the febrifuge powers of cinchona appear to be concentrated, it furnishes an admirable means of introducing the equivalent of large quantities of bark into the system, in a form which is less apt than any other to derange the digestive organs. The dose, however, which will produce the desired effect, is in all cases uncertain. From one to three grains of the ordinary sulphate (disulphate) of quinia every two or three hours, during the apyrexial period of an intermittent, is an average and adequate dose; much larger quantities have been given, such as five, ten, and twenty grains, and even drachm doses — and often, in the first-mentioned quantity, or five grains, with marked beneficial effects.

Acidulated infusion of bark, or infusion of roses, are good vehicles; or it may be made into pills with conserve of roses. The previous clearance of the bowels by a calomel purge, and of the stomach, if requisite, by an emetic, generally renders the tonic treatment more certain and effective. When given during the paroxysm, any form of bark adds to the nausea and general uneasiness, and nothing appears to be gained by commencing the tonic, as some have advised, during, or immediately after, the hot stage.

In all intermittent diseases, including our *congestive* fever, pale and yellow bark, and their preparations, but more especially the sulphate of quinia, are indicated, and are often highly effective. "It is efficacious in dysentery and diarrhœa, when they become intermittent; in chorea, epilepsy, some coughs, and rheumatism; indeed, I have long regarded it as a maxim, that wherever intermission clearly takes place, there cinchona or its preparations will prove useful; but it does not prevent the continuance of those paroxysms of ague which form one of the constitutional symptoms of stricture of the urethra, and some other local affections, and which can be cured only by removing the strictures and other sources of irritation. The yellow bark possesses the most powerful antiperiodic powers." — (Thomson's *Lond. Disp.*)

Great benefit is also derived from the use of cinchona in the treatment of remittent fevers; but in those cases the concomitant symptoms must be carefully considered, the bowels kept open, the skin moist, and general or local excitement previously subdued by the lancet. In these, and indeed in the former cases also, and in continued fevers of the typhoid character, the efficacy of bark is materially promoted by combining it with diffusible stimuli, and

with proper doses of opium; among the former, wine, brandy, aromatic and ethereal tinctures, and carbonate of ammonia, may be especially named.

There are many local complaints in which cinchona, upon the principles already adverted to, is eminently useful; such are some eruptive diseases, ulcers, certain forms of dyspepsia, and painful nervous affections; and as a topical application it furnishes, in the form of decoction, a good gargle in various forms of sore throat, in relaxed uvula, and in aphthous affections, and may be used as a lotion for fetid and gangrenous sores, or as an ingredient in poultices. Some practitioners have advocated the external application of cinchona in cases of marasmus and extreme debility, and atrophy, and have even directed powdered bark to be sewn up in muslin bags, and extensively applied to the surface of the body; but this treatment is worse than ineffectual. Enemata of bark are entitled to more confidence.

The following are some of the forms in which cinchona and its preparations may be administered, and in which the pale and the yellow bark may occasionally replace each other:—

1. ℞ Extract. cinchon. Lancifol. gr. v.; Solve in Decocti Cinchonæ Lancifol. f℥iss. et adde Syrupi Aurantii, Liq. Hoffman. Anod., āā f℥ss. Misce; fiat haustus bis vel ter die sumendus.
2. ℞ Decoct. Cinchon. Cordifol. ℥x.; Acid. Sulphurici diluti, ♏v.; Syrupi Aurantii, Aquæ Menthæ, āā f℥j. Misce; fiat haustus, quartis vel sextis horis repetendus.
3. ℞ Decoct. Cinchon. Cordifol. ℥x.; Confect. Aromat. ℈j.; Pulver. Cinchonæ gr. x.; Aquæ Cinnam. f℥ss. Misce; fiat haustus.
4. ℞ Decoct. Cinchonæ Lancifol.; Infus. Rosæ C. āā f℥iijss.; Acid. Hydrochlorici ♏x.; Syrupi Mori, Aquæ Cinnam., āā ℥ss. Misce; fiat mistura. Cochl. iij. ampl. pro dosi.
5. ℞ Decoct. Cinchonæ (Cordifol. aut Lancifol.) f℥vss.; Extract. Cinchonæ (C. vel L.) ℥j.; Aquæ Cinnam. f℥i.; Syrupi Zingiberis f℥ij. Misce. Cochlearia duo vel tria bis vel ter in dies sumenda.
6. ℞ Decoct. Cinchonæ f℥vij.; Pulv. Cinchonæ, Confect. Aromat., āā ℥j.; Ammoniæ Sesquicarbon. ℥ss.; Aquæ Menthæ ℥j. M. Sumantur cochlearia tria ampla pro dosi.
7. ℞ Quinæ disulphatis ℥ss.; Conservæ Ros. Gall. q. s. Ut fiat pilul. xv. Sumatur una secundâ vel tertiâ quâque horâ.
8. ℞ Quinæ disulphatis ℈j.; Extract. Cinchon. Lancifol. ℥j. Misce optime et divide in pilulas xx quarum sumatur una bis vel ter die.
9. ℞ Quinæ disulphatis grana ij.; Acid. Sulphurici diluti ♏iij.; Syrupi Croci f℥ss.; Aquæ destill. f℥j. Misce; fiat haustus.
10. ℞ Infusi Cinchonæ f℥xj.; Quinæ disulphatis gr. j.; Aquæ Cinnam. f℥ss.; Syrupi Papaveris f℥ss. Misce; fiat haustus.
11. ℞ Decocti Cinchonæ, Infusi Rosæ compos., āā f℥iijss.; Mellis Rosæ f℥ij.; Tincturæ Myrrhæ f℥ij.; Acid. Hydrochlorici ♏x. M. fiat gargarisma.

The sulphate of quinia is occasionally adulterated with mannite and gypsum. This fraud is detected by putting the suspected substance in alcohol, which will dissolve the sulphate of quinia, but leaves untouched either the mannite or the gypsum.

CINNAMOMUM. *Cortex.* CINNAMOMI OLEUM. *Oleum e cortice destillatum.* The *bark*, and the *oil distilled from the*

bark, of the Cinnamon Laurel, *Laurus cinnamomum. Cinnamomum Zeylanicum. Cl. 9. Ord.* 1. Enneandria Monogynia. *Nat. Ord.* Lauraceæ.

This species of Laurus is a native of Ceylon, and is cultivated in Java.

Several varieties of the cinnamon tree were formerly resorted to as sources of the bark, but the following four as those which are said to yield the bark which is now found in the market:—1. The finest is the *Sweet*, or *Royal Cinnamon.* 2. *Snake Cinnamon*, which closely resembles the first. 3. *Camphor Cinnamon.* This species contains camphor, especially in the root, and the bark and leaves have a camphorated odour. 4. *Astringent Cinnamon.*

The excellence of cinnamon depends probably upon the species whence the bark is derived, and upon the age of the tree; but it is an article the purchase of which requires much circumspection, for a large proportion of that which is found in the London market is insipid, or nearly so, and being often rolled up in the interior of the better kinds, is not easily detected except by tasting, and carefully examining each individual stick.

The best cinnamon is brought from Ceylon in bales or bags, made of the cloth of cocoa-nut bark, and weighing from ninety to one hundred pounds each. It should be nearly as thin as paper, of a yellow-brown colour, and splintery fracture, and it should readily yield its warm and sweet aromatic pungency when chewed.

Oil of Cinnamon.—In this oil, when good and genuine, pungency and sweetness are combined with a peculiarly grateful aroma. There are two varieties, the heavy and the light; the former is said to be the exclusive produce of the bark, and the latter of the leaves and twigs. When it has a rough and less agreeable flavour, and is very hot upon the tongue, adulteration with oil of cassia may be suspected. There is no test by which genuine oil of cinnamon can be accurately distinguished from that which is partly spurious; but a moderately experienced tongue, and careful comparison with a good sample, enable us to determine without difficulty upon its excellence. To taste it, however, in perfection, about two drops may be dissolved in a drachm of alcohol, and diluted with an ounce of water; the relative merits of different samples of the oil become then very apparent. It is imported from Ceylon.

One hundred and twelve pounds of recent cinnamon are said to afford an average product of three ounces of oil, part of which floats, and part falls, in water. The bark from which the oil has been drawn is sometimes dried and intermixed with good cinnamon.

Cinnamon is chiefly used as an agreeable adjunct and condiment; and cinnamon water, more or less diluted, is a pleasant vehicle for various bitters. Cinnamon is frequently combined with rhubarb and other purgatives, to prevent their griping qualities. The oil is usefully added to chalk-mixture and other remedies for checking common diarrhœa.

Cinnamon Water. — Take of Cinnamon, bruised, a pound and a half, *or of* Oil of Cinnamon, two drachms; Proof Spirit, seven fluid ounces; Water, two gallons. Let a gallon distil.

Compound Powder of Cinnamon. — Take of Cinnamon, two ounces; Cardamoms, an ounce and a half; Ginger, an ounce; Long Pepper, half an ounce. Rub them together into a very fine powder.

CISSAMPELOS PAREIRA, *see* PAREIRA.

CITRUS, *see* LIMONES.

CLOVES, *see* CARYOPHILLI.

COCCI. *Coccus Cacti.* The Cochineal insects. *Ord.* Hemiptera.

This valuable insect is imported from Mexico and New Spain, where it feeds on several species of *cactus.*

The great consumption of cochineal is by the dyers of scarlet cloths: the annual importations into Europe exceed 60,000 lbs. According to M. Fée, from 42,000 to 45,000, and according to Réaumur, 65,000 insects go to the pound.

In pharmacy, cochineal is chiefly used as a colouring material, and as such, it is added to several tinctures. It has been recommended as allaying the spasmodic action in hooping-cough, especially when administered with carbonate of potassa; but its efficacy is at least very doubtful, and generally discredited. It has also been employed as an anodyne in neuralgia, in the form of a saturated tincture, of which 120 drops have been given twice a day. Its taste is slightly bitter, and the odour peculiar.

It has been analysed by Pelletier and Caventou (*Ann. de Chim. et Phys.*, VIII., 250), who found in it a peculiar colouring matter (carminia), an animal principle (coccina), stearine, elaine, an odoriferous acid, and saline matters.

COCCULUS PALMATUS, *see* CALUMBA.

COCCULUS INDICUS. The seed of the *Cocculus tuberosus.* It contains a peculiar poisonous principle, which has been called *picrotoxin*, from πικρος, *bitter;* τοξικον, *poison*). It is imported into England in bags, from Bombay, Madras, and Ceylon.

From a druggist's private books, says Dr. Pereira, I find, in 1834, about 2500 bags entered; and this probably is much below the quantity imported. The greater part is consumed for illegal purposes, principally for adulterating beer and ale, though the practice is prohibited by the legislature under a penalty of 200*l.* upon the brewer, and 500*l.* upon the seller of the drug.

COLCHICI CORMUS. } The *cormus* and *seeds* of the *Colchi-*
COLCHICI SEMINA. } *cum autumnale*, or Meadow Saffron.
Cl. 6. *Ord.* 3. Hexandria Trigynia. *Nat. Ord.* Melanthaceæ.

This species of colchicum is a hardy perennial, found in meadows and low grounds, and flowering in September; its bulbous root then decays, and the new bulbs are in greatest perfection from early in June to the middle of August. Though not native, it is cultivated in the United States.

The bulbs contain an acrid milky juice, in which Pelletier and Caventou detected a salifiable body, which they considered identi-

cal with veratria; but, according to Hesse and Geiger, its efficacy and acrimony are referable to a peculiar alkaloid which they call *Colchicia*, and which may be obtained by digesting colchicum seeds in boiling alcohol, precipitating by magnesia, drying the precipitate, and digesting it in boiling absolute alcohol. It is bitter, less acrid than veratria, and forms crystallisable salts. Vinegar and wine are its best solvents.

"To preserve the virtues of the plant, the bulb, as soon as possible after it is dug up, should be cut into transverse slices not thicker than one-eighth of an inch, and dried by placing the slices upon clean white paper, distinct from each other, without heat, or at a very low temperature. The test of the drug being good and properly dried, is the appearance of a blue colour on rubbing it with a little distilled vinegar and alcoholic solution of guaiacum. The slices also should not appear deeply notched, or panduriform, as this is the mark of the bulb having begun to empty itself for the nourishment of the young bulbs, and consequently to suffer in its medicinal powers from the chemical change which at this period its contents must necessarily undergo for the nourishment of the offsets. It should be kept in slices in well-stopped bottles."—(*Lond. Disp.*)

The seeds and the flowers of this plant partake of the activity of the root; the former were recommended by Dr. Williams as more mild, but not less effective, than the root; it is probable, also, that the leaves might be employed; they are not eaten by quadrupeds, though it is said that horses eat the flowers with impunity. As colchicia, in the state in which it exists in this plant, is not volatile, they might be used in a dried state. Vinegar, wine, and proof spirit are used as solvents of the active parts of colchicum; two extracts, an acetic tincture of the cormus, two tinctures of the seeds, and a vinous tincture of the cormi, are in the *London Pharmacopœia;* a syrup of colchicum and an oxymel, are included in the formulæ of the Edinburgh and Dublin Colleges. The *Extractum Colchici Cormi* of the London College is directed to be prepared by pressing out the juice and evaporating, without straining, as in the process of making extract of aconite. The other formulæ are as follows:—

Vinegar of Colchicum. — Take of the fresh Cormus of Colchicum, sliced, an ounce; Distilled Vinegar, sixteen fluid ounces; Proof Spirit, a fluid ounce. Macerate the cormus of the colchicum with the vinegar in a stopped glass vessel for three days, then press out and set aside that the fæces may subside; lastly, to the clear liquid, add the spirit.

Acetic Extract of Colchicum. — Take of fresh Cormus of Colchicum, a pound; Acetic Acid, three fluid ounces. Bruise the cormi, gradually sprinkling them with the acetic acid, then express the juice and evaporate it in an earthen vessel not glazed with lead, to a proper consistence.

Tincture of Colchicum. — Take of Colchicum Seeds, bruised, five ounces; Proof Spirit, two pints. Macerate for fourteen days, and filter.

Compound Tincture of Colchicum. — Take of Colchicum Seeds, bruised, five ounces; Aromatic Spirit of Ammonia, two pints. Macerate for fourteen days, and filter.

Wine of Colchicum. — Take of dried Cormus of Colchicum, sliced, eight ounces; Sherry Wine, two pints. Macerate for fourteen days, and filter.

The acetic tincture, or vinegar of colchicum, should have been prepared with dry, instead of fresh, cormi; and doubts are entertained as to the propriety of employing ammonia in the preceding compound tincture. The vinous tinctures of the dried cormus, and of the seeds, are found to be the most certain and effective forms; in the extracts, the necessary exposure to heat is liable to modify the activity of the preparation.

Colchicum is the *Hermodactyl* of ancient pharmacy; it seems originally to have been employed chiefly as a diuretic in dropsical affections, but as such it is uncertain in its action. It acts on the secretors of the intestinal mucous membrane, and less obviously on the kidneys, skin, and liver. In gout, it has been called a specific, from its very rarely failing to allay the pain and inflammation, and occasionally altogether breaking up the paroxysm; sometimes acting upon the bowels, at others upon the kidneys and skin, and often without any such accompanying effect. It is, however, rather palliative than curative. In acute and chronic rheumatism, and in various forms of neuralgia, it is also a valuable remedy; a single dose will sometimes allay obstinate pains of the joints and tendinous expansions. Small doses frequently repeated are, however, preferable; and, if they operate favourably, they generally increase the secretion of urine, and remove the red sediment which in such cases it usually deposits. When the medicine purges, it produces bilious evacuations, and diminishes the activity of the arterial system. In some cases, colchicum has appeared to accumulate in the system, and after the continuous use of it in small doses, has brought on unmanageable diarrhœa, with great prostration of power.

In acute rheumatism, inflammatory dropsy, and bronchitis, the combination of the juice of colchicum with tartar-emetic in divided doses has a powerful effect; but one which, although decidedly beneficial in the alleviation of the disease, requires to be carefully watched, in order to prevent hypercatharsis and excessive prostration.

Sir Everard Home ascribes much of the griping and nauseating effect that sometimes follows the use of the vinous, or other tinctures of colchicum which have not been carefully filtered, to the sediment which forms in them, and which may be removed without injury to the specific effect of the medicine.

Acids are said to render the operation of colchicum violent and drastic; whilst alkalies produce a milder but not less efficacious operation; and the acetic tincture, or even the wine, may without impropriety be administered with magnesia. About ♏xxx of the *Vinum Colchici* may be regarded as a medium dose, and may be taken when the paroxysms of pain are violent: the evening is the best time for its administration, and the following is a good form:—

℞ Vini Colchici f℥ss.; Magnes. Carbon. gr. xv.; Aquæ Cinnam., Aquæ, āā f℥ss. M.

Scudamore's favourite mixture, from which he has witnessed the most remarkable success in gout, is composed of Magnes. gr. xv. ad. xx.; Magnes. Sulphat. ʒi. ad ʒij.; Aceti Colchici ʒi. ad ʒij., with any distilled water the most agreeable, and sweetened with any pleasant syrup, or with 15 or 20 grains Extract. Glycyrrhiz. The following is a prescription of which I make frequent use in subacute and chronic rheumatism and the severer cases of neuralgia. ℞ Vin. Colchici Sem. fʒij.; Aquæ Camphor fʒvi.; Sulphat. Morphiæ gr. ss. ad gr. i.; Saçch. Alb. ʒi. M. Dose, a teaspoonful every three or four hours until relief is obtained; or in the more chronic cases, three times a day. In chronic bronchitis and in asthma, I have found this prescription to be serviceable, but commonly I give it in smaller doses than the above in the former of these two diseases.

M. Tait speaks highly of the good effects of the vinum colchici in scarlet fever. His dose was twelve to fifteen drops for a robust adult, and three or four drops for a child from four to six years of age,—every four hours, in a little water sweetened with syrup. In the cases of children he decreased the dose, and carefully watching its distinctive effects; he stopped whenever these were manifested (*London Lancet*, Nov. 1837).

When used in fevers, as it has been by Mr. Haden and Mr. Lewins, it should be regarded as simply auxiliary to bloodletting and cathartics. The latter has given as much as 280 drops of the wine of the seeds in 22 hours, to a patient with fever: it caused vomiting of much viscid green bile and purging, and gave great relief. It was continued at the rate of fifteen drops every three hours. A common dose in the beginning of fever, directed by Mr. Lewins, was thirty drops every three hours (*Edinb. Med. and Surg. Jour.* April, 1837, and *Eclectic Jour. of Med.*, July, 1837, Vol. I.).

Dr. Thomson recommends a saturated vinous tincture, made by macerating an ounce and a half of the *dried* bulb in 12 ounces of white wine; from 30 to 60 minims may be taken whenever the patient is in pain. The fresh roots are probably employed under the apprehension of careless drying, but if not used as soon as removed from the earth, vegetation goes on, and their qualities are as effectually changed as if they had remained buried.

The *Acetum Colchici*, and the *extracts*, as above directed, have been found practically objectionable in consequence of their varying strength. From one to two grains of the *acetic extract*, two or three times a day, is, however, frequently prescribed in gout, and in acute rheumatism. It appears not improbable that when the nature and properties of the active alkaloid of colchicum have been more fully investigated, improved forms for its exhibition will be discovered: at present it is necessary to begin in all cases with small doses, and gradually to increase them till they produce their desired effect, for many causes seem to interfere with, and modify the activity of the formulæ in general use.

The tincture of the root of colchicum has been highly recommended by Mr. Laycock as an *external* application to the affected parts in gout and rheumatism.

COLLYRIUM (from κολλαν, *to check*; ρους, *running*). An astringent lotion; the term is generally applied to eye-washes.

COLOCYNTHIS (from κωλον, *the colon*, and, κινεω, *I move:* in reference to its purgative powers). *Reponum pulpâ exsiccata.* The dried pulp of the fruit of the *Cucumis colocynthis*, or Bitter Cucumber. *Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Cucurbitaceæ.

This plant is a native of Turkey and Nubia; it is a trailing annual.

The fruit is imported dried, and generally peeled, and is known by the name of *bitter-apple.* Its dried pulp is nearly white, inodorous, light, and spongy, mucilaginous, and intensely and nauseously bitter. It is almost entirely soluble in boiling water; the infusion is yellow, gelatinous; it forms precipitates in solutions of acetate of lead, and of nitrate of silver, and is rendered olive-coloured by sulphate of iron. Meissner obtained from 100 parts of dry pith of colocynth 18·4 *per cent.* of a peculiar bitter principle.

The pulp of colocynth is a powerful drastic purgative, and in over-doses produces great irritation in the alimentary canal, spasm, bloody evacuations, and other untoward symptoms.

It was employed by the ancients in lethargy, mania, and dropsy. It is a valuable adjunct to other cathartics, and of these combinations the compound extract is the most useful form. It is scarcely prescribed alone, nor is the simple extract often employed: when simple colocynth is required, it is better to use the powdered pith, which is nearly as efficacious, weight for weight, as the simple extract.

The Extract of Colocynth is made by evaporating the decoction of colocynth in water.

The Compound Extract of Colocynth is made of colocynth, extract of aloes, scammony, cardamom, soap, and proof spirit.

The preceding extract, when carefully made, is a valuable purgative; it should be sufficiently dry for reduction into powder, so as to prevent the necessity of heating it for the formation of pills. Some difference of opinion has been entertained respecting the propriety of the addition of the soap, which is supposed to render the extract incompatible with calomel; this, however, is not the case, and the soap has the advantage of increasing the solubility of the compound, so that, when pills chiefly composed of it have hardened by age, they retain their activity, and are soluble in the secretions of the stomach. Calomel and extract of jalap are combined with it in the *pilulæ catharticæ compositæ* of the U. States Pharmacopœia.

Much difference is occasionally found in the activity of this extract, obtained from different sources; half a drachm of one sample being sometimes less purgative than ten grains of another. This

arises either from carelessness in its preparation, as when overheated; or inattention to the goodness of its ingredients, more especially of the scammony; or, not unfrequently, to fraudulent substitution of some of its components. It is said that seeds of colocynth are sometimes substituted for an equal weight of pulp; if so, the extract must be much less active, as the seeds are inert, being oleaginous, like those of other *Cucurbitaceæ*. Colocynth pulp which is dense and deep gray, or dirty brown, is unhealthy, or has been injured in drying, and should be rejected.

From *five* to *ten grains* of the compound extract of colocynth is an average *dose;* it is generally combined with calomel, or used in small quantities to sharpen the activity of rhubarb and the milder aperients. A few drops of essential oil is a proper addition to prevent griping.

℞ Hydrargyri Chloridi gr. xij.; Extract. Colocynthidis compos. ʒss.; Olei Caryophyll. ♏viij. Fiant massa in pilulas aperientes octo dividenda; quarum sumantur duæ vel tres pro dosi.

A milder but active aperient pill is composed as follows: —

℞ Pulveris Rhei, Pilulæ Hydrargyri, āā ʒss.; Extracti Colocynthidis compos. ʒj.; Olei Carui ♏xij. Divide in pilulas xxiv. — duæ vel tres pro dosi.

Dr. Paris gives the following as the composition of "Barclay's Antibilious Pills:" — Take of Extract of Colocynth, ʒij., Extract of Jalap, ʒj., Almond Soap, ʒiss., Guaiacum, ʒiij., Tartarised Antimony, gr. viii., Essential Oils of Juniper, Caraway, and Rosemary, of each, gutt. iv., Syrup of Buckthorn, as much as is sufficient to form a mass, to be divided into 64 pills.

Colocynth is used in habitual constipation. Mr. Pereira says he is acquainted with individuals who have taken the compound extract for years without suffering any inconvenience therefrom. Alvine obstruction, as in hernia and doubtful cases of intussusception, even with stercoraceous vomiting, this writer has seen completely removed by it. More than once he has known an operation averted by its use, in those who, in addition to the above symptoms, had old herniæ, which led the surgeon to suspect strangulation. In diseases of the brain, this medicine is sometimes employed with good effect, on the principle of its revulsive or counterirritating operation. In dropsy, its hydragogue effects are deemed to be inferior to those of elaterium and jalap. In the form of decoction Hufeland regards it as the most effectual diuretic in persons of a cold and sluggish habit of body. In common with all the drastic purgatives which act on the rectum, and thence on the uterine organs, colocynth has been given in amenorrhœa and chlorosis.

The oil of colocynth, but in what manner prepared he does not tell us, has been used by Dr. Janelli as a substitute for croton oil, externally applied, in neuralgia, and especially in sciatica, and likewise in rheumatism.—(*Observat. Medico*, Jan. 1840.)

COLTSFOOT, *see* TUSSILAGO.

CONFECTIONS (from Conficio, *I make up*). The conserves

and electuaries of former Pharmacopœiæ are now included under this term; sugar is one of their leading ingredients. They are separately described.

CONGIUS. A gallon. A measure containing eight pints. The *imperial gallon* contains 10 avoirdupois pounds of distilled water, at the temperature of 62° Fahrenheit: of this, the *octarium*, or pharmaceutical *pint* (O), is an eighth part.

CONII FOLIA ET FRUCTUS. The *leaves* and *fruit* (seed) of the *Conium maculatum* (from κονις, *dust*). Hemlock. *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

Hemlock is a common umbelliferous biennial, flowering in England in June and July: it is now common in the United States. Its stem and leaves emit a strong peculiar odour, which has been compared to that of cat's urine. It is distinguished from other plants of the same natural order by the dark and shining colour of its lower leaves, by its large fine spotted stem, and by its odour.

The leaves should be collected for pharmaceutical use just before the plant flowers, and the stalks having been picked off, they should, if intended for powder, be carefully dried, either by exposure to sun and air, or in a very moderately heated stove. In this state they may be preserved in green glass bottles; or the powder may be kept in closely-stopped opaque vials. It is, however, doubtful how far dependance can be placed upon the medicinal activity of this plant when it has been dried; and, upon the whole, its other preparations are certainly preferable. Its medical efficacy is said to vary considerably with the climate under which it is produced: in Italy, Spain, and Portugal, it is represented as possessing a degree of narcotic power far beyond that which it attains in England; and in warm and dry seasons its activity exceeds that which it possesses in cold and wet weather.

The seed of hemlock is inodorous, bitterish, and somewhat acrid, and contains fixed oil; it possesses the narcotic powers of the plant.

The active principle of hemlock is an alkaloid of a peculiar character; it was first identified by Geiger, and by Boutron-Charland, and O'Henry, and has been examined more in detail by Dr. Christison (*Edinburgh Phil. Trans.* 1836, p. 383).

Conia (*Conicine*, *Conoin*, *Cicutine*,) thus obtained, resembles a colourless volatile oil, lighter than water, of a powerful diffusible odour, somewhat like that of hemlock, and an intensely acrid taste. It requires to be carefully excluded from air; otherwise it is slowly changed into a resinous matter.

Dr. Christison observes, that conia is most abundantly obtained from the fully-developed seeds, but still green; even from them, however, the quantity is small; from forty pounds, he obtained two ounces and a half of hydrated conia; but it probably exists in the plant in larger proportion, for much of it is always decomposed in the processes of separation, as is indicated by the evolution of ammonia.

Geiger says that the *dried* leaves of hemlock contain no conia, and that it is not to be found in many specimens of the extract;

hence the discrepancies respecting their efficiency. According to Dr. Christison, the extract becomes feeble, or inert, in two ways; either by having been overheated towards the end of the process, or by having been long kept exposed to air; in both cases ammonia is formed, and extracts well prepared at first, become inert in a few years. To ascertain if conia be present, the extract, or other preparation, may be triturated with solution of potassa, upon which the odour of conia, if present, is strikingly perceptible. The alcoholic extract of the ripe seeds appears to be most efficacious. Probably, however, some salt of conia will prove to be the most effective and convenient form for its medical use.

Conia is a deadly poison to every order of animals; it first palsies the voluntary muscles, then the respiratory muscles and the diaphragm, thus producing death by asphyxia. The heart continues to act after other signs of life are extinct. Few poisons equal it in subtilty or swiftness: a drop put into the eye of a rabbit, killed it in nine minutes; three drops in the same way killed a strong cat in a minute and a half. Two grains of conia, neutralised by hydrochloric acid, and injected into the femoral vein of a young dog, produced almost instantaneous death: "in two seconds, or three at farthest, and without the slightest warning struggle, respiration had ceased, and with it all external signs of life."

Conia is probably combined in the recent plant with some vegetable acid; this, however, has not been ascertained.

There are two preparations of hemlock directed in the London Pharmacopœia; an extract, and a tincture, in both of which the leaves are exclusively used.

Extract of Hemlock. — Take of fresh leaves of Hemlock, a pound. Bruise them in a stone mortar, sprinkled with a little water, then express the juice, and evaporate it, unstrained, to a proper consistence.

Of the two preparations the *extract* is most to be relied on, and when fresh and carefully prepared, is an active and useful remedy; the causes of its uncertainty, the modes of testing its efficacy, and the precautions requisite in its preparation, will be obvious from the preceding statement respecting the nature and properties of its active principle. The most active extract is that which is procured by moderate pressure from the leaves only; when the stalks and stems are used, and violent pressure employed, the extract is glutinous, dark-coloured, and viscid, and less active than in the former case, when it has a somewhat mealy consistency, and an olive-green colour. With every caution, however, on the part of the operator, the colour, odour, and efficacy of extract of hemlock will vary with the season and with the situation and soil in which the herb has grown. The best method of preparing this and similar extracts, consists in gradually heating the expressed juice to a temperature of about 212°, then to suffer it to cool, to strain it through moderately fine linen, and evaporate the strained liquor, and when

it has nearly acquired a proper consistency, to add the matter which remained upon the strainer.

The preparation of this extract almost necessarily requires the use of a proper steam apparatus, for over an open fire it is deteriorated by the heat, and in a water-bath the evaporation is so prolonged as to injure it. One hundred weight of the fresh herb yields from three to five pounds of extract, according to the state and quality of the plant.

When extract of hemlock is very dark-coloured, viscid, nearly inodorous, or having a burned odour resembling treacle, or when mouldy, or covered with saline efflorescence, it should be rejected; its odour should resemble that of the fresh plant, and become more powerful, from the evolution of conia, when triturated with a few drops of solution of potassa; if, when thus treated, it only gives out ammonia, its efficacy may be doubted. With every precaution, however, the activity of extract of hemlock is liable to such uncertainty as to require much care in its exhibition; *two* or *three grains* of one sample are sometimes as powerful as twenty or thirty of another; hence the necessity of beginning with doses of *one* or *two grains*, and gradually augmenting them till they produce the expected result.

In the present state of pharmacy, the *extract* is the only preparation of hemlock which can be trusted; the powder of the dried leaves is more uncertain, and the tincture (prepared with the dried leaves) is similarly objectionable. Perhaps a tincture of the seeds might afford a preparation of more certainty, but until the properties of conia and its salts have been more fully investigated in their pharmaceutical relations, the carefully prepared extract must be preferred to other forms.

Medical Use.—Hemlock is a powerful and useful sedative, and in those numerous cases in which opium is contraindicated, it will occasionally allay pain and diminish irritability. Dr. Paris says, "According to my own experience, it is, in well-directed doses, by far the most efficacious of all palliatives for quieting pulmonary irritation. It has been extolled also in the cure of schirrus and cancer, and will without doubt prove in such cases a valuable resource, from its sedative influence. Externally, it will afford considerable relief in irritable ulcers when applied in the form of fomentation or cataplasm." It has been used as an alterative in scrofula, and in secondary syphilis, and as a sedative in chronic rheumatism, neuralgia, and other painful affections; also in hooping-cough, and in those obstinate forms of cough which succeed pulmonic inflammation.

Extract of hemlock may be given in the form of pills, and in solution. The average dose is from one to three or four grains; if it produce vertigo, and nausea, its effects must be carefully watched, and the dose modified accordingly. It may be usefully combined with small doses of opium and of expectorants, as in

the following formula, which is effectual in quieting the cough and bronchial irritation that succeed or accompany catarrh.

℞ Extracti Conii, Pulv. Ipecac. compos., āā ℥j. Misce et divide in pilulas triginta, quarum sumantur duæ horâ decubitus.

Dr. Stoerk administered hemlock as follows :—

℞ Extracti Conii, Pulveris Foliorum Conii, āā ℥ss. Fiant pilulæ viginti. Initio sumat æger pilulam unam, mane nocteque ; postea binas, deinde tres vel quatuor, et denique augeatur dosis quantum possit.

The following may be used to allay common or spasmodic cough :—

℞ Extract. Conii grana v. ; Misturæ Amygdalæ f℥xiv. ; Syrupi Papaveris f℥ij. M. Sumat cochleare unum medium bis vel ter die.

The efficacy of extract of hemlock, as an external application in the form of lotion or poultice, is uncertain ; it may be used in the usual way with bread and water, or dissolved in hot water in the proportion of an ounce to a quart.

In over-doses, extract of hemlock produces vertigo, wandering of the mind, dilatation of the pupil, paralysis, and ultimately, the symptoms above mentioned as resulting from conia. In some of the best recorded cases the leading symptom was coma. Emetics and purgatives are the only antidotes ; they may be followed by ammonia, and mild stimulants. Vinegar, and the acids, which have sometimes been recommended, are, theoretically, inadmissible.

The primary seat of the action of conia is probably the spinal cord.

CONSERVE (from *conservo*), a composition in which substances are mixed with or preserved by sugar, *See* Confectio.

CONTRAJERVA. *Radix.* The root of *Dorstenia contrajerva. Cl.* 4. *Ord.* 1. Tetrandria Monogynia. *Nat. Ord.* Artocarpeæ.

This plant is a native of South America and the West Indies.

Contrajerva root is a warm bitter ; and mixed with chalk forms the *Pulvis Contrajervæ compositus* of former Pharmacopœiæ. The old physicians considered it as an antidote to all poisons, except corrosive sublimate. In modern times it has been employed in diarrhœa and dysentery ; in atonic gout, and in chronic rheumatism ; it also has been used as a diaphoretic tonic in various cases of febrile debility. It is one of the many articles of the Materia Medica, which, though once in great repute, has fallen into disuse.

CONVOLVULUS SCAMMONEA, *see* Scammonium.

COPAIBA. *Resina Liquida.* The *liquid resin* of the *Copaifera Langsdorfii. Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Leguminosæ.

There are many species of *Copaifera*, all of which yield the balsam ; hence, probably, the various characters which it possesses.

The liquid resin is obtained by boring the trees near the base of the trunk, when it flows abundantly. It is chiefly imported from

Brazil, in casks, containing from one to one and a-half hundred weight. It has the consistency of oil, but is more viscid and glutinous; a pale-yellow colour; a peculiar and somewhat aromatic odour; and a pungent and rather nauseous taste. Its specific gravity varies from 0·95 to 0·96. It communicates flavour to water shaken with it, and is perfectly soluble in about eight parts of alcohol, and in ether in any proportion. When rubbed upon paper and dried, it leaves an apparently greasy stain, but this differs from that of oil, by admitting of being written over with common ink. If adulterated with oil, the strain would of course be truly greasy, but we rarely meet with any samples which there is reason to believe are sophisticated by the addition of oil. The appearance of the article as it occurs in trade differs considerably, but this is probably chiefly owing to the circumstances under which it is collected, to the trees whence it is obtained, and to its age. "Its adulteration by castor-oil is discovered by mixing three parts of the suspected balsam with one part of sulphuric acid; if it be pure, a *plastic* reddish mass will be formed; if it contain castor-oil, the consistence is that of turpentine, and it is scarcely coloured. An easier mode is to agitate in a bottle one part of *liquor ammoniæ* with two and a-half of copaiba; if the mixture remain cloudy after standing at rest for some time, it contains castor-oil. If copaiba balsam be pure, it rapidly solidifies when mixed with calcined magnesia; if this be not effected, the balsam is impure, and contains a fixed oil."—(Thomson's *Lond. Disp.*)

The *Edinburgh College* gives the following tests of the purity of this drug: Transparency, free of turpentine odour when heated; soluble in two parts of alcohol; it dissolves a fourth of its weight of carbonate of magnesia, with the aid of a gentle heat, and continues translucent.

It appears to me, says Mr. Brande, that the chief adulteration to be apprehended is with certain species of turpentine, and that this fraud will not be detected by the method to indicate its mixture with castor-oil. According to some, a large quantity of this article, as sold in London, is entirely factitious. Some years ago, a trial took place between the owner of certain premises that were burnt down, and the Directors of the Sun Fire-office, in consequence of the latter refusing to indemify the proprietor, because the fire had been occasioned by his *making* balsam of copaiba. (*Pharmacologia.*) Mr. Pereira does not think that this balsam is adulterated now.

The term *balsam* being generally restricted to compounds of resin and benzoic acid, is not applicable to this substance; nor is it strictly a liquid resin, but a compound of volatile oil and resin. When distilled, the former, which is highly odorous and pungent, and upon which the virtues of copaiba depend, passes over, and there remains an insipid resin in the retort, which has sometimes been employed in medicine under the name of *inspissated copaivi*

balsam. In good copaiba balsam the proportion of oil to resin is about 40 to 60.

Medical Uses and Properties.—Copaiba has long been used in gleets, fluor albus, and other similar discharges; it has also been employed in hæmorrhoidal affections. It operates chiefly as a diuretic; in large doses it proves aperient. We are told that when there is inflammatory action in the urinary canals, this remedy should be avoided; yet it allays the irritation of the bladder and kidneys, and diminishes the secretion of uric sand.

Copaiba has been prescribed with success by Dr. La Roche and others in chronic diarrhœa and dysentery. In chronic bronchitis and catarrh its good effects have been long known. I have directed it with success in chronic and subacute irritation of the conjunctiva with copious discharge. It often gives relief in irritable bladder.

It is given in doses of 10 minims to f℥j. twice or thrice a day, either simply upon water, or triturated into an emulsion with yolk of egg or gum arabic. One drachm, administered three times a day, in piles, generally purges. It is apt to nauseate, especially when given in emulsion, but this effect may be prevented by the addition of some aromatic water, as in the following :—

℞ Mucilaginis Acaciæ ℥iss.; Copaibæ ℥ss. tere simul et adde gradatim, Aquæ Menthæ f℥j.; Tincturæ Capsici ♏iij. M. fiat haustus, bis vel ter quotidie sumendus.

Dr. Paris prescribes it as follows, as an antilithic in cases of uric diathesis :—

℞ Copaibæ ℥ss.; Mucil. Acaciæ f℥ij. tere simul et adde, Sodæ Carbonatis gr. x.; Mistur. Amygdal. f℥j.; Tinct. Opii ♏v. Fiat haustus urgente dolore sumendus.

Its activity is increased by union with cubebs. By some the oil of copaiba is preferred to any other preparation of the balsam. The usual dose is ten to twenty drops on a lump of sugar.

According to Dr. Chapman, copaiba is best exhibited by pouring it upon half a wine-glassful of water, and afterwards slowly adding a few drops of bitter tincture, by which means the copaiba will be collected into a globule that may be easily swallowed, while its taste is masked by the bitterness.

A recent mode of administration is in capsules, which consist of gelatin, gum and sugar. Enemata of copaiba have been employed by Velpeau in gonorrhœa with good effect.

COPPER, *see* Cuprum.

CORIANDRUM (κορις, *a bug;* from its odour). *Fructus.* The *fruit* of the *Coriandrum sativum. Cl. 5. Ord. 2.* Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

This plant is a native of the south of Europe.

Coriander seeds have a sweet but somewhat nauseous aromatic flavour. They are carminative and stomachic, and are occasionally prescribed in conjunction with cathartics. They enter into the composition of the *Confectio Sennæ* of the Pharmacopœia, and form one of the ingredients in *currie-powder.* When distilled with

water, they yield a small quantity of essential oil. Their active parts are perfectly extracted by alcohol, but only imperfectly by water.

CORNU. *Horn.* The horn of the *Cervus elaphus*, the Stag, or Hart.

The horns of the stag are more analogous to bone than to common horn; they contain less phosphate of lime, however, and a larger relative proportion of gelatine, than is found in common bone. Hartshorn shavings, when boiled in water, yield about one-fourth of their weight of gelatin. Four ounces, boiled in a quart of water down to a pint, and strained, yield a tremulous and moderately agreeable jelly. Subjected to destructive distillation, horn, like bone, yields a considerable quantity of ammoniacal products; hence the terms *salt of hartshorn*, and *spirit of hartshorn*, applied to the impure solid and liquid carbonates of ammonia derived from the above source. (*see* AMMONIA).

CORNUS FLORIDA. DOGWOOD. *Cortex.* The bark.

This, one of our most beautiful indigenous shrubs, grows in all parts of the United States. In New England it is known by the name of *boxwood.* The bark, both of the stem and root, has considerable astringency; and has long had no little reputation in different parts of the country for the cure of intermittent fevers. The dried bark should be used in preference to the fresh. It may be given, in powder, in *doses* of from *one* to *two scruples*, repeated at suitable intervals. The decoction is recognised as an officinal preparation in the United States Pharmacopœia, and is thus directed:—Take of dogwood bark, bruised, an ounce; water, a pint. Boil for ten minutes in a covered vessel, and strain the liquor while hot. Dose, two ounces, to be repeated as the case may require.

Although the *C. Florida* has been most attended to, there are several others of the same genus, which, from their bitterness, promise quite as much efficacy, such as the *Cornus Circinata*, or Round-leaved Dogwood, which is a favourite remedy in many parts of New England, and still more the one to be next noticed.

CORNUS SERICEA. SWAMP DOGWOOD. American Red Rod Cornel; called also Red Willow.

In its general characters this tree agrees with the *C. Florida.* It grows in a moist soil by the side of creeks and rivers, and in swamps; and seldom attains a height of more than six or eight feet. It flowers later in the season than the other cornel already described. Dr. Walker, who has borne the strongest testimony in favour of the barks of both species, recommends them as a substitute for the cinchona, and makes their composition to be of extractive matter, tannin, and gallic acid, &c. But we must receive the testimony of those who think they find so readily substitutes for the Peruvian bark with mistrust; and regard opinions of this nature as expressive of their hopes more than the realities of the case.

The bark of the *C. sericea* is used in the same doses, and its decoction prepared in the same manner, as that of the *C. Florida.*

CORRIGENS. That substance in a medicinal formula which is supposed to *correct* the operation of the more active ingredients.

COSMETIC (from κοσμος, *ornament*). A remedy which improves the complexion.

CREASOTON (from χρεας, *flesh*, and σωζω, *I save*). Creasote. *Oxy-hydro-carburetum, ex Oleo pyroxilico paratum.* An *oxy-hydro-carburet*, prepared from pyroxylic oil.

This compound was discovered by Reichenbach. When a large quantity of wood-tar is distilled, it yields a light and a heavy oil: the latter, when purified by distillation off carbonate of potassa, is mixed with solution of caustic potassa, heated, and afterwards separated again by the action of diluted sulphuric acid; it is then again distilled, mixed with phosphoric acid, to abstract a little ammonia, and ultimately rectified with water. The details of the whole process, which are very tedious, will be found in Dumas's *Chimie appliquée aux Arts*, and in Brande's *Manual of Chemistry*.

Creasote* is a colourless, transparent liquid, having a strong odour, like that of smoked meat; it has a hot, pungent taste, having a slight sensation of sweetness on the palate. Its specific gravity is 1·037. It boils at 397°; retains its fluidity at −17°: burns with a sooty flame. When mixed with water, two solutions result, the one consisting of 1·25 creasote and 100 water; the other of 100 creasote and 10 water. Creasote coagulates albumen and serum; it appears to be the principle which confers on wood-smoke and on pyroligneous acid, their antiseptic powers. It acts powerfully on the animal system; kills fishes and insects, and destroys vegetation, even when much diluted. It is medicinally used as a stimulant in atonic dyspepsia and anorexia, and to allay nausea and vomiting. It is applied externally for the relief of toothache, and of nervous and rheumatic pains; and also to foul ulcers, cancerous sores, and some cutaneous affections; also as a means of checking hemorrhage.

℞ Creasoton ♏iv. ad x.; Misturæ Camphoræ, Infus. Gentian. compos., āā ƒ℥vj. M. fiat haustus.

Ointment of Creasote. — Take of Creasote, half a fluidrachm; Lard, an ounce. Rub and mix.

CRETA. *Calcis Carbonas friabilis.* Chalk. Friable Carbonate of Lime. *See* Prepared Chalk, p. 103.

Note. — Chalk is entirely dissolved by dilute hydrochloric acid, with effervescence. This solution, when it has been boiled, deposits nothing on dropping in ammonia.

The object, probably, of these tests, is to show the absence of silica and other substances insoluble in dilute hydrochloric acid, and of alumina and phosphate of lime, by the non-action of ammo-

* The following characters of creasote are contained in the preliminary *Notes* of the *London Pharmacopœia*:—

Creasote is oily, colourless, of a peculiar odour, translucent, boils by a degree of heat of 397. In the degree of heat (that is at the temperature) of −50, it is not congealed. It is dissolved by acetic acid.

nia, after the whole of the carbonic acid has been expelled from the solution by boiling it. Care must be taken to use perfectly pure and caustic ammonia, for if it contain any carbonic acid, carbonate of lime will be thrown down. Whiting is a useful form of chalk, and generally very pure.

CROCUS. *Saffron. Stigmata exsiccata.* The *dried stigmata* of the *Crocus sativus.* *Cl.* 3. *Ord.* 1. Triandria Monogynia. *Nat. Ord.* Irideæ.

Next to English saffron, that which is imported fron France and Sicily is preferred to that from Spain; the latter is usually greasy, and carelessly cured. The petals of marigold and of safflower are sometimes used to adulterate saffron: but they are detected by infusion in water, when they unfold, and are easily recognised. Saffron, from which a portion of colouring matter has already been extracted, is sometimes fraudulently blended with the genuine drug; it then has a dingy aspect, and yields a paler infusion than it should do. Fine sand is sometimes fraudulently mixed with it. A kind of saffron compressed into cakes is also found in trade; it is very inferior to the former, and is chiefly used as a colouring matter by the confectioners. "The cake saffron, sold in some of the less respectable shops, consists of one part of saffron and nine of marigold, made into a cake with oil, and then pressed; it is sold in considerable quantities for the use of birds when in moult."—(Paris. *Pharmacologia.*)

Medical Properties and Preparations of Saffron.—Saffron was formerly regarded as powerfully exhilarating and antispasmodic, and was especially celebrated as an emmenagogue: "in one or two instances," says Dr. Cullen, "I have had some reason to believe in its power of this kind, but in many other instances, though repeatedly employed in large doses, it has entirely disappointed my expectation." Saffron tea is still a popular prescription in cases of repelled exanthemata, as of measles and scarlet fever. From modern regular practice it has been rejected, as a drug of no powers, and is now chiefly used as a colouring material in several tinctures, in the *Syrup of Saffron*, and in *Aromatic Confection.* The vapour, however, which rises from decoction of saffron, excites considerable irritation in the eyes and nose, and an atmosphere impregnated with the odour of saffron, is to some persons nauseating and overpowering. Syrup of saffron is principally used to give colour, but aromatic confection is a more valuable adjunct, though, as a stomachic stimulant, the saffron may safely be omitted; it adds little to its medicinal efficiency, and greatly to its expense.

Syrup of Saffron.—Take of Saffron, ten drachms; Boiling Water, a pint; Sugar, three pounds. Macerate the Saffron in the water for twelve hours, in a lightly-covered vessel; then strain the liquor, and add the sugar.

Aromatic Confection.—Take of Cinnamon, Nutmegs, of each, two ounces; Cloves, an ounce; Cardamoms, half an ounce; Saffron, two ounces; Prepared Chalk, sixteen ounces; Sugar, two pounds. Rub the dry ingredients together to a very fine powder, and keep them in a close vessel. But when

ever the confection is to be used, add water gradually, and mix until they are thoroughly incorporated.

CROTON CASCARILLA, *see* Cascarilla.

CROTON TIGLIUM, *see* Tiglii Oleum.

CUBEBA. *Baccæ. Cubebs.* The *berries* of the *Piper cubeba. Cl.* 2. *Ord.* 3. Diandria Trigynia. *Nat. Ord.* Piperaceæ.

This plant is a native of Java.

Cubebs (or Java pepper) much resemble common black pepper in appearance, but each berry has a short stalk attached to it, whence the term *Piper caudatum.* The larger, heavy, and plump berries are to be preferred to the small, light, and shrivelled; they have an aromatic and rather agreeable odour, and a warm bitterish taste, without the biting pungency that belongs to black and long pepper. They contain, according to Vauquelin, a volatile oil and resin, forming a compound not unlike copaiba balsam, together with a coloured resin, extractive, and some salts. According to Thomson, there are two volatile oils, one fluid and the other concrete.

Cubebs are diuretic and aperient: they are administered most effectually in the form of powder, and in doses of from a scruple to one or even two drachms, three or four times a day, in a wine-glassful of water.

Cubebs are almost exclusively used as a remedy in gonorrhœa: they generally produce increased secretion of urine, which becomes deep-coloured, and acquires an aromatic odour. They seem to be most advantageously given in the early and acute form of the disease, moderating the pain and suppressing the discharge. According to Mr. Jeffreys, their good effects manifest themselves generally within forty-eight hours after the first dose; but unless material relief be obtained in the course of five or six days, their continued administration is rarely to be recommended: when, however, they fail, the symptoms readily yield to copaiba. Their efficacy in gonorrhœa may be judged of from the following statement of the results of forty cases, treated by Mr. Broughton (*Medico-Chirur. Trans.*, vol. xii).

Cured in two to seven days	10
Cured in eight to fourteen	17
Cured in fifteen to twenty-one	8
Cured in twenty-two to thirty	1
Cured in fifty-five	1
No sensible effect	3

In some cases the adequate dose of cubebs produces flushing and headache, giddiness, quick pulse, and burning sensation of the hands and feet; in others, urticaria, and, according to Dr. Duncan, swelled testicles. Cubebs have been used advantageously in leucorrhœa, and in inflammation of the mucous membrane of the intestines, and spasm of the colon.

In India they are regarded as aphrodisiac. According to Dr. Paris, it is important, during the use of cubebs, to keep the bowels open, for where hardened feces are allowed to accumulate, the spice

insinuates itself into the mass, and produces excoriations in the rectum.

Cubebs I have found to be one of the best remedies for irritable bladder, both alone and when combined with carbonate of magnesia. The dose should not exceed twenty grains two or three times a day.

The volatile oil of cubebs is a good diuretic, and may be administered in the form of elœosaccharum, and with the powder in gonorrhœa.

COCUMIS COLOCYNTHIS, *see* Colocynthis.

CUPRUM. *Copper.* The name of this metal is derived from the island of Cyprus, where it was first wrought by the Greeks; it has a peculiar reddish colour, much brilliancy, and is very ductile and malleable. Its specific gravity is 8·8. It melts at a dull-white heat, being a temperature between the fusing-points of silver and gold; by the joint action of heat and air it becomes superficially oxidized.

There is only one salifiable oxide of copper, which, if considered as a *protoxide*, gives the equivalent of the metal as = 32, and is composed of—

	Atoms.	Equivalents.	Per Cent.
Copper	1	32	80
Oxygen	1	8	20
Oxide of Copper	1	40	100

This oxide is of a black colour, and furnishes blue solutions with the acids; from these it is thrown down, in the form of a bulky blue *hydrate*, by the fixed alkalis, and by ammonia, but it is soluble in excess of the latter alkali, producing a deep sapphire-blue liquid. This blue tint, communicated by addition of ammonia to solutions containing only slight traces of the metal, is a valuable test of its presence; another very delicate test of copper is the ferrocyanuret (ferrocyanide) of potassium, (*prussiate of potassa,*) which produces a brilliant brown tint in solutions extremely diluted, and in other cases throws down a rich brown precipitate, which is a ferrocyanuret of copper. The acid solutions of copper are decomposed by the immersion of a plate of clean iron, which becomes coated with metallic copper; and sulphuret of copper is thrown down by hydrochloric acid (sulphuretted hydrogen).

The salts of copper are poisonous, but metallic copper is apparently without deleterious action upon the system; copper coins which have been swallowed, have remained for a long time in the alimentary canal without poisonous influence; and formerly copper filings were used as a vermifuge and remedy for chronic rheumatism. Two cases of halfpence swallowed by children are cited by Dr. A. Thomson; in one the halfpenny remained six months in the intestines, and in the other two months; both were evacuated without having in the smallest degree injured the health, although the impressions on the coins were nearly effaced, and the metal much corroded.

Another case is mentioned by Dr. Paris, of a young woman who swallowed six copper penny-pieces, with a view of destroying herself; she was supposed to be suffering from some visceral disease, but, after the lapse of five years, she voided them, and then confessed the cause of her protracted illness, during the whole course of which, however, no symptom arose in any way attributable to the poisonous influence of copper. Dr. Baillie related a case in which five halfpence were lodged in a pouch in the stomach for a long time, without occasioning mischief.

In all cases of poisoning by copper, therefore, the metal must either have been oxidized or salified, and this is in some cases more easily effected than might at first be supposed.

Pure water derives no contamination from long-continued contact with copper filings, but water containing about $\frac{1}{20}$th of common salt, after being boiled in a brass or copper pan, is found to be slightly cupreous; beef, fish, or vegetables, on the other hand, boiled with their usual quantity of salt in the same vessels, are not contaminated; milk, tea, coffee, or beer, boiled for two hours in a perfectly clean copper vessel, contract no impurity; nor does water in which carrots, turnips, cabbage, potatoes, onions, rice, or barley are boiled. If, however, the vessel is not thoroughly clean, or if the article be allowed to remain in it some hours, action may not only ensue, but even to a very great extent. It was at one time customary to boil pickles in copper vessels, or to put halfpence into them, and leave them till they acquired a green colour. In all these cases, the chief action ensues at the edge of the fluid where it is in joint contact of air and the metal; and fat or greasy liquids, and acids, are most energetic in promoting this action. Upon the whole, it is highly desirable that all copper utensils should be banished from culinary use, for even when tinned, they become abraded, and the protection is at best imperfect.

Another article of food, which is occasionally contaminated by copper, is bread; never, I believe, in this country, but in some of the towns of Flanders and France, the bakers add about $\frac{1}{1800}$th part of the sulphate of copper to dough, for the purpose of improving the colour of the bread: this quantity, is, it is true, very minute, but its continued introduction into the system may ultimately prove hurtful.

Symptoms and Treatment of Poisoning by Copper. — The symptoms produced by copper poisons depend partly upon their local action on the alimentary canal, and partly on their operation upon distant organs. Orfila found that twelve or fifteen grains of acetate of copper killed dogs within an hour, and that besides the usual symptoms of irritation in the stomach, they often had insensibility, almost always convulsions, and, immediately before death, rigidity, or even absolute tetanus. (Christison. Art. *Copper.*) Sulphate of copper also proves fatal when applied to wounds. In an experiment made by Dr. Duncan, the animal died in twenty-two hours, and the body was everywhere in a healthy state.

According to Orfila, however, acetate of copper produces no such effects. Copper has been found in the blood of animals that have taken it; in that of the carotid artery, but not in the jugular vein, by Lebküchner; and by Dr. Wibmer only in the incinerated residue of the liver.

The symptoms caused by the soluble salts of copper, in man, are stated by Dr. Christison to be generally the same with those caused by arsenic and corrosive sublimate; there are also some peculiarities. The first symptoms are headache, vomiting, pains in the bowels, and afterwards cramps and pains in the legs and thighs: there is also aversion to the smell of copper, and a copper taste in the mouth. Jaundice is also a symptom in some respects peculiar to copper. When the case ends fatally, convulsions, palsy, and insensibility generally precede death; signs, in short, of injury done to the brain. In some cases, narcotic symptoms form the commencement, and irritant symptoms the termination, of the poisoning. Artisans and workmen who employ copper, and are much in contact with it, are stated by Patissier (*Traité des Maladies des Artisans*) to have a peculiar appearance, which distinguishes them from other tradesmen, and are said to be liable to painters' colic. Dr. Christison observes, however, that these statements must be received with some limitation, for copper-workers in Great Britain are not generally unhealthy.

The appearances found in the body after death, in cases of copper-poisoning, are those of inflammation of the œsophagus, stomach, and intestines; the skin is described as having a peculiar yellowness, and in a case of poisoning by verdigris, it was found in the form of powder lining the inside of the stomach, after almost incessant vomiting for three days: too much reliance, however, must not be placed upon a mere green or blue tint of the membranes, for the stomach and its contents have been observed to acquire these tints in consequence of natural disease.

Sugar, whites-of-eggs, or, in the absence of these, milk, or even wheat-flour, iron filings, and ferrocyanuret of potassium, are represented as antidotes to the poisonous effects of copper. Vinegar is decidedly injurious.

Preparations and Uses of Copper. — *Sulphate of copper* (*Cupri sulphas*) has a place in the Materia Medica of the present Pharmacopœia, and the *Ammonio-sulphate* is among the Preparations. The diacetate of copper, or verdigris, has already been described. *See* Ærugo.

Sulphate of copper, called also *Roman*, or *blue vitriol*, and *salt of Venus*, is obtained by dissolving oxide of copper in dilute sulphuric acid; sometimes it is procured by the action of sulphuric acid on chloride of copper; or by the decomposition of sulphate of silver by plates of copper: the latter process is limited to the refiners.

Sulphate of copper is a powerful and rapidly-acting emetic; it is chiefly useful where the stomach has been paralysed by narcotic

poisons. In cases of over-dose of opium, it will often occasion vomiting where other emetics are ineffectual. The best mode of administering it is to dissolve half a drachm in six ounces of water, a third part being taken every ten or fifteen minutes, until it operates. It has also been used as an emetic in the early stages of phthisis, and in croup. In very small doses, it is sometimes prescribed as a tonic, especially in certain cases of epilepsy, and in diarrhœa, chronic dysentery, and alvine hemorrhages. In a case of epilepsy recently under my care I derived no advantage from the sulphate of copper. It seemed, on the contrary, rather to accelerate a return of the fit.

℞ Cupri Sulphatis gr. iij.; Medullæ Panis ʒj. Fiat massa in pilulas xxiv. dividenda, quarum capiat æger unam ter quaterve in die.

Even in these small doses, however, if persevered in, it is apt to excite spasmodic pains of the stomach, an effect which may generally be counteracted by the addition of a quarter of a grain of opium to each pill.

In obstinate intermittents, two grains have been given twice a day, with half a grain of opium, with manifest advantage; but it is a remedy which should not be resorted to on trifling occasions.

Externally, sulphate of copper is a useful escharotic, and, properly diluted, it is sometimes applied advantageously to foul and indolent ulcers, or as a styptic in hemorrhage. In ulcerated sore throat, where there is no material constitutional affection, the sores may generally be made to heal by touching them two or three times a day with a camel-hair pencil, moistened with the following solution: —

℞ Oxymel fʒss.; Cupri Sulphatis gr. v. M.

A very dilute solution of sulphate of copper is sometimes used as an ophthalmic lotion. "In the proportion of half a drachm to eight ounces of rose-water, it forms a lotion which has been found very efficacious in phagedenic ulcers of the face, and in allaying itching when attended with erysipelatous inflammation about the anus." — (Paris. *Pharmacologia.*) Bate's *Aqua Camphorata* was a favourite eye-wash of the late Mr. Ware, especially in the purulent ophthalmia of infants. The following was his formula: —

℞ Cupri Sulphatis, Boli Gallici, ãã gran. xv.; Camphoræ gran. iv. Solve in aquæ ferventis ʒiv. et dilue cum aquæ frigidæ octariis iv. cola ut fiat collyrium.

A solution of half a grain to a grain to the ounce of Rose Water, gradually increasing if need be the strength of the dose, is an excellent injection in gleet.

Ammonio-Sulphate of Copper. — Take of Sulphate of Copper, an ounce; Sesquicarbonate of Ammonia, an ounce and a-half. Rub them together till carbonic acid shall have ceased to be evolved; then dry the ammonio-sulphate of copper, wrapped in bibulous paper, in the air.

Solution of Ammonio-Sulphate of Copper. — Take of Ammonio-Sulphate of Copper, a drachm; Distilled Water, a pint, Dissolve the ammonio-sulphate of copper in the water, and filter.

During the mutual action of the sulphate of copper and sesquicarbonate of ammonia, carbonic acid is evolved, and carbonate of copper and sulphate of ammonia are formed, which, together with the undecomposed sesquicarbonate of ammonia, constitute the *ammonio-sulphate of copper*. It has an ammoniacal odour, a fine blue colour, and a styptic and metallic taste; it is liable to vary in composition, in consequence of the retention of more or less of the sesquicarbonate. The aqueous *solution* is of a fine blue colour, but, unless some excess of sesquicarbonate of ammonia is retained, it gradually deposits oxide of copper.

The *ammonio-sulphate of copper* (*cupro-sulphate of ammonia*) or *ammoniated copper*, is placed by writers on the Materia Medica in the list of tonics and antispasmodics. It has been recommended in epilepsy, and is usually tried in obstinate cases of that disorder; from one to five grains are given twice or thrice a day, in the form of pill; in consequence, however, of its uncertain composition, it is not well adapted for internal use. It is said to have been given with advantage in chorea, after a course of purgatives; but in this disease sulphate of copper, sulphate of zinc, vegetable antispasmodics, and cold bathing, are remedies more to be relied upon.

The *solution of ammonio-sulphate of copper* is stimulant and astringent, and among the applications which sometimes induce indolent ulcers to assume healthy actions and ultimately cleanse and heal them; but it frequently irritates, and appears to possess no real advantage over solution of sulphate of copper. It has also been extolled as a stimulant for the cornea, when threatened with specks and opacity; to say nothing, however, of the variability of the ammonio-sulphate itself, the tendency of its dilute aqueous solution to deposit oxide, is a serious objection to its employment.

CUSPARIA. *Cortex.* The *bark* of the *Galipea Cusparia*. *Cl. 5. Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Rutaceæ.

This bark was originally introduced into the Materia Medica by Mr. Brande's father, in the year 1778, under the name of *Angustura Bark*, and in 1791 he published an essay upon it. Upon the authority of M. St. Hilaire, it is represented as the produce of a species of *Galipea*, for which the specific name *Cusparia* has been adopted; it is represented elsewhere as the produce of *Cusparia febrifuga*, and of *Bonplandia trifoliata*.

This bark is imported from South America, and is generally packed in casks; the original package consisted of large palm leaves, and a net-work of sticks. It is both in flat and quilled pieces; it breaks with a short resinous fracture. It is covered with an ash-coloured epidermis, and is internally smooth, and of a dull, brown colour. A spurious and poisonous bark, probably that of one or more of the species of *Strychnos*, is sometimes met with under the name of *Angustura*; it is more intensely bitter, in shorter and less regular pieces than the genuine; internally nearly black, and externally covered with a rough, rust-coloured, and spotted epidermis.

Cusparia bark is bitter flavoured, accompanied by a peculiar

and somewhat aromatic pungency. Its odour, especially when fresh from the package, is rather nauseous and fishy. It is easily pulverisable. Its chemical nature has not been accurately determined. Chemists have failed to obtain from it a salifiable base, though it appears to contain a peculiar alkaloid, for, when triturated with caustic potassa, it exhales ammonia.

Cusparia bark contains *resin*, a peculiar variety of *extractive*, *carbonate of ammonia*, *volatile oil*, and igasuric acid, which Brande was inclined to think was in combination with cinchonia; but Saladin has investigated the subject, and asserts that it is a new alkali, which he has termed *Cusparin:* it is procured by acting upon the infusion (query, extract?) of cusparia bark by absolute alcohol, and leaving it to spontaneous evaporation. The crystals procured are four-sided, melt at a low temperature, and lose 3·09 *per cent.* of weight. Water at 60° dissolves only 0·5 *per cent.*, and at 212° 1 *per cent.* They dissolve in acids and alkalis, and are precipitated by infusion of galls.

Cusparia is a valuable tonic, especially in cases of dyspepsia, with diarrhœa and loss of appetite. It may be given in powder, in doses of ten grains twice or thrice a day, or in infusion or decoction. In cases of flatulency, attended by nausea, five grains, with the same weight of rhubarb, taken an hour before dinner, will often restore appetite and digestion. It is particularly useful in dysentery and chronic diarrhœa, especially that form of diarrhœa to which persons who have resided in warm climates are frequently subject, and which often assumes, even in this country, more or less of a dysenteric character. It may be conjoined in such cases with some aromatic, such as *Pulvis Cinnamomi compositus*, or *Pulvis Cretæ compositus*, or given as follows:—

1. ℞ Cuspariæ contusæ ℥j.; Caryophilli ℥j.; Aquæ ferventis, octarium. Macera per horas sex et cola.
2. ℞ Colaturæ f ℥iss.; Tincturæ Catechu, Syrup. Aurantii, ää f ℥ss. M. Ter vel quater quotidie sumendus.

In the cure of intermittents, cusparia does not come into competition with cinchona; but in mixed and nervous fevers, and generally as a tonic, it is less apt to disagree with the stomach and bowels: it admits, in these cases, of the usual combinations with saline, aromatic, and antispasmodic medicines. Infusion of cusparia is incompatible with infusion of galls and yellow cinchona; sulphate of iron, tartar-emetic, acetate of lead, corrosive sublimate and potassa.

Infusion of Cusparia. — Take of Cusparia, bruised, five drachms; Boiling distilled Water, a pint. Macerate for two hours, in a lightly-covered vessel, and strain.

CYANOGEN (from κυανος, *blue*, and γενειν, *to produce*). *Bicarburet of Nitrogen.*

This gaseous compound was discovered by Gay-Lussac, in 1815. It is obtained by heating *cyanuret of mercury*. It is condensible into a liquid by a pressure of between three and four atmospheres, at a temperature of 45°. It has a pungent odour, somewhat re-

sembling that of bitter almonds, and is unrespirable and poisonous. It burns with a beautiful purple flame, and when detonated with twice its volume of oxygen, it produces two volumes of carbonic acid and one of nitrogen. Its specific gravity, compared with hydrogen, is as 26 to 1. Compared with atmospheric air, its specific gravity is as 1·81 to 1·00. Combined with hydrogen, it constitutes the *hydrocyanic acid* (which see). Cyanogen consists of —

	Atoms.	Equivalents.	Per Cent.
Carbon	2	12	46·1
Nitrogen	1	14	53·9
Cyanogen	1	26	100·0

CYATHUS (κυαθος, *a drinking cup*). A *wine-glass*. This measure is considered equivalent to about a fluid ounce and a half.

CYMINUM. *Fructus. Cumin Seed.* The fruit of the *Cuminum Cyminum. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

This plant is a native of Egypt and Ethiopia; but the European market is chiefly supplied with it from Sicily and Malta, where it is abundantly cultivated for medical and culinary purposes.

Cumin seed has a peculiar and rather nauseous odour, and a bitter, warm, and disagreeable taste. It contains gum, resin, and a volatile oil having the odour and flavour of the seed. Water acquires its odour, but alcohol is the best solvent of its active parts; the tincture leaves, on evaporation, a powerful extract. Some kinds of cheese, much esteemed in Switzerland, are flavoured with cumin seed, and it forms an ingredient in currie-powder; to most persons, however, its taste and smell are disagreeable. As a medicine it is said to be stomachic and carminative, and to have some peculiar virtues as a stimulant in promoting the absorption of indolent tumours. It was formerly supposed to produce a pallor of countenance, and, according to Pliny, the disciples of Portius Latro, a celebrated teacher of oratory, used cumin to acquire the paleness which their master was supposed to have contracted by his studies.

CYNIPS QUERCIFOLII. A hymenopterous insect, whose habitation forms the gall-nut of the oak. *See* Gallæ.

CYNOSBATUS (κυνος, *a dog*, and βατος, *a bramble*). The *dog rose*. The *Conservi Cynosbati* of former Pharmacopœiæ is now termed *Confectio Rosæ Caninæ*. *See* Rosa Canina.

DAPHNE MEZEREUM, *see* Mezereum.

DATURA STRAMONIUM, *see* Stramonii Folia.

DAUCI FRUCTUS ET RADIX RECENS. The *fruit* and *fresh root* of the *Daucus carota. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

The fruit or seed of the *wild carrot*, and the root of the *cultivated carrot*, have been generally specified as the officinal varieties.

The root of the cultivated carrot, when well boiled, and rubbed

into a pulp, is often a soothing application in the form of poultice, to irritable and ill-conditioned ulcers. The seeds of the wild carrot have been recommended as diuretic, in cases of gravel: they are aromatic and antiflatulent.

DECOCTIONS (decoquo, *I boil away*).

These preparations, as the name imports, are obtained by boiling vegetable substances in water, an operation which is requisite when mere infusion is inadequate to the abstraction of their active principles; in many cases, however, there are objections to the process: the continued application of heat frequently modifies or decomposes some of the substances present; volatile matters, upon which much of the activity of remedies often depends, are dissipated; and substances retained in the solution, whilst hot, precipitate as it cools. Where the object is to separate difficultly soluble mucilaginous substances, and principles which are neither volatile nor changeable at the temperature of boiling water, the process is often effectual and unobjectionable.

In the preparation of decoctions, the boiling should not be continued longer than is absolutely necessary for the extraction of the soluble matters, and they should be strained while hot, lest their active parts should be deposited and left on the strainer. Common saucepans, which should be rather deep than shallow, are generally used in preparing these decoctions: and the vegetable substances should either be sliced or bruised, so as to facilitate the action of the solvent, without at the same time being so finely divided as to pass through the strainer.

In the greater number of decoctions there is held in solution a portion of extractive matter, and frequently of astringent matter, or tan; acids and other peculiar vegetable principles are also often present, and in many of them a large relative proportion of mucilage; hence the greater number of metallic salts are said to be *incompatible* with them, that is, to occasion change of colour, or precipitation; but it by no means follows, that because the metallic oxide enters into new combinations, it is therefore rendered inert; nor are we always to conclude that substances are medically incompatible, because they are chemically so. All decoctions should be prepared either with distilled, or, at all events, with soft, water, for the saline ingredients of hard water may in some cases materially interfere with their efficacy; they should always be employed fresh, for, when kept, most of them are liable to decomposition.

The different *Decoctions* are noticed when speaking of the substances which make them.

DEMULCENTS (demulceo, *I soften*). Medicines which protect parts from the action of acrid substances or secretions, and which are generally themselves inert and viscid. Thus the tracheal irritation in catarrh is soothed by gum, sugar, liquorice; intestinal irritation by oily and mucilaginous remedies, &c. Demulcents are sometimes supposed to act sympathetically or indirectly; as when mucilaginous drinks are prescribed in cases of irritation of the uri-

nary organs, as in gravel, gonorrhœa, &c.: here they are probably only useful as *diluents:* upon this principle, almond emulsion is often administered to prevent the excitement of those parts which sometimes follows the external application of cantharides in the form of a blister plaster.

DENTIFRICE (dentes, *the teeth*, and frico, *I rub*). Remedies employed for cleansing the teeth and gums. Tooth-powders generally act mechanically, and should be of such a nature as to cleanse the teeth without injuring the enamel; chalk, charcoal, bole, cuttle-fish, and other similar substances in fine powder act upon this principle: a mixture of two parts of chalk and one of well-burned charcoal, in fine powder, forms an excellent dentifrice, but its blackness is sometimes objected to. Pumice-stone, which is an ingredient in some tooth-powders, is objectionable, as, from its hardness, it scratches the enamel of the teeth. Myrrh, cinchona, catechu, alum and other astringents, are occasionally added to dentifrices, with a view of strengthening and corrugating, as well as cleansing the gums; and tincture of myrrh, bark, and catechu, are sometimes employed, diluted with water, upon the same principle. The ingredients of tooth-powder are sometimes mixed with syrup, honey, and other viscid materials, into a kind of electuary, or *tooth-opiate;* and red bole, cochineal with a little alum, powdered pomegranate flowers, and other red colouring matters, are often added for appearance sake, and, according to some, for the purpose of improving the colour of the gums.

DEPILATORY (de, *from*, and pilus, *hair*). An application for the removal of hair. The celebrated *Turkish Depilatory* is a compound of one part of yellow sulphuret of arsenic and seven of quick-lime, well mixed and in fine powder. The quick-lime is the essential ingredient, and is alone effectual; it is occasionally used by ladies who are troubled with beards, and should be applied with a camel-hair brush, made into a thin paste with water; it may remain on till it excites a tingling sensation of the face, and should then be wiped off with a soft sponge, and warm water, when the greater part of the hair is removed with it; two or three applications are generally sufficient to produce the desired effect.

"Delcroix's *Poudre Subtil, for removing superfluous hairs in less than ten minutes:* this fashionable depilatory appears, upon examination, to consist of quick-lime and sulphuret of arsenic, with some vegetable powder; it is, however, so unequally mixed, that, on submitting it to analysis, no two portions afforded the same results. It can scarcely be necessary to state, that such a composition is incapable of fulfilling the intention for which it is so confidently vended." — (*Pharmacologia.*)

DIACETAS CUPRI, *see* ÆRUGO.

DIGITALIS FOLIA ET SEMINA. The *leaves* and *seeds* of the Foxglove. *Digitalis purpurea. Cl.* 14. *Ord.* 2. Didynamia Angiospermia. *Nat. Ord.* Scrophulariaceæ.

This is a common indigenous biennial plant growing in gravelly

soils; in July it produces its bell-shaped flowers, bearing a resemblance to a finger of a glove, whence the term *Digitalis*, first applied to it by Fuchsius, (*Plantarum omnium Nomenclatura*, 1541,) from the German *Fingerhut*. It had been previously described under the name of *Campanula sylvestris*

The *leaves* are the part chiefly employed in medicine; they have scarcely any smell, but a bitter and slightly nauseous flavour. They should be gathered just as the plant is about to blow, and those which are not perfectly healthy should be rejected; the footstalks and the thick part of the rib of the leaves should be pulled off; and they should be carefully and separately dried at a temperature not exceeding 212°, so as to retain their colour, and appear of a tolerably lively green when powdered; they should not be tied in bundles, or of a black colour, as they commonly occur in the herb shops.

The virtues of the leaves of digitalis are extracted both by alcohol and water. The watery infusion is of a pale olive colour. "It does not precipitate solutions of galls, tartarized antimony, or sulphate of iron; the last only deepens its colour, but it precipitates infusion of yellow cinchona bark, produces a yellowish precipitate with bichloride of mercury, and a blackish-violet very copious one with nitrate of silver. The dry powder, which should have a beautiful green colour, moistened and triturated with lime or calcined magnesia, and a glass rod dipped in hydrochloric acid held over it, exhibits copious white fumes, proving the presence of ammonia. The presence of ammonia is also apparent in the tincture, which is rendered milky by water. Destouches, a French chemist who analysed foxglove, obtained also much carbonate of ammonia, by distilling the watery extract. Ten grains of the powder macerated in half a fluid ounce of sulphuric ether lost three grains of its weight and yielded all its colour to the ether, and the ethereal tincture, on being evaporated on water, left a pellicle of a dark green, unctuous, resinous matter, whilst some yellowish extractive was dissolved in the water, and precipitated afterwards by chlorine." — (*Lond. Disp.*) From this analysis Dr. A. T. Thomson concludes that foxglove contains ammonia, extractive, and a pea-green resinous matter in which its narcotic power resides. Leroyer has given a process for separating the active principle of digitalis, which, from the experiments of Prevost, appears to be a crystallisable alkaloid, but its characters have not as yet been accurately defined.

The medical powers of foxglove require to be considered under two points of view, namely, as a sedative, and as a diuretic.

As a *sedative* its powers seem to be distinct and peculiar, and to act more *directly* as such than any other article of the Materia Medica; for we perceive no previous stimulation, nor are those other symptoms produced which usually attend the operation of narcotics. In this opinion Dr. Paris coincides: "It is directly sedative (although some maintain the contrary opinion), diminishing

the pulse and the general irritability of the system, and increasing the action of the absorbents, and the discharge by urine. The effects appear to be in a great degree connected with its sensible influence on the body, which is indicated by feelings of slight nausea and languor; accordingly, every attempt to prevent these unpleasant effects, or to correct the operation of digitalis by combining it with aromatic and stimulant medicines, seems to be fatal to the diuretic powers of the remedy."

The effects of digitalis upon the heart and arteries are remarkable, and deserving of serious attention. Where the pulse is full, hard, and frequent, it generally reduces the fulness and hardness, and then the quickness. Dr. Baildon brought down his own pulse from 110 to 40 beats in a minute. In a patient in St. George's Hospital, suffering under acute rheumatism, a very full, strong, and rapid pulse, of 130 in a minute, was first rendered soft and compressible, and afterwards fell, in the course of six hours, to 60 beats in the same period. In a patient suffering under phthisis, the pulse was lowered in forty-eight hours from 125 to 45 beats in a minute. But this remarkable effect upon the pulse is attended by other symptoms. Upon any sudden, and often even trifling exertion, the pulse quickens, the heart throbs, nausea and fainting come on; and persons under the full influence of digitalis have died suddenly under such circumstances. Dr. Baildon found that, when his pulse had been reduced to 40 beats in a minute, if he merely assumed the erect posture, it would rise to 100; when sitting up in a chair it was 72: the same effect, he says, was produced upon several other persons. (*Edin. Med. and Surg. Journ.* III. 271.) The consumptive patient above adverted to got up in bed, in consequence of being suddenly seized with nausea, and his pulse, which half an hour before was 45, became too quick to count: he then fainted, and some ammoniacal stimulants were administered for his recovery, after which scarcely any pulse could be felt; it was alarmingly slow and feeble. A dropsical woman, 65 years of age, under the full influence of digitalis, fell in a fainting fit on walking across the room; she showed appearances of recovery, but vomiting and fainting came on again, and she died. Mr. Brande relates these from among similar cases, taken from notes made at the clinical lectures of the late Dr. Pemberton, at St. George's Hospital, to show the necessity of precaution in the use of digitalis, and the care which persons require under its influence. It was formerly incautiously used as a diuretic, without much reference to its sedative power; and such cases as the above, of fainting fits frequently recurring, and of sudden death, were not of very uncommon occurrence. When such symptoms come, as they sometimes do, suddenly on, they are best treated by small doses of ammonia and ether; paying, at the same time, the utmost attention to the quiet of the patient, who should not be allowed to sit erect in bed, or to attempt to get up.

Some writers have ascribed a stimulant power to digitalis, and

have considered it as only indirectly sedative, and have represented it as first quickening and filling the pulse and afterwards weakening the force of the vital functions; but this view is based on speculation more than experience; in general, indeed, the remarkable effects of digitalis, as a sedative, are unattended by other prominent symptoms. The skin is not dry, nor is thirst complained of; the pulse occasionally may intermit; but that decided effect upon the brain which narcotics in full doses produce, is never eminently shown by digitalis.

The poisonous effects of digitalis upon animals have been described by Orfila; his experiments were made with the powder, extract, and tincture: in moderate doses it produced giddiness, languor, vomiting, and death in twenty-four hours; in larger doses, tremors, convulsions, stupor, and coma were superadded. It is also active when injected into a vein, or applied to a wound. Dr. Christison enumerates the following as the effects of an overdose in man: great nausea, frontal headache, sense of disagreeable dryness in the gums and pharynx, some salivation, giddiness, weakness of the limbs, feebleness and increased frequency of the pulse; in a few hours an appearance of sparks before the eyes, and subsequently dimness of vision and a feeling of pressure on the eyeballs. *These effects may be occasioned by so small a dose as two or three grains of good foxglove.* (Schroek, *de Digitali purpurea*, 1829.)

Digitalis is liable, like some other poisons, to accumulate in the system when it has been long used in moderate doses, and at length to produce constitutional effects, even after it has been discontinued. The symptoms of its gradual accumulation are, in the slighter cases, nausea, vomiting, giddiness, want of sleep, sense of heat throughout the body, and of pulsation in the head, general depression, sometimes diarrhœa, sometimes salivation, and for the most part profuse sweating. In more urgent cases convulsions also occur, and it appears from a case mentioned by Dr. Blackall, that the disorder thus induced may prove fatal. One of his patients, while taking two drachms of the infusion of the leaves daily, was attacked by pain over the eyes and confusion, followed in twenty-four hours by a profuse watery diarrhœa, delirium, general convulsions, insensibility, and an almost complete stoppage of the pulse. "Although some relief was derived from an opiate clyster, the convulsions continued to recur in frequent paroxysms for three weeks; in the intervals he was forgetful and delirious, and at length died in one of the convulsive fits." — (Blackall *on Dropsy*.)

The following cases, exemplifying the effects of single large doses of digitalis, are also referred to by Dr. Christison. An old woman drank ten ounces of a decoction made from a handful of leaves, in a quart of water. She grew sick in the course of an hour, and for two days had incessant retching and vomiting, with great faintness and cold sweats in the intervals, some salivation and swelling of the lips, and a pulse feeble, irregular, intermitting, and not above

40. She had also suppression of urine for three days. (*Edin. Med. and Sur. Journ.* VII. 149.)

The following instance is from the *Journal de Médecine* (Novem. 1817). A man, 55 years old, took by mistake a drachm, instead of a grain, for asthma, and was attacked in an hour by vomiting, giddiness, excessive debility, so that he could not stand, loss of sight, colic, and slow pulse. These effects continued more or less for four days, when the vomiting ceased, and the other symptoms then successively disappeared; the vision, however, remained depraved for nearly a fortnight.

The following fatal case arose from an overdose administered by a quack doctor, and became the ground of a criminal trial in 1826. (*Edin. Med. Jour.* XXVII. 223, and *Morning Chronicle Newspaper*, October 30 and 31, 1826). "Six ounces of strong decoction were taken as a laxative early in the morning. Vomiting, colic, and purging were the first symptoms; towards the afternoon lethargy supervened; about midnight the colic and purging returned; afterwards general convulsions made their appearance, and a surgeon who saw the patient at an early hour of the succeeding morning, found him violently convulsed, with the pupils dilated and insensible, and the pulse slow, feeble, and irregular. Coma gradually succeeded, and death took place in twenty hours after the poison was swallowed." The morbid appearances after death are stated to have been redness of some parts of the inner coat of the stomach, and the external membranes of the brain were much injected with blood.

As a *diuretic*, digitalis is chiefly useful in conjunction with other remedies, especially with squills and mercurials: it has been much extolled in dropsical affections, and it is certain that other diuretics are more effective in that peculiar state of the system which digitalis induces, and which have been above described: but its depressing and dangerous influence must in these cases never be lost sight of. Mr. Brande knew an instance of a person who suffered under anasarca of the legs, and who applied for relief at a dispensary, where he received a box of pills, one of which he was directed to take three times a day. On the evening of the third day, he complained of debility and faintness, and in the course of the night vomiting and fainting fits came on; in the morning he died, upon attempting to get out of bed. This was apparently a case, perhaps a peculiar one, of poisoning by digitalis; it shows the risk of carelessly administering it, and the necessity of attending to those peculiarities of habit which sometimes seem to render the system particularly open to its lowering and sedative influence. The pills were composed of two grains of digitalis, one of squills, and half a grain of calomel.

The singular effect of digitalis upon the pulse suggests its trial in inflammatory diseases, where bleeding has been carried to as great an extent as is consistent with safety, without effecting that reduction of symptoms which might have been hoped for. The question here is, how far the reduction in fulness and frequency of pulse

which digitalis produces, is equivalent, where inflammation is going on, to the same effect produced by the lancet. To which the answer appears to be, that in such cases digitalis is not to be trusted in: and although we may lower and soften the pulse, we do not at the same time produce corresponding effects upon the part in which the inflammatory action is going on. In other words, the effects of digitalis are perfectly distinct from those brought about by actually diminishing the quantity of circulating blood.

Foxglove has been recommended in active hemorrhage, but ti is dangerous; for if hemorrhage should recur in a patient under its influence, death would probably follow.

Digitalis, independently of its diuretic powers, is sometimes a useful palliative to the most distressing symptoms of hydrothorax; but the cases in which the most decided benefit has resulted from its use are those of organic affections of the heart,or larger blood-vessels. In *angina pectoris*, in some cases of aneurism, in violent and remitting attacks of palpitation, and in hypertrophy of the heart or of one of its ventricles, digitalis has proved a valuable and effective sedative. On the necessity of the extremest caution in its use in such cases, and of most assiduously watching the various fluctuations of the patient, I need not again insist; and it must be always remembered, that in some constitutions the alarming symptoms are much more readily induced than in others; and that it is impossible to state, in any case, what precise quantity of the remedy must be administered to produce particular effects. This medicine has also been used in mania, and in that variety called *delirium tremens* is highly spoken of by Dr. Hooker (*Boston Med. and Surg. Journ.* Vol. VIII.); also in epilepsy.

Mr. Brande concludes this subject with a few remarks on the forms and doses of digitalis, which he has elsewhere published (*Manual of Pharmacy*), and with the formulæ of the Pharmacopœia.

The best forms for the administration of digitalis appear to be the powder and the tincture; to these the Pharmacopœia adds an infusion.

Of the powdered leaves one grain may be given, in the form of pills, twice a day, as an incipient dose, and it may be gradually increased by quarter-grains until some decided effects results; recollecting always, however, that its influence may come on suddenly, and that, without any previous notice, the pulse may, after the fourth or fifth dose, rapidly sink, and bring the patient into a state requiring careful management. In the use of the tincture, precaution is equally necessary. As the prescription now stands in the Pharmacopœia, four ounces of the dried leaves are directed to be digested for fourteen days, without heat, in a quart of proof-spirit: it is then to be filtered off for use. Of this tincture, thus prepared, about ten minims twice a day may be called an incipient dose, and it may be gradually and cautiously augmented by two minims daily, till it produces the desired action upon the pulse. It is sometimes customary, in pharmaceutical laboratories, to leave

tinctures upon the dregs, after they have stood a due time, and gradually to pour off the clear part for use; the dregs are afterwards pressed out, and the last portion of tincture acquires, by this careless proceeding, double the strength of the first. A person suffering under hydrothorax, who had been in the habit of taking forty drops of tincture of digitalis every night, went from home without his medicine, and was obliged to send to an apothecary in the country for an ounce of the tincture, of which he took the accustomed dose; its effects were much more violent than usual; and he died, exhausted by continual vomiting and faintings, in the morning. Very particular inquiries were made respecting the quality of the tincture: when it appeared that the leaves had been shaken out of the bottle in nearly a dry state, since an ounce of the tincture was with much difficulty squeezed out of them. Here, therefore, the strength of the tincture was not only increased by long standing, but probably greatly augmented by evaporation; and there is little doubt that the patient died of the over-dose, and not of his disease. Similar instances of carelessness in regard to tinctures are not uncommon; and they deserve severe censure from the uncertainty of effect that must always ensue, and from the dangerous consequences that may, as in the above instance, follow.

There is another precaution, not only applicable to the use of digitalis, but also to that of other analogous and powerful remedies. It is well known that their dose may often be augmented, by slow degrees, to a remarkable extent. A person habituated to opium will perceive no effect from a dose which would, perhaps, prove fatal to one who had never taken it. Doses of digitalis are borne by persons who have long used it, which could not have been given to them with impunity in the first instance. Hence persons often do themselves mischief by resuming their medicine, after some interval, in the same doses they had previously employed it. This observation particularly applies to patients who erroneously suppose that a dose once taken may always with impunity be repeated.

The effects of digitalis, like those of other medicines, are sometimes singularly modified by peculiarities of habit: it has thus been administered in large doses without any corresponding affection of the pulse; sometimes it proves merely diuretic, and sometimes it acts as a brisk purge; but its general operation is that above described.

Digitalis has not been employed as an external application with any success.

The following are the officinal formulæ of digitalis: —

Infusion of Foxglove. — Take of Foxglove Leaves, dried, a drachm; Spirit of Cinnamon, a fluid ounce; Boiling distilled Water, a pint. Macerate the foxglove leaves in the water for four hours, in a lightly-covered vessel, and strain; then add the spirit.

This infusion is only half the strength of that directed in the

previous Pharmacopœia; it is not, however, upon the whole, a good form for so powerful a remedy; the powder, or the tincture, is preferable. Of the above, from two drachms to half an ounce, twice a day, may be a dose, gradually increased, with the precautions already enforced, till it produces the desired effect.

Tincture of Foxglove.—Take of Foxglove Leaves, dried, four ounces; Proof Spirit, two pints. Macerate for fourteen days, and strain.

The precautions requisite in the preparation and exhibition of this important tincture, together with its dose and effects, have been above detailed. It should not be exhibited with substances likely to combine with or modify its active principle. Tincture of digitalis is not rendered turbid by water, nor by the greater number of the simple infusions; and it may be given without any impropriety in a saline draught, or with camphor or almond mixture; but the free acids should be avoided till the chemical characters of *digitalia* are better known.

The *seeds of digitalis* seem uselessly introduced into the list of the Materia Medica: they are said to be uncertain in their operation.

DILL, *see* ANETHUM.

DILUENTS (diluo, *I dilute*). Under this term, a number of fluid agents are included, of an inert character, and calculated, by the quantity in which they may be taken, to attenuate the blood and the secretions. The principal and most effective diluent is *water* (*see* AQUA), and it forms the basis of the others. There are many cases in which diluents perform very important remedial functions, as in allaying thirst, promoting perspiration, and increasing the secretion of the kidneys; hence their use in febrile and inflammatory disorders, and in many instances of urinary irritation and gravel. They also act more directly upon the contents, and influence the functions, of the stomach and intestines; hence it is that a moderate quantity of aqueous liquid, taken at meals, promotes digestion, and modifies the action of the bile and the formation of chyle. The *temperature* of diluents is often a matter of much consequence, as in the varied effects of hot, tepid, and iced water. The operation of medicines is also greatly influenced by their state of dilution; a dose of laudanum, for instance, or of hydrocyanic acid, given in a tea-spoonful of water, will be more immediate in its action, than when administered in two or three ounces of the same fluid; and in many other instances, the skilful practitioner will adapt his prescriptions to particular purposes by merely varying the proportion of the *diluent*. Two drachms of sulphate of magnesia in an ounce of water, is often inert as an aperient, when the same quantity of the salt, in half a pint of tepid water, will run off speedily by the bowels; the influence of many mineral waters, as remedial agents, is referable to the quantity in which they are taken, and to the change thus effected in the operation of their active principles upon the system. In the exhibition of emetics, and of *enemata*, the influence of dilution is also most important.

DIOSMA (δις, *double*, and οσμη, *odour*). *Folia.* Buchu leaves. The *leaves* of the *Diosma crenata*. *Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Rutaceæ.

The crenated diosma is a native of the Cape of Good Hope.

Buchu leaves have a peculiar, strong, and somewhat aromatic odour, and a pungent and sweetish flavour, at first somewhat resembling that of peppermint. Their qualities are extracted by infusion in hot water, and by digestion in proof spirit; they afford, according to Cadet de Gassicourt, 0·7 *per cent.* of essential oil, 21 of gum, 6 of extractive, 1 of chlorophylla, and 2 of resin; the residue is inert fibre. They are diuretic and diaphoretic; they have been found useful in chronic irritation of the bladder, and in rheumatic pains, and generally as a tonic stimulant. The infusion is a good form, the dose being from an ounce and a half to two ounces three or four times a day. The *Dublin Pharmacopœia* directs a *tincture*, in the proportion of two ounces of the leaves to a pint of proof spirit: it is a good adjunct to the infusion, in a dose of thirty drops, gradually increased at subsequent times.

Infusion of Diosma. — Take of Diosma, an ounce; Boiling distilled Water, a pint. Macerate for four hours in a lightly-covered vessel, and strain.

DIRIGENTS. A term applied in old pharmacy to certain ingredients in prescriptions, which were supposed to *direct* the operations of others in their actions upon particular organs.

DISCUTIENTS. Remedies employed in promoting the resolution of tumours.

DISINFECTANTS. Substances which destroy infectious and contagious poisons. Many articles were formerly considered as possessing these properties, which are now known to be ineffectual, such as the fumes of vinegar, of burned resins, and aromatic woods, and certain essential oils. These, however, only cover bad odours. The real disinfectants are few in number; they comprise two or three of the gaseous acids; but all these have been superseded by the peculiar powers of *chlorine;* and, better than all, fresh air in motion.

DIURETICS (δια, *through*, and ουρειν, *to make water*). Substances which increase the discharge of urine. Water, and other diluents, have sometimes been classed among these remedies, but the term is more properly applied to medicines which exert some peculiar stimulant power upon the secretory structure of the kidneys, such as acetate and nitrate of potassa, squills, digitalis, the turpentines, &c.

DOG ROSE, *see* Rosa Canina.

DOLICHOS, *see* Mucuna.

DOREMA, *see* Ammoniacum.

DORSTENIA, *see* Contrajerva.

DRACONTIUM. *Cl.* 4. *Ord.* 1. Tetrandria Monogynia. *Nat. Ord.* Adroideæ. *Radix.* The root of the Skunk Cabbage.

This is an indigenous plant, deriving its name from the strong and peculiarly offensive odour which it gives out, resembling that from the skunk. Its odour is highly volatile, not easily obtained in a separate state, and soon dissipated by heat or by drying. It con-

tains, also, according to Dr. Bigelow, from whom I borrow on the present occasion (*Treat. on Mat. Med.* &c.), an acrid principle like that of the genus *Arum ;* also a portion of gum and mucilage.

In small doses this plant is a stimulant and antispasmodic, and in larger ones a narcotic. Thirty grains of the powdered root, if freshly prepared, will bring on vertigo, nausea, and frequently vomiting ; but age and exposure diminish its activity. It has been found serviceable in asthma and chronic catarrh ; in the former disease it may be given during the paroxysm, and repeated according to the exigency of the case. This medicine has, also, been recommended in hysteria, rheumatism, and dropsy. The form of administration is in powder, infusion, and syrup ; the first the most certain, the last the most in popular use. Of the powder the *dose* of the dried root is *ten grains* in melasses or other syrup, and to be gradually increased according to its toleration by the stomach and nervous system.

DULCAMARA (dulcis, *sweet*, and amarus, *bitter*). *Caulis.* The *stalk* of the *Bitter-sweet*, or *Woody Nightshade. Solanum dulcamara. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ.

This plant is common in shady places, and in hedges ; it flowers about the end of June, and its berries ripen in October.

The fresh twigs, gathered in dry situations, in the autumn, have a peculiar bitter-sweet and slightly acrid flavour. Their extractive matter has been called *picroglycion*, or *dulcamarin.*

According to Desfosses (*Journ. de Pharm.*, VI. & VII.), the activity of solanum is referable to an alkaloid, which may be termed *solania ;* it appears not to form crystallisable salts. According to Blanchet, its ultimate elements are, 62·0 carbon, 8·9 hydrogen, 1·6 nitrogen, 27·5 oxygen. According to Otto, one grain of solania killed a rabbit in nine hours, and the symptoms were those of a narcotic poison.—(*Journ. de Pharm.* XX.)

The decoction of dulcamara is said to operate as a narcotic and diuretic. It has chiefly gained celebrity in cutaneous affections, and has been recommended in chronic rheumatism, and for nocturnal emissions. The notion of the extremely poisonous nature of its berries seems to be erroneous. Duval found that 180 berries produced no effect upon a dog, and that large doses of the extract might be administered with impunity (*Hist. des Solanum*, 1813). Orfila states that the extract of the *Solanum nigrum* is about as efficient as lettuce opium.

Decoction of Dulcamara. — Take of Dulcamara, cut, ten drachms ; Distilled Water, a pint and a half. Boil down to a pint, and strain.

" It is possessed of diuretic, diaphoretic, and narcotic properties, and has been found useful in humoral asthma and dropsy, and in *lepra vulgaris*, and *alphas*, and ptyriasis, in conjunction with bichloride of mercury. The dose is from f℥iv. to f℥j., combined with any aromatic tincture, given three times a day."—(*Lond. Disp.*)

ELATERIUM (ελαυνειν, *to stimulate*). *Pepones recentes.* The *fresh fruit*, or *gourds*, of the *Momordica Elaterium*. *Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Cucurbitaceæ.

This species of *Momordica*, known under the title of the *wild*, or *squirting cucumber*, is cultivated for medical use; it is perennial, and a native of the South of Europe.

For the preparation of what is termed the *extract*, the cucumbers should be gathered in September, when in rather an unripe state. "They should be sprinkled with water, each cucumber cut through longitudinally, thrown upon a sieve, and the clear juice allowed to run from it without pressure. The juice soon becomes turbid, and, after standing a few hours, a sediment is formed from which the clear fluid should be decanted. This sediment is *elaterium*. It should be carefully dried, by being spread on fine linen, and exposed to warm dry air in the shade. The juice obtained by the expression of the fruit is inspissated, and forms much of the elaterium of the shops."—(*Lond. Disp.*)

When carefully prepared, elaterium is light, friable, and of a pale dingy-green colour. When brown, hard, and of a gummy appearance, it is not to be depended on: this is generally the character of that which is prepared abroad.

According to Dr. Paris, elaterium contains about one-tenth of its weight of a peculiar principle, to which its activity is referable, and which he terms *elatin*. According to Dr. Clutterbuck, forty cucumbers yield only six grains of genuine elaterium, which is contained in the juice surrounding the seeds, and which is violently purgative in doses not exceeding one-eighth of a grain.

Mr. Hennell obtained a crystalline principle from elaterium, which ether and water scarcely dissolve; it is fusible, has a bitter taste, and is neither acid nor alkaline. It contains no nitrogen. 100 grains of elaterium afforded 40 of this crystalline substance, and 21 of green resin, the residue being starch, ligneous fibre, and earthy matter. According to Dr. Morries, the purgative principle of elaterium (*elaterin*) is obtained by evaporating an alcoholic tincture of elaterium to the consistence of thin oil, and pouring it into boiling distilled water; it falls as a crystalline precipitate, which is to be purified by a second alcoholic solution and aqueous precipitation.

Elaterin is intensely bitter; insoluble in water and alkalis, sparingly soluble in dilute acids, and readily soluble in alcohol, ether, and oils. It has no alkaline reaction on litmus. The best English elaterium yields 26 *per cent.*, the worst 15 *per cent.* French elaterium does not contain above 5 or 6 *per cent.*; hence the irregularity in the cathartic effects of this drug. Elaterin is purgative in the dose of $\frac{1}{10}$th of a grain; $\frac{1}{5}$th of a grain, in two doses, administered at an interval of twenty-four hours, to a rabbit, killed it in seventeen hours after the second dose.—(*Edinb. Med. and Surg. Journ.*, xxxv., 339. Christison *on Poisons*, chap. xx.)

Ordinary elaterium is seldom active in less than half-grain doses, which may be repeated every three or four hours till they produce the desired effect. It is chiefly used in dropsical affections, and

its operation is remarkable for the quantity of watery secretion which it brings away; but it should be administered with much caution, and by no means frequently, for hypercatharsis and unmanageable diarrhœa, attended by great debility, sometimes follow its injudicious exhibition.

As a purge, in obstinate cases of constipation, it is inferior in certainty of operation to the oil of *Croton*, but, as a hydragogue, it will frequently evacuate water where other diuretics, and drastic purges fail. The following is, perhaps, the safest mode of prescribing elaterium:—

℞ Extracti Elaterii gr. ij.; Sacchari Purificati ʒj. To be well triturated together, then divide into eight powders, of which the patient will take one every four hours until purging comes on.

Where a very efficient suppository is required, Dr. Paris recommends one or two grains of elaterium, rubbed up with eight grains of hard soap.

In reference to the toxicological history of elaterium, Dr. Christison observes, that the plant itself is probably poisonous, but that the only case in point with which he is acquainted, is a singular instance of poisoning, apparently produced by the plant having been carried for some time betwixt the hat and head. A medical gentleman in Paris, after carrying a specimen to his lodgings in his hat, was seized in half an hour with acute pain and sense of tightness in the head, succeeded by colic pains, fixed pain in the stomach, watery purging, bilious vomiting, and fever. The symptoms continued upwards of twelve hours.—(*Annales d'Hygiène Publique*, &c. VIII., 333.)

The hands of the persons who prepare elaterium are often much excoriated, and, without great precaution, the bowels are purged.

ELECTUARIES, *see* CONFECTIONS. According to Dr. Paris (*Pharmacologia*) the term *Electarium* is first used by Cælius Aurelianus; but the ἐκλικτον of Hippocrates was an electuary. Electuaries generally consist of powders mixed with syrup or treacle, or occasionally with mucilage, or even water. Some of the inert *confections* of the Pharmacopœia are good vehicles for active and heavy powders, and for the formation of electuaries.

ELEMI. The *resin* of the *Amyris elemifera*. *Cl.* 8. *Ord.* 1. Octandria Monogynia. *Nat. Ord.* Amyridiæ.

This tree is a native of Carolina and the Brazils.

Elemi is obtained from incisions in the bark; it exudes and dries in the sun; it is imported either in mats and chests, or in cakes wrapped in flag-leaves. It is a yellow translucent substance, of a peculiar aromatic odour, and slightly bitter taste; it is somewhat tenacious, and easily fusible; its specific gravity is 1·019. When distilled with water, a fragrant essential oil passes over, and a brittle inodorous resin remains. It is almost entirely soluble in boiling alcohol.

The *Unguentum Elemi* of the Pharmacopœia is an old, but useful ointment, formerly known under the name of *yellow basi-*

licon ; it is slightly stimulant, and has some viscidity and adhesiveness. It is frequently used for setons and issues, and applied to old indolent sores.

Ointment of Elemi. — Take of Elemi, a pound ; Common Turpentine, ten ounces; Suet, two pounds ; Olive Oil, two fluid ounces. Melt the elemi with the suet; then remove them from the fire, and immediately mix with them the turpentine and the oil ; then press them through a linen cloth.

EMETICS (ἐμέω, *I vomit*). Substances which occasion vomiting. Much has been written upon the *cause* of that apparent inversion of the action of the stomach which occasions vomiting; some referring it to spasm of the abdominal and other muscles, and regarding the stomach as passive ; others considering the muscles and nerves of the stomach itself as immediately influencing the phenomena. Upon these questions the reader may consult Magendie, and other writers on physiology.

The practical uses of emetics are various and important. Soon after their introduction into the stomach, *nausea* comes on; the patient becomes chilly, his countenance pinched and pale, the eyes lose their lustre, saliva flows from the mouth, his pulse is feeble, and often quick or irregular, the usual force of the circulation being considerably diminished. In this state, the activity of the absorbents is increased, but the muscular powers relaxed. Hence, in some cases of hemorrhage, in the treatment of anasarca, and some other forms of dropsy, in certain cases of spasm, and in the passage of a gall-stone through the bile-ducts, *nausea* may be usefully induced, whereas vomiting might be highly prejudicial. In such cases, therefore, the dose of the emetic must be modified so as to produce the desired effect, and such emetics selected as are the most efficient in exciting nausea. In the act of *vomiting*, on the other hand, the face becomes flushed, perspiration ensues, the pulse acquires strength and rapidity, and the general powers of the absorbent system are diminished.

During the act of vomiting, in consequence of the pressure made on the abdominal aorta, and the interruption to the circulation through the lungs, from the impeded respiration, the blood returns with difficulty from the head; the face swells and becomes coloured; the conjunctiva is turgid and red; the jugular veins are gorged, and tears burst from the eyes. The violent straining is often attended with pain in the head and eyes, and with the involuntary expulsion of urine and fæces. Afterwards a degree of languor, and often drowsiness, succeeds, and the pulse gradually returns to its natural standard.

In prescribing emetics, attention must be paid to the constitution, we might say idiosyncrasy, of the patient, which is sometimes such as to render vomiting painful, and not without danger, by the violent straining which accompanies it. Determination of blood, or local plethora in particular organs, as the head and lungs, and uterus also, contraindicate vomiting. In both of these classes of cases there will be much less risk encountered, if some time elapses

between the administration of the medicine and its emetic operation, so that considerable nausea shall intervene: hence it will be better, and the advice applies to all inflammatory affections, to divide the emetic into small doses, given at intervals, so that complete relaxation may precede the vomiting. This latter, in many diseases, which are represented to be so much relieved, some of them, as croup, cured by it, is rather an evidence of the subjugation of morbid excitement and phlogistic diathesis, than a direct cause of such a result. In all cases, therefore, in which we wish for more extensive effects from an emetic, than the mere evacuation of the stomach and a concussion of the viscera of the abdomen, our selection of the article and mode of administration should be such as to meet the indication for protracted nausea, and general relaxation before vomiting takes place. On this condition, which implies not merely an irritation of the nerves of the stomach, and consequent contractile effort of its muscles and those of the abdomen, but a sedative and depressing action on the whole nervous system, there would be comparatively little danger in an apoplectic subject being made to evacuate the stomach by the ingestion of an emetic. It is only by the virtual admission of this principle that physicians continue to give the preference to those emetics which have a more nauseating and protracted effect, such as tartar-emetic, over those of speedy operation, such as sulphate of copper and sulphate of zinc. To be beneficial to the extent often desired by those who prescribe emetics, the increased secretion from the stomach of mucus and other fluids, which they cause, must find analogous and responsive action in the secretions from other organs, as from the liver and pancreas, the trachea, pulmonary mucous surface, uterus, and skin. Failing to bring about these results, we derive comparatively little benefit from mere vomiting, other than that which follows, and it is certainly no unimportant good, the expulsion of some indigestible, irritating, or even poisonous matter from the stomach. But for general and effective therapeutical purposes, the practitioner will not derive the good effects from emetics, which they are capable of producing, unless he maintain by them, for some time, nausea and its concomitant depression, with, at intervals, the regular expulsive effort of vomiting. By a judicious extension of the period for the operation of an emetic in the manner now suggested, the patient would be less jarred by the act of vomiting, less liable to suffer from undue determination of blood to an important organ, and what is most desired, his disease would be more under control, if not entirely arrested, by emesis, that which is commonly regarded as a beginning, and too often as a *pro forma* beginning, of the treatment. In confirmation of this view I will just advert to the familiar fact, that bile is seldom thrown up by vomiting until after the sickness from the emetic has lasted some time, and that the deeper the feeling of nausea, the more likely is the discharge of bile from the

stomach. What is here known respecting the liver, will doubtless serve as an index to the change in the secretion of other organs.

Ipecacuanha is almost the only vegetable emetic which is relied on; emetic tartar, and the sulphates of copper and zinc, are also valuable medicines of the class. Emetics are often administered with great advantage at the commencement of certain acute and febrile diseases, as creating a kind of counteraction in the system, by which the symptoms are mitigated, or in some instances wholly superseded. They are employed to evacuate the stomach when overloaded with food, and for the removal of poisons, as well as for the fulfilment of a variety of secondary ends, which are mentioned under individual articles. In all diseases of habit, or of periodical recurrence, in which the nervous system is so generally disordered, emetics have been employed with more or less success, when given just before the time of the expected return of the paroxysm. In the advanced stage of diseases, as in phthisis, and in very young children, emetics are hurtful, sometimes dangerous.

EMETIN, *see* IPECACUANHA.

EMMENAGOGUES (ἐμμηνια, the *menses*, and αγειν, to *induce*). Remedies which induce the catamenial discharge.

Though not intending in this work to discuss questions of general therapeutics, which necessarily imply, for their elucidation, certain pathological distinctions and references, I must add a few words to the mere definition of Emmenagogues, which is all that Mr. Brande has introduced under this head. They are intended to be admonitory to the young practitioner, and as a warning against his indulging in the common and vulgar error respecting both the indications for the use of this class of medicines, and their intrinsic and relative value, when administered for the cure of suppressed menstruation. So soon as a young unmarried female ceases to menstruate, the domestic and neighbourly advisers commonly induce her to take some stimulating infusion, tincture, or pill, which is alleged to possess the virtue of bringing back the menses, the suppression of which was supposed to be the cause of all the other ailments from which she frequently suffers at the time, and the restoration of which it is believed will consequently restore her to health. A little knowledge of the sympathies of the uterus with other organs, by which its health is in a measure dependent on theirs, and of its being arrested or embarrassed in its menstrual function by either plethora and excessive vascular excitement, or by an opposite state of poverty of blood and asthenia, will at once show that amenorrhœa is more frequently an effect of disorder in another organ, or of the system at large, than a cause of these; and will, also, point out the rational practice to be pursued in the particular case. It will be found that, at one time, as in a female of a sanguine constitution and full plethoric habit, bloodletting, rest, and reduced regimen, are the best emmenagogues; in another, as in one of an anemic constitution, pale, and with flabby muscles and feeble circulation, that tonics, nutritive diet, and regular exercise, bordering

on activity, will be the best emmenagogues for her. In a third case, if we stimulate a torpid stomach, we rouse the uterus into consentaneous and healthy secretive action. In a fourth, the liver is to be restored to its function, and the uterus returns to its proper state.

The question of the general health, and particularly of the health of the digestive system, should be clearly settled before medicines are given which are said to have a specific effect on the uterus. If the other organs are restored to their physiological condition, the uterus will generally imitate them: if they are in a morbid state, remedies specially addressed to it will only aggravate their disorder, without restoring the suspended secretion of the uterus. Sometimes we accomplish the latter purpose by medicines which act on the uterus in common with all secreting, glandular, and mucous membranes: of this class are mercurials, and more particularly and commonly the blue pill and calomel, to which I am inclined to add iodine. At times, again, in augmenting the vitality of the blood, and imparting greater nutritive activity to the functions generally, as when we administer chalybeates and vegetable bitters, the uterus participates in the improvement, and renews its periodical secretion. There are cases in which menstruation is restored by the same means as those which bring back obstructed pulmonary or cutaneous secretion; the morbid state, that of capillary constriction and irritability of the nervous tissue being the same in both, will be removed by the same remedies, viz, the warm bath, anodynes, and mild salines. Local irritation of a part of the nervous system, as of the lumbar region of the spinal marrow and corresponding nerves, may pervert the function of the uterus; and then leeches to the spine, followed by a blister or rubefacients, and the administration of laxatives and narcotics, will be the approved emmenagogues. In a torpid condition of the alimentary canal and sluggish circulation, stimulating purgatives, which act more particularly on the lower bowels, will determine also to the uterus, and stimulate it by sympathy. Their effect may be aided by subsequently warm pediluvia, and warm and somewhat stimulating drinks, such as infusions of serpentaria, cimicifuga, &c.

EMOLLIENTS (emollio, *I soften*). Substances which soften and relax the parts to which they are applied; or, according to the definition of Cullen, "substances whose application diminishes the force of cohesion in the particles of the solid matter of the human body, and thereby renders them more lax and flexible."

EMPLASTRA (εμπλασσειν, *to spread upon*). Plasters.

The term *plaster* is applied to adhesive compounds limited to external use, and generally spread, by the aid of heat, upon leather, linen, calico, or silk; in this operation care should be taken that the compositions are injured as little as possible by heat.

Plasters are frequently used as mere mechanical supports, and in

this way they often effect essential service : — indeed, one of the great improvements in modern surgery consists in healing ulcers by strips of adhesive plaster, so applied as to support the parts, and bring the edges of the sore together.

Sometimes plasters are beneficial from the warmth which they afford as a mere covering to the part ; they are also occasionally used as stimulants, rubefacients, and vesicants; and sometimes sedatives are thus applied to allay pain and irritation.

The Plasters are described under the head of the substances out of which they are made.

ENEMA (ενιημειν, *to inject*). *A Clyster* (from κλυζειν, *to wash out*). The injection of medicines into the rectum furnishes the practitioner with many valuable resources, though, as Dr. Paris observes, "the remedy has not escaped its due share of persecution; Paracelsus bestowed upon it the epithet *turpissimum medicamentum*, and Van Helmont that of *pudendum medicorum subsidium*."

The following remarks on clysters are abridged from Dr. Paris, *On the Theory and Art of Prescribing*. They are calculated, he remarks, to fulfil the following indications; namely, 1. To promote the tardy operation of a cathartic, or to evacuate the bowels, where from delicacy of stomach medicines cannot be retained, or from debility of body they cannot be safely administered. Warm water and aperients attain these ends. 2. To induce relaxation, as by a tobacco clyster. 3. To produce astringent, anodyne, or carminative effects, as a starch clyster, with opium, assafœtida, oil of turpentine, &c. In some cases, cold water acts as an astringent, and from its impression on the rectum affords relief in piles. 4. To destroy ascarides. 5. To act as an emollient fomentation. 6. To convey nutriment.

In the first case, the quantity of liquid, and the force with which it is injected, affect their operation : "When most forcibly urged, they rarely reach beyond the sigmoid flexure of the colon, and yet when the largest quantity of fluid which the bowels will admit is introduced with considerable impulse, the local impression is so powerful that it is at once extended, by the medium of sympathy, through the whole of the alimentary canal, and very thorough and copious discharges result." When clysters are administered for the fulfilment of any of the last five indications, the quantity of the injection requires to be graduated; thus, to prevent an opiate clyster from being returned it should seldom consist of more than three or four ounces of liquid, and the same precaution is required in employing a bitter decoction for the removal of worms. "The proportions of fluid which are necessary for the different stages of life, under ordinary circumstances, may be stated as follows: an infant at its birth, or soon after, requires about *one fluid ounce*; a child between the ages of one and five years, from *three to four fluid ounces ;* a youth of ten or fifteen, from *six to eight fluid ounces ;* and an adult may require *twelve*. With regard to the

dose of the active ingredient of a *lavement*, it may be estimated as triple of that taken by the mouth." This proportion is much too large. Practitioners of experience, especially French, allege that the activity of a medicine administered by the rectum is fully as great as when taken into the stomach. In the case of narcotics, the safer calculation is, one and a half the quantity, for an enema, of that given by the mouth. It will be easy afterwards, according to the toleration of the system, to increase the dose.

The composition of the following *Enemata* is described in this work: —

Enema Aloes . .	Enema of Aloes, *see* ALOES.
Enema Opii . .	Enema of Opium, *see* OPIUM.
Enema Tabaci . .	Enema of Tobacco, *see* TABACUM.
Enema Terebinthinæ .	Enema of Turpentine, *see* TEREBINTHINÆ OLEUM.

EPISPASTICS (ἐπι, *upon*, and σπαω, *I draw*). Blistering and other similar applications which produce cuticular discharge by exciting inflammation.

Blisters act, 1, as *rubefacients*, increasing the physiological action of the capillary and nervous tissue of the skin; 2, as *inflammatory excitants*, causing the phenomena of inflammation, and the discharge of albuminous serum, which is interposed between the true skin and the epidermis; 3, as *secretory excitants*, giving rise to a secretion of sero-purulent matter, by which the blistered surface is for the time being converted into an ancillary glandular organ.

According to the stage and degree of vesication, as above described, will be the therapeutical effects of blisters. In virtue of their rubefacient and incipient vesicatory operation, they are useful *counter-irritants*, diminishing morbid sensation and pain at a part remote from the part blistered, and augmenting the sensibility of the spot to which they are applied. They at the same time act as *revulsives*, by causing a fluxion of fluids — at first augmented capillary fulness, and then serous secretion. As exciters, both of the nervous and of the sanguiferous systems, at first locally, and afterwards by reaction on the centres, blisters may be supposed to be, as they in fact are, useful in cases of diminished sensibility, whether manifested in a single nerve or in a series of nerves, including the spinal marrow and brain. Hence, in anæsthesia, and in paralysis and stupor, blisters have been long a remedy on which great reliance is placed. In an apparently opposite state, but not so much so as is generally believed, or of morbid sensibility, as in the various forms of neuralgia, and the pain of rheumatism, and in the admitted phlegmasiæ, blisters are also had recourse to. Even though it were proved that we do not by their agency actually shorten the duration of the disease, we gain much by removing pain itself — a perturbator of the system, tending to complicate the morbid phenomena, and in its moral effects ever to be deprecated.

But whilst admitting the propriety and advantage of applying

blisters in the simple phlegmasiæ, and in their complication with abnormal conditions of the nervous system which constitute, for the most part, fever, practitioners have found it necessary to wait for a particular stage of the disease in which the remedy displays its best effects. Baglivi was among the first to indicate some of the necessary precautions in the employment of blisters, by his advising against their use in the acute stage of the phlegmasiæ, when the fever was yet high, and the skin hot, and in which the sensibility was greatly exalted with manifest tendency to delirium. Rush, whilst giving directions on this head, rather sanctions the importance of a rule than specifies the circumstances under which it is operative, when he speaks of the "blistering point" in the treatment of fevers and the phlegmasiæ. We can, however, readily understand how it should happen, when the sympathetic irritation of the heart and central nervous organs is yet active, that a high excitement of any portion of the capillary and nervous tissue, such as ensues on the application of a blister, should augment this irritation, and increase fever, and its concomitant restlessness, thirst, &c.

Very different and beneficial are the effects of a blister when applied after the subsidence of the acute or paroxysmal stage of inflammation or of fever, whether this be brought about by time, or by direct depletion (v.s., purgatives, &c.). Dryness of the skin, wakefulness, marked yet not well defined painful sensations, and quickness of pulse in fever, and the violent pain in inflammation, often yield to the timely application of a blister, and are replaced by a soft, if not moist skin, tranquillity and sleep. Secondary symptoms in fever, as of stupor, delirium, bronchial and pulmonary, peritoneal, gastro-intestinal, and hepatic irritation, are often successfully combated by a blister. In the case in which the brain or its meninges are affected, it is applied commonly to the nucha; sometimes in more profound lesions and aggravated symptoms directly on the scalp, the hair having been previously shaved. In this latter case, the blister should be kept on from twelve to twenty hours. In affections of the chest, the blister is applied between the scapulæ behind, or, on either side, below the axilla, or between the clavicle and mamma. If for abdominal disease, the vesication is either on the anterior surface of the abdomen, or in subacute, and particularly in chronic affections, on the inside of the thighs. Blisters for the relief of inflammation or other disease of the pelvic viscera, are applied, also, to the inside of the thighs, or on the sacrum.

In periodical diseases, both of a febrile and more distinctly nervous character, as in intermittents and remittents, and in hysteria, epilepsy, &c., blisters have been recommended with a view of preventing the return of the paroxysm, and of breaking up entirely the morbid habit. The value of the remedy has, I have no doubt, been greatly overrated in these and analogous cases. Not to mention other instances, I may refer to the case of intermittent fever in my own person, in which four blisters, one to each leg and

wrist, and one on the side, were incompetent to ward off the paroxysm. Equally ineffectual was the application of a fresh blister over an already raw surface from former vesication, an hour or two before the expected return of the fit.

Some cases of epilepsy are no doubt benefited by vesication kept up for a length of time; but the relief, it has seemed to me, was owing more to the drain thus established as a relief of local plethora than to mere counter-irritation; and that the pain caused by the frequent application of a blister, or of blistering ointment, on the same spot, is prejudicial to some very sensitive persons suffering under epilepsy or hysteria, I am well convinced.

Great difference of opinion exists respecting the spot where the blister should be applied; whether near to, or remote from, the diseased organ. In general, the end desired from revulsion is accomplished, if the blister be put on the outer surface of the wall of the cavity directly over the contained and suffering organ,—as in cases of laryngitis, pleurisy, pneumonia, bronchitis, gastritis, enteritis, and peritonitis; or in its immediate vicinity, as to the nucha in encephalitis and meningitis, below the ear in otitis, to the temples in ophthalmia, &c. But, as in chronic affections of the abdominal viscera, a blister to the inside of the thighs was recommended, so in analogous stages of pulmonary and bronchitic disease, and in certain disorders of the heart dependent on valvular obstruction, the vesicating surface may be established with benefit on the inside of the arm, about midway between the axilla and the internal condyle. I have had occasion repeatedly to test the good effects of this latter mode of treatment. The chief objection is the sensibility of this region, and the great irritation and pain to which repeated vesication on it give rise.

Theoretical reasoning more than positively ascertained success, has long swayed us in the application of blisters to the lower extremities, in inflammatory diseases and engorgements of the organs of the great cavities of the trunk. In certain forms of disease, and particularly in fevers called typhoid, vesicating applications to the legs or arms ought to be attended with unequivocally good effects, in order to obviate the objections to the remedy on account of the protracted and painful, and even gangreneous, sores to which they often give rise. Whilst deprecating the use of blisters in this way, I do not, however, regard the explanation of the destruction of the parts, which supposes this to be owing to a deficient vitality of tissues and feebleness of the system generally, to be a true one. The excessive and morbid secretion of caloric in these fevers, the petechiæ and sudamina are, to my mind, evidences of inordinate capillary excitement, which readily tends to destructive inflammation, when an exciting cause, such as cantharides, is applied. The objections to the use of blisters in this state of the cutaneous circulation come entirely within the cautionary rule laid down in a preceding page of these remarks, viz., to avoid vesication when there is much febrile excitement and abnormal heat. When the

excitement is irregular and unequal, and the extremities occasionally cold, and the skin dry, blisters applied so as to produce rubefaction only will be of service, but not otherwise; and we cannot but regard it as one of the improvements in therapeutics, that in low fevers, or those of a typhoid and congestive form, blisters are not "clapped on" as a matter of course, and their application renewed until half the surface of the skin is converted into either ulcerated sores or a tanned and parchment tissue.

Blisters are used in certain diseases of the skin, acute and chronic; of the former, chiefly erysipelas, of the latter, tinea, &c. In erysipelas, they should be applied on the sound skin contiguous to, or, if the limb be the part affected, around the margin of the diseased surface. In chronic affections of the joints, and even in acute varieties, after V. S., cups and leeches, blisters, large enough to surround the whole joint, are often directed with good effect; more particularly if they are renewed so as to keep up a vesicated and discharging surface. Indolent tumours are sometimes quickened to absorption by vesication, which is, in these cases, a good precursor of such active discutients as mercurial and iodine ointments.

Blisters are contraindicated in very irritable persons, in whom they not only excite strangury, but also fever, and symptoms of gastro-enteritis; also in scurvy, dropsy, gravel, stone, stricture, or most kinds of urinary irritation. From this latter generalisation, we may, however, except some cases of irritable bladder, such as *catarrhus vesicæ*, in which a blister to the sacrum or the perineum is at times very serviceable. In certain stages also of diseased kidney, accompanied with albuminous urine, a blister over the renal region is a useful remedy. We are cautioned against the employment of blisters in exanthemetæ attacking children, owing to the tendency of the skin to slough under these circumstances.

As respects the repetition of blisters, it is better to use small ones in succession in a particular region, over sound skin, than to put on a fresh blister or blistering ointment on an already vesicated surface. The pain and the risk of strangury are less in the former than in the latter practice.

ERGOTA. Ergot. *Spermœdia clavus*. *Nat. Ord.* Fungaceæ. Spurred Rye (*Secale Cornutum*). This is a curved, purplish-black body of a cylindrical form, rounded at its extremities, of a firm, horny texture, covered with a powdery substance externally, the nature of which is not ascertained. The mass appears to the eye, even when assisted by moderately high magnifying powers, to be a homogeneous substance in which no organization can be detected. But if sliced very thin, and examined in water, by a very powerful microscope, the mass is found to consist of fine flocci, or threads, branched, and bearing spherical sporules as transparent as the flocci themselves; the whole consolidated into a compact substance. In the last edition of the *London Pharmacopœia*; ergot is referred to the *Acinula clavus* of Fries (*Syst. Mycol.*);

but Fries has no such plant in any of his works, and the only species of acinula known, *Acinula caudicans*, is found on the rotten leaves of the common alder, and among melting snow; its organization is quite of another kind from that of spermœdia, and Fries, who regards the other as a morbid state of the grain of certain grasses, considers acinula as a true fungus. — (*Lindley.*)

Ergot yields a deep brown tincture with alcohol, which on evaporation leaves a considerable portion of wax; it also yields a bitter and sourish extractive, and crystals which have been supposed to contain morphia. Water takes up a brown bitter substance from the ergot after digestion in alcohol. Wiggers obtained from ergot a thick white, odorous, and fixed oil, fungin, albumen, osmazome, wax, and a peculiar extractive substance in which its active properties apparently reside. It is said sometimes to be adulterated with plaster of Paris casts, coloured to resemble it.

Mr. Wright (*Harveian Prize Essay*, and *Edinb. Med. and Surg. Journ.* 1839–1840) gives, as the result of his analysis, the following constituents and their proportions, viz., in 100 grains of ergot, he found — of a thick white oil 31·00, osmazome 5·50, mucilage 9·00, gluten 7·00, fungin 11·40, colouring matter 3·50, fecula 26·00, salts 3·10; loss 3·50. Ergot appears to differ from sound rye, chiefly in the presence of oil, osmazome, and fungin.

Spurred rye appears to act as a poison on all animals. Mr. Wright (*ut supra*) concludes, from numerous experiments on animals, that solutions of ergot injected into the arteries and veins affect chiefly the brain and the nervous system, sometimes the spinal marrow by paralysis, but sometimes the brain by coma before paralysis; its effects differing according to the strength of the solution employed. In a concentrated form it appears to paralyze the system instantly, no resistance to its effects being discoverable. A milder preparation causes for a time great excitement, the nervous energy is raised, but sinks eventually under the influence of the poison. The effects are much more speedy when introduced by the arteries than by the veins. Ergot appears also to exert a deleterious influence upon the system through the medium of absorption, and its activity seems to be correspondent with the relative absorbent power or varied sensibility of different membranes.

As respects the effects of ergot when given in large and single doses by the stomach and rectum, Mr. Wright infers, that this substance is capable of exerting a local irritation upon the parts with which it comes into contact; determining, when in the stomach, nausea, vomiting, and hiccup; when in the rectum, tenesmus, and by sympathy, dysury and priapism. Its influence on the brain and spinal marrow is also clearly manifested; and especially on the latter; but it is evident that a considerable dose is required for the development of any active results. Rabbits were much less influenced by it than dogs; among other reasons, because they are able to bear a much greater quantity of narcotics and other substances of that class than carnivorous animals.

Mr. Wright's experiments do not lead him to a belief in the excessively morbid action and peculiar symptoms consequent upon the administration of smaller and continued doses to the inferior animals. Spasms following the use of ergot he "can fully believe," but he did not witness the production of gangrene, even when the animal was fed entirely with ergot, as so frequently mentioned by continental writers. But, he adds: "Nevertheless, from the numerous substantial cases in which the virulence of ergot is represented, I am inclined to the opinion, that gangrene may have frequently succeeded its use."

In man, in a dose of two drachms, it excites giddiness, headache, flushed face, pain and spasm in the stomach, nausea, vomiting, colic, purging, and weariness in the limbs. But its effects are not commonly observed in this way, and they have usually been produced by grain contaminated by the spur having been employed for bread. In these cases two sets of symptoms have been described: the one characterised by violent spasmodic convulsions; the other, by a depraved state of constitution, ending in a remarkable form of gangrene.

The symptoms of *convulsive ergotism* are described as follows, by Dr. Wagner of Schlieben. (*Journal der praktischen Heilkunde*, LXXIII. and LXXIV., as quoted by Dr. Christison, *On Poisons*, chap. XL.) In consequence of unusual moisture and late frosts in the summer of 1831, the rye was so much spurred in many fields, that a fifth, at least, of the prickles were diseased. As soon as the country people began to use the new rye, convulsive ergotism showed itself, and it recurred, more or less, till next midsummer, when the diseased grain was all consumed. The usual symptoms were, at first, periodical weariness; afterwards, an uneasy sense of contraction in the hands and feet, and at length violent and permanent contraction of the flexor muscles of the arms, legs, feet, hands, fingers, and toes, with frequent attacks of a sense of burning or creeping on the skin. These were the essential symptoms; but a great variety of accessory nervous affections occasionally presented themselves. There was seldom any disturbance of the mind, except in some of the fatal cases, where epileptic convulsions and coma preceded death. Every case was cured by emetics, laxatives, and frequent small doses of opium, provided it was taken in reasonable time, and the unwholesome food was completely withdrawn.

The symptoms of *gangrenous ergotism* have been described by various authors: they are summed up as follows, by Dr. Christison, in the chapter of his work relating to poisonous grain. In Germany, this disease is known by the name of *Kriechelkrantheit*, or *creeping sickness*. "In the most severe form, it appeared in Switzerland, in 1709 and 1716; it commenced, according to Lang, a physician of Lucerne, with general weakness, weariness, and a feeling as of insects creeping over the skin; when these symptoms

had lasted some days or weeks, the extremities became cold, white, stiff, benumbed, and at length so insensible, that deep incisions were not felt; then excruciating pains of the limbs supervened, along with fever, headache, and sometimes bleeding from the nose; finally, the affected parts, and, in the first instance, the fingers and arms, afterwards the toes and legs, shrivelled, dried up, and dropped off at the joints: a healthy granulation succeeded, but the powers of life were frequently exhausted before that stage was reached. The appetite, as in the convulsive form of the disease, remained voracious throughout. In milder cases, as it prevailed at different times in France, nausea and vomiting attended the precursory symptoms, and the gangrenous affection was accompanied by dark vesications. In another variety, which has been witnessed in various parts of Germany, the chief symptoms were spasmodic contractions of the limbs at first, and afterwards weakness of mind, voracity, and dyspepsia, which, if not followed by recovery, as generally happened, either terminated in fatuity, or in fatal gangrene."

Instances of epidemics, resulting from spurred rye, and other diseased grain, are numerous in German medical history, dating from that in 1596, recorded by Wendelm-Thalius, down to the middle of the last century. They have of late years become rare, in consequence of agricultural improvement; the creeping sickness has, however, been observed several times in Germany within the present century. France and Switzerland have suffered at different times in the same way. It is not unlikely, however, that disease marked by gangrene, and great prostration, &c., and referred to ergot may, at different times, have resulted from a deficiency of nutritive food.

Before speaking of the medical uses of ergot, it may be well to advert to some of the symptoms produced by it, on which Mr. Wright differs from the continental and preceding writers. Besides great debility, there is positive disease following its use, even when neither convulsions nor gangrenous symptoms occur. He did not observe, what others had remarked, that animals slowly poisoned with ergot retained a good appetite and an unimpaired digestion until death: nor that the heart was empty in all its cavities. Mr. W. has more than once found them all full. The pulse, which it has been alleged is unaffected throughout, was found by him to be uniformly altered, consequent upon the enfeebled action of the heart. He noticed, also, that not only was a fracture prevented from uniting, by feeding the animal on ergot, but that he has many times given ergot to animals having limbs weakened or crippled from injuries of long standing, and has invariably found such parts to suffer before any direct signs of constitutional disease were recognizable.

Medical Uses of Ergot. Mr. Wright is inclined to the opinion that the chief injury to the animal economy caused by ergot is referable to its sedative influence upon the system. Not that he

regards it in the light of a simple or primary sedative, but as secondarily so; and he thinks that it is unquestionably a *narcotico-acrid*. He has a high opinion of its powers in arresting hemorrhage, even by the use of the infusion, the injection of which into the uterus, in cases of flooding, would, he believes, answer every practical end that can be wished for.

The extraordinary medicinal powers of spurred rye in its action upon the gravid uterus, are stated, upon the authority of Robert, (*Erläuterungen und Beiträge zur Geschichte des Mutterkorns:* Rusts *Magazin für die gesammte Heilkunde*,) to have been long known in Germany, as they were indeed in other parts of Europe; they were, however, first brought into general notice between the years 1807 and 1814, by the physicians of the United States. Dr. Stearns, of New York, in a letter to Dr. Akerly, directed the attention of the medical world to the merits of this drug, in which he fully illustrates its therapeutic value, and demonstrated its claims to general attention. In 1813 Dr. Prescott read a paper before the Massachusetts Medical Society, which contributed much to confirm the views of Dr. Stearns, and to extend the employment of the medicine. Its peculiar property appears to be that of increasing the contractile powers of the gravid uterus, when too languid to effect the expulsion of its contents; hence the use of ergot in cases of tardy labour, and for the purpose of promoting the separation of the placenta, and quickening the contraction of the uterus after delivery.

The effects of ergot in *accelerating labour*, when it has been tedious or lingering, are now indisputable; and the circumstances under which its use is proper have been tolerably well defined. Dr. Gooch, I know, holds a directly opposite opinion, and in his usual plain and somewhat abrupt style, says: "I never used it, neither do I credit what has been said respecting its efficacy." His editor, Mr. Skinner, of Bath, who is equally strong in his denial of its virtues, adds a note to the foregoing: "I have repeatedly given the ergot in half drachm, and two scruple doses; I have given it both in powder, and in infusion; and I never witnessed, in any one instance, the slightest benefit from it." It is but right to suppose that Mr. Skinner must have used ergot that had lost its virtues by having been kept a long time.

The indications for the use of ergot in labour have been well set forth by Dr. Stearns, as follows: —1. When, in lingering labours, the child has descended into the pelvis, the parts dilated and relaxed, the pains having ceased, or being too ineffectual to advance the labour, and there is danger to be apprehended from delay, by exhaustion of strength and vital energy, from hemorrhage, or other alarming symptoms. 2. When the pains are transferred from the uterus to other parts of the body, or to the whole muscular system, producing convulsions. After bleeding, the ergot concentrates those misplaced pains upon the uterus, which it restores to its appropriate action, and the convulsions cease. 3. In the early stages of pregnancy

when abortion becomes inevitable, accompanied with profuse hemorrhage, and feeble uterine contractions. 4. When the placenta is retained, from a deficiency of contraction. 5. In patients liable to hemorrhage immediately after delivery. In such cases, the ergot may be given as a preventive, a few minutes before the termination of the labour. 6. When hemorrhage or lochial discharges are too profuse immediately after delivery, and the uterus continues dilated and relaxed without any ability to contract.

In reference to the alleged power of ergot to produce abortion and premature labour, Mr. Wright adduces various confirmatory authorities; but gives, on the opposite side, the opinions, also, of many physicians, including Drs. Prescott and Chatard of the United States, the latter of whom administered an ounce of ergot to a sow about to "farrow," which only augmented the secretion of urine and produced agitation. "Three ounces given in two days to a she-goat, near the time of parturiency, failed to excite uterine action. Three ounces given in the space of two days to a young sow, about the middle of gestation, caused no remarkable symptoms. Four ounces given to a cow, four months with calf, produced only a loss of appetite. Wasener gave it to a bitch with young, which went its full time and pupped safely. This experiment was repeated by Dr. Villeneuve, and with the same results." Mr. Wright himself administered ergot to animals in the different stages of gestation; to some soon after conception, to others shortly before delivery, but without either abortion in the first class, or premature labour in the second, being induced. In different instances, the young were born dead, after ergot had been administered either just before or during the time of labour.

It is but right, however, to state the recent affirmative experience of the powers of ergot to bring on premature labour, as given by Dr. Patterson of Glasgow (*Med. Gaz.* June 1, 1839). This gentleman relates two interesting cases of pregnant females having deformed pelvis; to one of whom, in the seventh month of utero-gestation, he gave half an ounce of the ergot of rye infused in twenty-four ounces of boiling water, of which two ounces were exhibited every third hour. When this quantity was finished, two drachms more were infused and administered at short intervals; so that altogether the patient took six drachms of the medicine. Labour soon came on, and twenty-nine hours and fifteen minutes from the first administration of the medicine she was delivered of a live child. The second, also in her seventh month of pregnancy, required a larger quantity and a longer period of time before the effects of the medicine were displayed. In all, thirty-four drachms of the ergot of rye were administered; and the time elapsed from the first dose of the medicine till the expulsion of the child was five days, twenty hours, and twenty-five minutes. Both patients rapidly recovered. In the second case the presentation was a footling, and on the expulsion of the legs the child moved them freely, but the breech being wedged in the superior cavity of the pelvis

and the funis entangled round one of the thighs, caused such delay, that the child was born dead. A third case of a similar tenor to the first of these two is given by Mr. Heane of Gloucester. This woman had been pregnant thirteen times, and had six of her children still-born, five of them having been destroyed by the perforator.

Doctor Patterson thinks that "in proportion as the period of natural parturition draws near, *cæteris paribus*, so will the action of the secale be manifested on the system." He thinks that we can find, in the admission of this principle, an explanation of the comparatively little effect exerted on the uterine system in the earlier periods of pregnancy; and of the difference between its stimulating the uterus in the parturient state, and its failure to produce abortion. Were we without evidence of the emmenagogue virtues of the ergot, and of its power over hemorrhage in the earlier months of pregnancy, this explanation of Dr. Patterson's would be more plausible.

Dr. Ramsbotham (*Med. Gaz.*, June 15, 1839), whilst admitting the power of the ergot to induce premature labour, and citing cases within his own observation in proof, makes a large deduction from our hopes of benefiting by such agency, when he states that ergot thus administered, although it exerts no injurious effect on the mother, has often proved deleterious and destructive to the child. In 26 cases in which the ergot induced labour without any other means being used, 12 children were born alive, and 14 were still-born: but of the 12 born alive, 4 only survived for any length of time; of the remaining 8, one was a shoulder presentation, 3 died within the hour, but not in convulsions, 4 died of convulsions. Of the 14 born still, 1 was a breech presentation, and in 2 craniotomy was performed, the women being further advanced than they had calculated on.

"The quantity [of ergot] each of these patients took varied from 2 to 12 drachms, and they all had it given to them in the same form. Half a drachm of the powdered grain was infused for half an hour in an ounce and a half of boiling water; the *strained* infusion was exhibited, and the dose repeated every four hours."

In 36 cases, the membranes were punctured; in these, 21 children were born alive, and 14 were born still. Of the 21 children born alive, 19 lived for a considerable period, and many, says Dr. R., "are alive at this time to my knowledge."

From the foregoing analysis, Dr. Ramsbotham thinks we may conclude that, although the ergot may bring on labour without having recourse to any operation, yet that it does not present a more likely, nor indeed so probable a means of saving the infant as the older method of puncturing the membrane.

In order that the reader may have the evidence on this question before him, and be the better able to form a judgment of the course to be pursued in some of the emergencies of obstetrical practice, I introduce the following condensed analysis, furnished by Dr. Patterson in the Paper above quoted, and taken from the *Neue*

Zeitschrift für Geburtskunde, Vol. xv. 1837. "In 175 cases, where it was given on account of weak labour-pains, after the *os uteri* was well dilated, 177 children were born: of these 142 were born alive, 18 in a state of asphyxia, but by proper treatment recovered; and 17 were born dead. On examining these, it was evident that 7 had been dead for some time previous to the administration of the medicine; and of the 10 others, which died during labour, 2 lost their lives from prolapsus of the funis; 2 from turning; 1 from presentation of the nates; 1 from contracted pelvis and consequent impaction of the head; 2 from rigidity of the external parts; 1 from deformity of the extremities; and 1 from no very peculiar cause. Agreeably to this statement, therefore, only *one death* out of 177 births could properly be attributed to the employment of the secale cornutum."

Contrasted with this exceedingly favourable view of the remedial virtues of ergot, is the experience, on a small scale, it is true, but still quite clear and precise, of Mr. John Patterson, of Aberdeen (*Edinb. Med. and Surg. Journ.*, Jan. 1839). In eight cases of labour it fully answered his expectations, by its acting strongly (in half drachm doses) in less than five minutes after it was administered. "In every one of these cases there was, in the symptoms produced, a uniformity very surprising; all the patients expressed their feelings in the same language, viz., that they never felt themselves in a similar state, as their pains were never away." But, (and my introduction of Mr. P.'s cases was with the intention of directing attention to what follows)—out of the eight cases in which he used the ergot he lost three of the children, "than which no stronger evidence need be adduced of its extreme danger." In the three cases, Mr. Patterson satisfied himself before the administration of the medicine that the children were not only alive, but apparently strong and healthy; but so soon as the action of the medicine commenced, these impressions gradually became less sensible to the accoucheur and the mother. Mr. P. has little doubt (he was not permitted to make an examination), that death was occasioned by the uninterrupted pressure of the uterus upon the brain. In that way, and by premature separation of the placenta before birth, produced by the same action, he is inclined to believe that more deaths are occasioned than by the use of instruments. Dr. Ramsbotham thinks that the child is poisoned by the ergot through the system of the mother.

Here, at home, the attention of the profession was directed several years ago by Dr. R. M. Huston (*North Amer. Med. and Surg. Journ.* Vol. vii., 1829,) to the dangers and fatal consequences of the free use of ergot to accelerate delivery. He points out the fallacy of confounding the pains in natural labour with those induced by ergot, or that the whole contractile force, in the latter case, which bears upon the placenta and child, is employed in urging the latter into the world. The mother "feeling very soon not only the alternate contractions or labour-pains increased, but a *constant cramp* or

tightness of the uterus, which never leaves her for a moment until the child is expelled, or the effect of the medicine gradually dies away." The late Dr. Hosack also says, that in some of the books ergot is called *pulvis ad partum*, but as it regards the child it may be called *pulvis ad mortem*. Dr. Chapman, on the other hand (*Elem. of Therapeutics*, I. p. 486) affirms, that in his own practice, and in that of Dr. James and Dewees, the ergot was used without doing harm in any respect.

I have myself used ergot in three or four, out of probably a hundred, cases of labour, and the result in one of the former, a still born child with the appearance of its having died from apoplexy, was such as to disincline me from subsequent trials; and to draw more on that which Dr. Gooch calls *tincture of time*, one of the best and most certain aids to the accoucheur for the safe and successful discharge of his duty to a lying-in woman. Where the pains are irregular, or grinding and inefficient, and V.S. not required or admissible, the next most useful tincture is that of opium. There can be no doubt that ergot is used in the United States with a prodigality and a recklessness that make many physicians guilty of infanticide, from their not taking a little more time and patience in order to allow nature to complete her operation. By putting ergot on the list of active poisons (narcotico-acrid), we shall have at once just views of its powers, and exercise a proper reserve in its administration, especially to parturient women. Nor can we, with safety, admit the belief that it is entirely harmless to the mother when administered during labour, for there have been cases in which it is certain that rupture of the uterus has followed, and pretty certain that this result has been caused by the administration of ergot.

Ergot in Various Diseases. Of late years the use of ergot has been extended to a considerable number and variety of diseases; and first and most important, from their danger, is uterine hemorrhage. Mr. Wright attributes to the American physicians the discovery of the value of ergot in these often intractable states. "Chapman, Stearns, Dewees, Hosack, and Church, speak of it in the highest terms, and some even regard it as a prophylactic. Their views have been ably supported by Bigeschi in Italy, by Goupil, Bordot, and Prefet in France, and by a vast number of able and accomplished practitioners in our own country" (Great Britain). In hematemesis, as well as in hemoptysis, hematuria and epistaxis, it has been given with notable advantage. Similar testimony is borne to its favour in gonorrhœa, and, less certainly, in gleet. In puerperal convulsions the ergot has been praised by different practitioners; and in diarrhœa, both acute and chronic, and amenorrhœa, it has been prescribed with good effects. For farther proofs of the remedial power of this medicine, the reader is referred to a subsequent page in which the *oil* of *ergot* is described. There is a variety of uterine disease, designated by Duparcque as engorgement with congestion, in which the uterus is swelled, tender to the touch, and painful, and the sympathetic disturbances numerous

and distressing. In such cases he recommends ergot in doses of eight grains every two or three hours, either in powder or simply suspended in water — and gives histories corroborative of its efficacy. I have myself employed the medicine in a case of this kind, with surprising good effect; I say surprising, when compared with that of the various other means had recourse to, among which were leeches to the *cervix uteri*, cups and counter-irritation to the spine, colchicum, opium, and the carbonate of iron. In what M. Duparcque calls hemorrhagic uterine engorgement from succeeding abortion or stoppage of the lochia, he has directed ergot with happy results. Pauly, the editor of Lisfranc's Lectures on Diseases of the Uterus (Lodge's Translation), recommends the ergot in similar cases to those just stated, and adds, also, evidence of its good effects in uterine enlargements of an indolent character, sometimes accompanied with granular ulcerations.

Administration. Ergot is given either in powder or in infusion, sometimes in decoction, less frequently in tincture; and, of late, in a relatively small number of cases, its oil has been employed. The *dose* of the *powder* is from *fifteen grains to half a drachm*, to be repeated at intervals of half an hour, until there is an obvious increase of parturient pains; unless, in the meantime, a quantity should be given which there is reason to fear would act prejudicially on the child through the mother. In other cases, as hemorrhages, amenorrhœa, &c., the dose is from *ten* to *twenty grains*, three times a day: but even here its use should not be continued beyond a few days.

The *infusion* is made of ergot, bruised, one drachm; boiling water, four ounces. Macerate till cold, in a slightly-covered vessel, and strain. The dose, for a woman in labour, is *one-third*, or even *one-half* of this, to be repeated at intervals of half an hour, until the whole be taken. Sugar, or aromatics (as nutmeg and cinnamon), may be added to flavour it.

The *decoction* is made of ergot, bruised, ʒi.; water fʒvi. Boil for ten minutes, in a lightly-covered vessel, and strain. The dose is *one-third* of the strained liquor, to be repeated at intervals of half an hour, until the whole be taken.

The *tincture* is prepared after various formulæ. That of Dr. Robert consists in digesting ʒss. of bruised ergot in ʒvi. of rectified spirit, for four days, and then strain. The dose, in lingering labours, is a teaspoonful. At Apothecaries' Hall, London, *tincture of ergot* is prepared by digesting ergot ʒij. in proof spirit Oj. Another formula (published in the Lancet, 1827–8, Vol. II. p. 435) is,—Ergot, bruised, ʒi.; boiling water, ʒij. Infuse for twenty-four hours, and add rectified spirit ʒiss. Digest for ten days. Half a drachm of this tincture is said to be equivalent to ten grains of the powder. One or two spoonsful of a tincture of ergot (prepared by digesting ʒss. of ergot in ʒiv. of rectified spirit) mixed with water, have been recommended as an injection into the uterus in difficult labour. It is to be introduced between the head of the child and the neck of

the uterus (Berlin *Jahrbuch*, Bd. xxxviii. 234, 1837).—Pereira. We would prefer greatly reading of this recommendation to putting it into practice.

Oil of Ergot of Rye. Mr. Wright, to whose experiments and observations I have made frequent reference, has succeeded in procuring the oil of ergot, and in making trials of its powers, both on animals and on the human subject (*Ed. Med. and Sur. Journal*, July 1840). He indicates several methods by which the oil can be obtained.

1. If ergot of rye, in a state of fine powder, be heated in a retort, there distils over, a thick oily matter, having an offensive smell, a bitter acrid taste, and a colour varying from a light brown to a perfect black. This is the oil of ergot in an empyreumatic form, and the characters just given are strong in proportion to the heat employed. It was thus separated by Vauquelin, and was, consequently, described by him as thick and rancid, having the appearance of fish oil; properties which belong not to it in its natural condition, and are only produced by its partial decomposition. 2. Another way by which this oil may be obtained is, by squeezing the ergot (previously reduced to powder, and placed in a canvass or a muslin bag) between two plates of iron, heated to the temperature of boiling water. As thus separated, the oil is more fluid, lighter in colour, and less offensive to the smell, than when prepared in the manner first described. 3. A third process, and a convenient one for ordinary purposes, is to digest the ergot in *liq. potassæ* at a temperature of 120° to 150°, until a perfectly saponaceous solution be formed. The liquid is then to be distilled with half its weight of water, exactly neutralized with sulphuric acid, and submitted to distillation from a saline or an oil bath. The product is white, adhesive, and fatty-looking, almost free from empyreuma, and nearly tasteless. 4. It may also be separated by digesting ergot in alcohol for some days, filtering the fluid, and then allowing it to evaporate spontaneously. The oil thus obtained, is not, however, pure, owing to the alcohol being an active solvent of the osmazome and the colouring matter. 5. The readiest and best, though, unfortunately, the most expensive way of obtaining this oil, is by percolating ergot, in a state of fine powder, with sulphuric ether. By allowing the ether to evaporate spontaneously, the oil of ergot is left in its purest form. This last is the method adopted by Dr. Hooker, of New Haven, in 1837 (*Boston Med. and Sur. Journal*).

As thus prepared, it usually consists of two portions — the one, colourless and translucent, the other having a reddish-brown hue. The latter character is an acquired one, and simply dependent on the age of the ergot. In old specimens, the oil is coloured throughout, and often deeply; in recent ones, on the contrary, it is not unfrequently entirely free from colour.

Properties. Its taste is oily, and slightly acrid; its odour is similar to that of ergot, though more agreeable, and neither heightened by acetic acid, nor destroyed by long contact with a clear plate of copper, or of iron. When heated, it blackens rapidly, acquires a disgusting empyreumatic odour, like that of an old tobacco-pipe, and an acrid biting taste. If the heat be long-continued, complete volatilization takes place; but if the oil be suffered to cool, it thickens, solidifies slowly, and ultimately becomes resinous. The purple hue seems to be owing to the action of light and air upon the oil, aided by the free phosphoric acid.

Oil of ergot is of less specific gravity than water, and when they are agitated together, the latter becomes slightly odorous, and the former is rendered somewhat opaque. It is soluble in all the ethers, alcohol, naptha and bisulphuret of carbon, from which it is imperfectly separated on the addition of water. It is dissolved by all the essential oils, and mixes intimately with some of the fixed ones, particularly almond and olive oil. It is likewise soluble in creosote, caustic alkalies, earths, and ammonia. With the latter substances, it forms a soapy solution, from which it may be separated by an acid. Sulphuric, nitric, and hydrochloric acids in the diluted form, have little action upon it, but when concentrated they

convert it into a deep brown or black mass. When long exposed to light and air, at a moderate temperature, the oil thickens, deepens in hue, and diminishes in strength; *yet, if kept in a stoppered bottle, it is well preserved, and will retain its activity for years.* On this account, as also from the fact of its embodying all the active properties of ergot in a safe and manageable form, Mr. Wright is confident that it will be found a much more advantageous officinal preparation than the crude drug. For this reason, as well as from the novelty of the subject, I have given its pharmaceutical history and characters in unusual detail.

Mr. Wright, although he avers that whatever of activity is possessed by the ergot, is centred in its oil, is not prepared to say whether this oil be the active principle, or the mere vehicle for containing it. He inclines, however, to the latter opinion.

Medical Uses of the Oil of Ergot. It may be premised, as shown by Mr. Wright's experiments, that the effects of the oil of ergot, when injected into the arteries and veins, are precisely those which characterise an infusion of the crude drug: the same remark applies to the operation of the oil when taken into the stomach, with the exception of its greater activity, on account of its greater concentration, than that of the crude ergot. Inhalation of the vapour of the oil affected Mr. Wright himself with a curious tingling sensation over his limbs, distressing lassitude, irritability and giddiness; and produced, when carried to a greater extent on animals, tetanic rigidity nearly equal to that which occurs from strychnine.

Mr. Wright employed the oil in nine different cases of labour, where the exhibition of ergot was particularly indicated, and in all of them it answered most satisfactorily. In four of these cases, in which the contractions of the uterus were sluggish and imperfect, yet the *os uteri* sufficiently dilated, it produced very increased action in six minutes, and delivery speedily followed. In the ninth case the pains were for the most part suspended, from sudden terror with which the patient was seized; the pulse had risen from 75 to 130 beats in a minute, and an alarming irritability of the whole system prevailed. The administration of the oil to this patient reduced the pulse to 90 in less than ten minutes; the irritability in a great measure subsided, and during a state of calmness, the uterine contractions were vigorously and steadily renewed, and within an hour from the time at which the dose was given parturition was fully completed. Dr. J. Y. Simpson, Professor of Midwifery in the University of Edinburgh, states that he has used the oil of ergot both in cases of lingering parturition, dependent on deficient uterine contraction, and also in instances of *post partum* hemorrhage. In one case of the latter, where the uterus relaxed, again and again, after the repeated introduction of the hand into its cavity, he gave Mr. Wright's preparation in a large dose (60 drops, and repeated), and very shortly afterwards the uterus began to contract firmly, and the woman, who was much reduced by the flooding, complained of the severity of her after-pains. M. Meisser, of Paris, and Dr. Gordon and Mr. Wilkinson, bear similarly favourable testimony to the use of this medicine. Mr. Wright has seen

it used in two cases of retained placenta with speedy and complete relief, in the expulsion of the uterine contents.

Twice he has administered the oil in troublesome diarrhœa, and with very marked advantage. The dose in these cases was ten drops every three hours, and both the patients were cured on the day following that of the administration of the medicine. It must be understood, however, continues the author, that this remedy acts simply by subduing any inordinate irritability of the intestines, for it is not physiologically an astringent. He has also repeatedly given it in cases of irritability and cramp of the stomach, and he has never known it fail to relieve or remove the symptoms.

The *dose* of the oil is from *twenty* to *fifty drops*. It may be given in any convenient vehicle, such as cold water, warm tea, or, in cases of prostration, with some alcoholic or ethereal mixture.

The *external application* of the oil of ergot has been found serviceable, in the hands of Mr. Wright, in cases of local rheumatism. The affected part should be well rubbed with it night and morning till relief be obtained. It is in the same gentleman's experience, one of the best remedies for the cure of toothache. But perhaps its greatest value, as an external application, is in the arresting of hemorrhage, which it does very effectually. In a severe case of epistaxis, the hemorrhage was arrested by injecting up the nostril equal parts of very dilute spirit and oil of ergot. Mr. Wright has very little doubt, that in the severe cases of flooding which succeed delivery, the injection of this oil, diffused through water, into the uterus, would be productive of the happiest effects.

An *ethereal solution of ergot* is recommended by Mr. Lever (*Med. Gaz.*, p. 108, Vol. II. 1840) as possessing the virtues of the medicine in substance, and exerting a very beneficial effect in cases of tedious labour, and in hemorrhage after delivery of the placenta, in which the uterus has not contracted well; also in passive menorrhagia. Mr. L. is disposed to attribute peculiar powers to this preparation, by its not producing nausea, sickness, headache, falling of the pulse, dilatation of the pupil, &c., to which all the other preparations of ergot (except the oil?) are so apt to give rise. The deleterious principles are not, he thinks, soluble in ether; but this is a speculative opinion.

The solution is that prepared by Dr. Rees, after the following formula:—Digest ʒiv. of ergot in powder in f ʒiv. of ether during seven days. The result was a solution of the oily matters contained in the ergot, which was poured off and evaporated to dryness, and the residue again dissolved in f ʒij. of ether. This preparation, it will have been seen, is in fact little else than an ethereal solution of the oil, of which so full mention has been already made. The dose given by Mr. Lever, to women in parturition, varies from *fifteen* to *thirty drops* upon a lump of sugar; and he has found that uterine action has commenced in twenty minutes or half an hour after its use. In cases of menorrhagia, he has given

five to *eight drops* three times a day; and he has not had occasion to persevere in its employment more than four or five days.

ERRHINES (ἐν, *in*, and ῥὶν, *the nose*). Substances which stimulate the nasal membrane, exciting sneezing, and an increased secretion of mucus. They are also termed *Sternutatories.*

The errhine in most common use, is *snuff*, a compound of various substances, of which tobacco is generally supposed to be the basis, and to which various additions are made for various purposes, but chiefly for increasing its irritating quality; these additions are either mechanical or chemical in their effect; if the former, fine sand and powdered glass are said to be the most common; if the latter, carbonate of ammonia, essential oils, hellebore, euphorbium, and some other vegetable irritants: asarabacca leaves had a place in former Pharmacopœiæ, on account of their stimulating merits, and the *Pulvis Sternutatorius*, or *Pulvis Asari compositus*, commonly called *Herb Snuff*, was constituted as follows—:

Take of the Leaves of Asarabacca, three parts; Leaves of Marjoram, Flowers of Lavender, of each one part. Rub them together into a powder.

When the nasty custom of taking snuff is once established, it is, like other evil habits, difficultly broken. By habitual use, snuff, like other stimulants, gradually looses its effects, and hence the necessity under which the snuff-taker finds himself, of increasing the frequency and quantities of his pinches, till he becomes an annoyance, if not to himself, at all events, to others. It has sometimes been stated that the habit of snuffing, when once established, cannot be left off with impunity; no doubt, when the discharge which it excites is considerable, as at first it often is, its sudden suppression might possibly be productive of some evil; but by habitual use, the errhine and stimulating powers of snuff are soon lost, and no serious mischief need be apprehended, therefore, on that score.

As remedial agents, errhines are sometimes useful in headache, toothache, earache, deafness, chronic ophthalmia, and habitual drowsiness; they are often also mischievous, producing a morbid state of the nasal membrane, and sometimes inducing a tendency to dangerous bleeding from the nose. Cullen supposed that snuff might, in some cases, by its local stimulant action, prevent palsy or apoplexy; but, in fact, it is more likely to cause them.

ESCHAROTICS (ἐσχαροῦν, *to scab over*). Substances which produce an eschar upon the skin, as the consequence of their caustic or destructive action.

ESSENTIAL OILS, *see* Olea Destillata.

ETHER, *see* Æther.

EUPATORIUM PERFOLIATUM. Thoroughwort. Boneset. *Cl.* 19. Syngenesia. *Nat. Ord.* Corymbiferæ.

This is an indigenous vegetable, growing in wet meadows throughout the United States. The whole plant is medicinal, but the leaves and flowers are most active. The effects of this, as of many other medicines, show the artificial character of our common classification

of the articles of the Materia Medica; for, according to the mode of exhibition of the eupatorium, it proves tonic, emetic, purgative, diuretic, and actively diaphoretic (*Chapman's Therapeutics and Materia Medica*, Vol. I. p. 429, 3d edit.). It is much employed for the cure of intermittents, in districts where this form of disease prevails. In warm infusion, thoroughwort proves emetic, and in smaller quantities diaphoretic: even in cold infusion, Dr. Bigelow says that it brings on diaphoresis more readily than most tonics. With such varied powers, this medicine is applicable to a considerable number of diseases. We find it prescribed in catarrh: more especially did it acquire reputation for the cure of an epidemic catarrh or influenza which prevailed in Pennsylvania and other parts about the middle of the last century; and of which the late Dr. Rush has given us some account. He mentions the estimation in which the eupatorium was held in popular and domestic practice, and the name of *boneset* which it acquired, at that time, by relief from one of the most troublesome symptoms of the disease, a violent pain in the limbs and joints, as if they were broken, following its use. In rheumatism and dropsy it has also been prescribed with repeated good effect: and owing to its ready action on the cutaneous capillaries, it has been inferred from analogy that it would be serviceable in chronic cutaneous affections. Instances are even recorded of its beneficial operation in this way.

It is administered as a tonic in powder, in a *dose* of *twenty* or *thirty grains*, in some convenient vehicle. Milk is sometimes used for this purpose in the country: some aromatic infusion, as of calamus aromaticus, ginger, or of the leaves of the mint, or peppermint, is preferable. When intended to act as an emetic, a strong decoction may be made from an ounce of the plant in a quart of water, boiled down to a pint. Taken in quantities short of producing an emetic effect, it operates as a cathartic, and may be given in circumstances in which the bowels are to be stimulated in this way. The conjoined emetic and diaphoretic powers of thoroughwort have caused it to be regarded with favour in the beginning of fevers, particularly those of the remittent and intermittent varieties.

EUPATORIUM TEUCRIFOLIUM. Wild Horehound.

This species of the large family of the eupatorium is looked upon, in the southern section of the United States, especially, as one of our most useful indigenous medicinal plants. By the president of the Medical Society of Georgia, says Dr. Chapman, it is said, that "it serves as an excellent substitute for the Peruvian bark, and, indeed, that among the planters in or near the seaboard it supersedes the bark in the cure of fevers. It is tonic, diaphoretic, diuretic, and mildly cathartic, and does not oppress the stomach as the bark is apt to do — hence it may often be exhibited where the cinchona is inadmissible. It is usually given in the form of infusion: one ounce of the dried leaves, infused in a quart of water, may be taken daily, in doses of from two to four ounces every hour or two. It may be advantageously combined with Peruvian bark, and though it may sometimes fail of producing the desired effect, I think that

it well deserves a station among the articles of the Materia Medica." In this sentiment Dr. Chapman himself entirely coincides, and adds his belief in the efficacy of the medicine in catarrhal affections; and, also, as a bitter tonic in weak states of the stomach. For coughs the horehound is made into a syrup or candy.

EUPHORBIA IPECACUANHA. *Radix.* The root of the Spurge. *Cl.* 11. *Ord.* 3. Dodecandria Trigynia. *Nat. Ord.* Euphorbiaceæ.

The family of the euphorbiæ furnishes many plants, the operation of which is very active on the animal economy, in their being either purgative or emetic, or stimulant. The variety now under notice is an additional example to the same purport. This plant is low and tufted, growing in the middle and southern parts of the United States. It was at one time supposed to be the plant from which the officinal ipecacuanha is procured.

The root, which is the part employed, is large in proportion to the plant, and is fleshy, irregular, and branched. When dried it is of a grayish colour outside and white within. It is light and brittle, without a ligneous centre, and has about the hardness of cork. To the taste it is sweetish and not particularly unpleasant. It contains a substance of the nature of caoutchouc, likewise resin, mucus, and probably fecula.

Dr. Bigelow, whose description of the root of the euphorbia ipecacuanha I have just repeated, performed a series of experiments to test its medicinal operation, assisted by some medical gentlemen of the Boston Dispensary and Alms-House. From these trials, he infers, that this root, in doses of from ten to twenty grains, is both an emetic and a cathartic; that it is more active than ipecacuanha, in proportion to the number of grains administered, and that in small doses it operates with as much ease as most emetics in a majority of instances. If it fails, however, at first, it is not so safely repeated as many of the emetics in common use. If accumulated in the stomach to the amount of two or three scruples, it finally excites active and long-continued vomiting, attended with a sense of heat, vertigo, indistinct vision, and great prostration of strength. Its operation seems exactly proportionate to the quantity taken, and the vomiting is not checked by the powder being thrown off in the first efforts in the stomach. It is pretty evident, from the preceding statement, that the euphorbia is not a fit substitute for the officinal ipecacuanha.

The *dose* of this medicine, as an emetic, is from *ten* to *twenty grains.* If this quantity fails to vomit, it generally purges. In smaller doses it will display a diaphoretic operation, and may, like its kindred root, be combined with opium.

EUPHORBIA COROLLATA. Large Flowering Spurge. This species resembles in most respects the one already described, and the same remarks, with additional reservation, apply to its medicinal properties.

EUPHORBIUM. *Gummi-Resina.* The *gum-resin* of *Euphorbia officinarum.* *Cl.* 11. *Ord.* 3. Dodecandria Trigynia.

Nat. Ord. Euphorbiaceæ (named after Euphorbus, physician to Juba, King of Libya).

This plant is a native of Africa: it is a succulent shrubby perennial.

All the species of euphorbia afford an acrid, milky juice. The *gum-resin*, as it is not quite properly called, is imported in the form of small hollow tears of an intensely acrid flavour. It is emetic and cathartic, but has long been rejected as an internal remedy: and externally, as an errhine, it is apt to occasion excessive irritation and swelling; so that, although it has sometimes been diluted with inert powders, and snuffed up the nostrils in cases of deafness, amaurosis, &c., it is now no longer employed even in this way. Nor is at present used in stimulating plasters, though the following formula has been extolled by Cheselden and others, for the relief of diseases of the hip-joint, and for exciting superficial inflammation in cases of chronic visceral inflammation: —

℞ Emplastri Picis ʒiv.; Euphorbii ʒss.; Terebinthinæ vulgaris q. s.

The peculiar acrid resinous principle contained in this drug has been by some designated *Euphorbin*.

EVACUANTS (evacuo, *I empty*). Substances which stimulate particular organs, occasioning increased secretion, or evacuation. The term is generally applied to aperient or purgative remedies.

EXPECTORANTS (ex pectore, *from the breast*). Remedies which are supposed to facilitate the excretion of mucus from the bronchiæ and trachea.

EXTRACTA. *Extracts.* The term *extract* is applied in pharmacy, to preparations obtained by evaporating certain vegetable juices, infusions, or decoctions, and may contain, independently of *extractive matter*, gum, starch, sugar, albumen or gluten, tannin, resin, and other substances, among which we may enumerate certain salifiable bases, such as cinchonia, quinia, morphia, &c. In some cases alcohol is employed, and the extracts are then termed *alcoholic* or *resinous*.

In the preparation of aqueous extracts, a decoction made in the usual way is evaporated, at a temperature not injurious to the substances present. Sometimes the evaporation is conducted directly over the fire, by which the extract is invariably injured; sometimes the process is performed in vessels heated by steam, which is the best method of preparing extracts upon a large scale: in some few instances evaporation at low temperatures, in vessels more or less exhausted of atmospheric air, and consequently under greatly diminished pressure, is resorted to; but the apparatus required for this purpose is complicated, and the benefit derived from it, in respect to the efficacy of the products, not such as to warrant its general adoption. Mr. Barry's contrivance for the purpose is one of the best. (*Medico-Chirur. Trans.* i. 231.) The *waterbath*, directed by the Pharmacopœia, is objectionable in consequence of the length of time required for the evaporation, and the continuous exposure of the extract to air.

When alcohol is employed in the preparation of extracts, the evaporation is usually conducted in a still, which should be heated by steam, and the spirit thus drawn off; the process may be finished in the usual way.

In these evaporations, iron, copper, tinned copper, or pewter vessels, are generally used, and sometimes basins of earthenware must be employed; and it would have been well if the Pharmacopœia had directed the greater number of the extracts to be so evaporated as to become brittle when cold; for when originally of the consistency "fit for making pills," they become, on keeping, too hard for that purpose, and not hard enough to be reduced to powder; in this case they are frequently heated, or softened in a hot mortar, before they can be used, and if to be mixed with other substances, it is almost impossible to effect their incorporation. It may also be remarked, that when of such consistency as easily to admit of being formed into pills, these invariably flatten, and often adhere and agglutinate in a warm room, or in summer weather. The sprinkling of extracts with spirit is useless; when properly dried, they do not become mouldy, if kept in a dry place, but the greater number of them do so if they are put into warm pots, and tied over, before they have cooled.

Extracts are in many instances convenient and efficient formulæ, and where it is desirable to prolong the action of a medicine upon the stomach, they may be given in the form of a pill; or, they may be dissolved in common or in aromatic distilled water, and in that way used as substitutes for decoctions, and, in some instances, for the fresh juices of plants.

Extracts. — In preparing Extracts, unless otherwise indicated, evaporate the moisture by a water-bath in a pan, as quickly as possible, towards the end stirring constantly with a spatula, until a proper consistence is acquired for forming pills. Sprinkle a little rectified spirit upon all the softer extracts, lest they become mouldy.

The composition of Extracts will be found under the heads of the several substances from which they are procured.

FARINA (from *far*, corn). *Flour.* The flour of the seeds of winter wheat, *Triticum hybernum*. *Cl.* 3. *Ord.* 2. Triandria Monogynia. *Nat. Ord.* Graminaceæ.

Wheat was first cultivated in Sicily, but the country whence it originally came is not known. The spikes of wheat are long, and the grain is lodged in four rows, and imbricate; the chaff is smooth, bellied, and terminated by very short awns, by which it is distinguished from *spring-wheat* (Triticum æstivum), the awns of which are three inches long.

Wheat has two sets of roots; one proceeding directly from the seed, and the other from the *corona* of the plant, about two inches above the first. Several species of wheat are cultivated in England, but that which is termed *white Dantzic* is said to yield the most productive flour for the manufacture of bread; its grain is small and translucent. — (*Lond. Disp.*)

The principal constituents of wheat flour are *starch* (*see* Amylum), *gluten*, and *albumen:* the latter principles may be obtained by tying up the flour in a piece of coarse canvass, and kneading it under a stream of water; the starch is gradually washed out, and a gray, viscid, and elastic substance remains behind, consisting of the gluten and albumen, with a little residuary starch and water.

By boiling this substance in alcohol, it is separated into a soluble part, which is *gluten*, and an insoluble matter, which is *albumen*. The mixture of the two constitutes what is sometimes called the *vegeto-animal* principle, from its resemblance in properties and composition to animal matter; in a moist state, it soon passes, under favourable circumstances, into putrefactive fermentation; it exhales ammonia when subjected to destructive distillation, and its ultimate elements are carbon, hydrogen, oxygen, and nitrogen. The tenacity of wheaten dough, and its peculiar fitness for the manufacture of a light, or porous, and nutritious, and digestible bread, depends upon the large relative quantity of this albumino-glutinous part, which is more abundant in the wheat of warm than of cold climates, whence the excellence of the grain grown in the South of Europe, for the purpose of *macaroni*, *vermicelli*, and other similar pastes. The average quantity of nutritive matter in wheat amounts to 955 in 1000, of which 765 is starch, and 190 gluten and albumen.

FERMENTATION. The process by which sugar is converted into alcohol, and which is concerned in the production of beer, wine, and other fermented liquors. *Beer* is usually made of an infusion of ground malt, or *wort*, which is boiled with hops, and afterwards allowed to ferment; the saccharine principle of the malt becomes to a greater or less extent destroyed, or, in other words, converted into alcohol; carbonic acid is evolved, and the hops, by their aroma and bitterness, give the beer an agreeable flavour, and cover the mawkish sweetness of the undecomposed saccharine matter. Strong beer, thus made, is usually called *ale;* and when largely diluted with water, it becomes *small-beer*, which ought to be, therefore, a weak ale. *Porter* derives its character from high-dried malt, which gives it a peculiar flavour, and greatly deepens its colour.

The ale and porter produced in the great breweries of London are excellent in quality, and by no means unimportant in remedial agents; but when they have passed through the hands of the publicans (who are invariably sinners), they are always more or less adulterated and diluted, as the reports of excise prosecutions amply prove; hence the headache, drowsiness, stupor, bowel complaints, and other mischiefs arising from the trash of the retailer, and the necessity, where beer is employed, as it often might be, as a restorative and tonic, of obtaining it from the fountain head, and not from the polluted taps of the public houses. Small-beer is much more difficult to obtain of tolerable quality, and as, on the one hand, porter, and even ale, can scarcely be had in perfection except from

the wholesale source, small-beer that is worth drinking can seldom be obtained from a brewer of that article, as far, at least, as my experience goes; it is generally too well deserving of its appellation, and though sometimes tolerably palatable when fresh, it speedily becomes flat and sour, or something worse, especially in warm weather; *home-brewed beer*, therefore, is the only beverage of this denomination to which the medical man can resort. The ill character which beer has so generally acquired is referable to its adulterations and imperfections: when in perfection, it is agreeable, wholesome, and nutritious; tonic, slightly exhilarating, and afterwards mildly sedative, and calculated to fulfil many important indications in its medicinal uses. In *bottled beer*, the excess of carbonic acid modifies and generally exalts these qualities.

The average quantity of alcohol in the strongest ale seldom exceeds 6 *per cent.*, and in porter, 5 *per cent.*; from strong *Burton ale*, I have, however, obtained between 8 and 9 *per cent.*, and from *brown stout* between 6 and 7 *per cent.*, by measure, of alcohol of 825 sp. gr.

The further changes suffered by wine, beer, and analogous liquids, when exposed at a due temperature to the air, and which are resorted to for the production of vinegar (*see* Acetic Acid, and Acetum), are usually described under the term *acetous fermentation.* — (See *Manual of Chemistry*, chap. vii. § 25.) *Brande.*

FERN ROOT, *see* Aspidium.

FERRUM. *Iron.* Iron is a metal which was known in the early ages of the world. Its specific gravity is 7·7; it requires an intense white heat for its fusion; it is very ductile and tenacious, but not very malleable; it is attracted by the magnet, and susceptible, therefore, of induced temporary magnetism, but when pure, it does not permanently retain magnetism. At a high temperature, it undergoes a splendid combustion in oxygen gas. All known specimens of *native iron* are probably of meteoric origin; its principle ores, as far as the commercial supplies of the metal are concerned, are the *oxides* and *carbonates.*

Iron is susceptible of two degrees of oxydizement; each of the oxides is used in medicine, and each forms the basis of a distinct class of salts.

1. *Protoxide of Iron* (*Martial Ethiops*, *Magnetic Oxide*), is formed during the solution of iron in dilute sulphuric acid; hydrogen gas is evolved, and the equivalent of oxygen transferred to the metal, which is thus rendered soluble in, and combines with the acid; on adding potassa, and carefully washing and drying the precipitate, out of the contact of air, it acquires a black colour, and is a *protoxide*, not, however, perfectly pure, for in drying, a little oxygen is apt to be absorbed, and a small portion of peroxide formed. When iron filings are moistened with a small quantity of water, or when steam is passed over red-hot iron, a similar oxide is obtained; it is, however, extremely difficult, in consequence of its high affinity for oxygen, to procure it perfectly free from peroxide, but its composition may be accurately determined from the

quantity of hydrogen evolved during the action of dilute sulphuric acid upon a given weight of pure iron. The equivalent of iron, thus deduced, is 28, and the protoxide consists of —

	Atoms.	Equivalents.	Per Cent.
Iron	1	28	77·8
Oxygen	1	8	22·2
Protoxide of iron	1	36	100·0

Peroxide of Iron. Sesquioxide of Iron. This, the *red* oxide, is thrown down, in the form of a brown precipitate, by the addition of potassa to a solution of iron in nitromuriatic acid; it falls in the form of a pale-brown bulky hydrate, which acquires a deeper colour when dried. The same oxide, obtained by exposing sulphate of iron to a red heat, so as to expel the sulphuric acid and water, has long been known under the name of *colcothar*. It is constituted of —

	Atoms.	Equivalents.	Per Cent.
Iron	1	28	70
Oxygen	1½	12	30
Sesquioxide of iron	1	40	100

The *precipitated carbonate of iron* is formed by the addition of carbonate of soda in solution to the sulphate of iron, also in solution: the precipitate is, in fact, a hydrated sesquioxide of iron mixed with a protocarbonate.

There are two *chlorides of iron* corresponding in composition with the oxides, and a *protiodide*, a *protobromide*, a *percyanide*, or *ferro-sesquicyanide*, a *potassio-tartrate*, *a sulphate*, and also several *sulphurets*.

Iron is a powerful tonic, but its reputed activity in the metallic state is doubtful; in powder it has been administered with aromatics, and as an electuary, but its uncertain operation under such forms has led to its rejection from modern practice, and to the substitution of its oxides or salts, if we except a few instances in which iron filings are occasionally given as a vermifuge, and in which, from their power of decomposing the salts of copper, and precipitating that metal, they have been administered as an antidote in cases of cupreous poisoning.

Where the effective preparations of iron are not contraindicated, and where they agree, they augment the appetite, take off muscular flabbiness, remove the pallor of debility, and even give a florid vigour to the countenance, an effect which has sometimes been erroneously attributed to their deepening the colour of the blood. The cases, therefore, which are best adapted for their exhibition, are those of weak and languid habits, where the constitution is what is usually called *broken*, either by long-continued mental anxiety, excessive study, or bodily exertion beyond the strength; and generally, after diseases which have necessarily received a debilitating treatment, or which have left the body in a pallid, and, as it were, flaccid state, very susceptible of fatigue, and of morbid actions in general; or in what may be called a state of *anemia*, and enfeebled digestion. In simple hypertrophy of the liver, and in

chronic splenitis, iron ranks very high. But where the preparations of iron are used after active inflammatory diseases, they favour returns of phlogistic action, and are apt to induce chronic mischief: when; therefore, the habit, under such circumstances, shows any symptoms of returning fulness of vessels, where a loaded tongue is associated with headache, and where the pulse hardens, chalybeates are contraindicated.

In some painful and obstinate nervous affections, the preparations of iron in large doses have been found of service; and in tic douloureux, Mr. Hutchinson recommends the sesquioxide (precipitated carbonate) in doses of half a drachm to a drachm, twice or three times a day. In certain stages of asthma, the same preparation appears, according to Dr. Bree, to lengthen the intermissions of the disease, by enabling the constitution to throw off the causes of the morbid irritation in the stomach and in the lungs. In this view, he adds, it is effective, not merely for the cure of the paroxysm, but of asthma itself. To weakly children, especially where there is a tendency to rickets, and appearances of scrofula, chalybeates may be given with well-grounded hope of advantage. In chlorosis, and amenorrhœa, with an atonic state of the system, and in certain varieties of dysmenorrhœa, they are often of especial advantage, when combined or alternated with purgatives, and occasionally the blue pill. Chalybeates have, also, acquired no little reputation in various diseases of the nervous system, in which there is no inflammation of the nervous centres, or of the meninges, but the disease is kept up by excessive susceptibility to even slight impressions. When chalybeates nauseate, gripe, or purge, which they sometimes do, proper adjuncts, especially aromatics and opiates, may be administered with them. When given with vegetable astringents, the inkiness of the mixture is sometimes an objection, though not always an important one, and there are several good tonic bitters which are not thus discoloured, such as quassia and calumba.

In availing ourselves of the remedial powers of iron, much will depend upon the proper selection of its preparations; of these the protoxide is a very efficient one, but, as it can scarcely be used in an isolated form, it is usually prescribed as a hydrated carbonate, or as separated from sulphate of iron by the action of alkalis. In the following formula, these decompositions are resorted to:—

Compound Mixture of Iron. — Take of Myrrh, powdered, two drachms; Carbonate of Potassa, a drachm; Rose-water, eighteen fluidounces; Sulphate of Iron, powdered, two scruples and a half; Spirit of Nutmeg, a fluidounce; Sugar, two drachms. Rub the Myrrh with the spirit of nutmeg and carbonate of potassa, and to them, while rubbing, first add the rose-water, with the sugar, then the sulphate of iron. Put the mixture immediately into a proper glass vessel, and stop it.

In this mixture the sulphate of iron is decomposed by the carbonate of potassa, and a green hydrated protocarbonate of iron is produced, which, however, soon becomes changed by the action of air, and acquires a brown tint; it should, therefore, be used as soon

after its preparation as possible. It is nearly the same as the antihectic mixture of the late Dr. Griffith. It is said to be preferably prepared by selecting a lump of fine myrrh of the proper weight, and triturating it in the first instance into a perfectly even emulsion with the rose-water; then adding the spirit of nutmeg, carbonate of potassa, and sugar: and, lastly, dissolving in it the sulphate of iron.

This mixture is an excellent tonic, and frequently admissible where other preparations of iron cannot be employed: if it feel uneasy upon the stomach, or gripe, an additional drachm of spirit of nutmeg may be added to each dose, or when this disagrees, as it not unfrequently does, with the stomach, we may substitute for it, cinnamon, or mint, or peppermint-water; sometimes it constipates, but that effect usually goes off after a few doses. From one to two ounces may be given, as occasion requires, from once to three times a day; six drachms twice a day, namely, in the morning early, and an hour before dinner, is generally sufficient to begin with; and, if it agrees, it improves the appetite and the tone of the muscular fibre, and ameliorates the general complexion of the patient more safely and decidedly than most other chalybeates.

"It must be regarded as permanently serviceable in chlorosis and the numerous sympathetic affections connected with it. In the painful swellings which infest the breasts of chlorotic young women, I have found it almost a specific. I have also found it extremely valuable as an astringent in chronic diarrhœa; as soon as the feces have become black, the bowels have generally retained their contents for a longer period."—(Paris. *Pharmacologia.*) Acids and acidulous salts, and astringents containing gallic acid and tannin, are incompatible with it.

The following is another formula which derives its activity from protocarbonate of iron, and in this, as in the former, myrrh is an excellent tonic adjunct:—

Compound Pills of Iron.—Take of Myrrh, in powder, two drachms; Carbonate of Soda, Sulphate of Iron, Melasses, of each, a drachm. Rub the myrrh with the carbonate of soda; then, having added the sulphate of iron, rub the mixture again, and beat the whole together in a vessel previously warmed, until incorporated.

These pills are tonic and emmenagogue; they may be given in the dose of ten or fifteen grains two or three times a day, with any bitter infusion; they are a solid substitute for the *Mistura Ferri composita*, but the latter is a preferable chalybeate; the melasses prevents their becoming hard and insoluble by keeping.

The following is a similar pill, with the addition of aloes, and is preferable where the action of the bowels is sluggish:—

℞ Ferri Sulphatis, Potassæ Carbonatis, āā ℈j.; Myrrhæ pulv. ʒj.; Aloes pulv. ʒss. Tere simul ut fiat massa in pilulas xxx. dividenda, quarum sumantur ij. vel iij. nocte maneque.

Sulphate of Iron. This salt should be kept excluded from air, otherwise it becomes superficially brown from the absorption of

oxygen, and the formation of a persulphate of iron, and it is then not perfectly soluble in water.

This sulphate of the protoxide of iron was formerly known under the name of *copperas, green vitriol,* and *salt of Mars;* it often occurs native, and is produced by the action of moist air upon certain varieties of *sulphuret of iron,* or *pyrites;* it is also prepared upon a large scale by exposing pyrites, previously roasted, to the action of air and water; it is not unfrequently held in solution by water which has percolated pyritiferous strata. All common green vitriol contains traces of copper, so that, for medical use, it requires to be prepared for the purpose.

The following are the components of the anhydrous and of the crystallised salt:—

	Atoms.	Equivalents.	Per Cent.
Protoxide of iron	1	36	47·4
Sulphuric Acid	1	40	52·6
Anhydrous protosulphate of iron	1	76	100·0

And the composition of the crystals is:—

	Atoms.	Equivalents.	Per Cent.
Protoxide of iron	1	36	25·9
Sulphuric Acid	1	40	28·8
Water	7	63	45·3
Crystallised protosulphate of iron	1	139	100·0

This salt is decomposed by alkalis and their carbonates, yielding precipitates of hydrated protoxide and protocarbonate of iron, and, like the other ferruginous salts, is blackened by infusion of galls and most other vegetable astringents.

Sulphate of iron is chiefly employed as a tonic and emmenagogue; it has also been extolled as an anthelmintic, and was used as such in the time of Pliny.—(*Nat. Hist.* lib. xxxiv. cap. xii.) It is seldom administered in solution, in consequence of the facility with which it is in that state decomposed; but is generally given in pills, combined with aromatics. The usual dose is from two to five grains; if it nauseates and occasions spasmodic pains of the stomach, and bowels, it is generally prudent to desist from its use, and resort to some other form of iron, which, for this reason, is to be preferred for long use. I have given a dose of eighty grains, as an anthelmintic, without its nauseating or vomiting.

As a tonic, in scrofulous habits, it may be given with a course of bark, or as follows:—

℞ Ferri Sulphatis ℈j.; Extract. Cinchonæ ʒj. Divide in pilulas xx. una ter in die sumenda.

In amenorrhœa, with bitter extracts, or with myrrh, and occasionally aloes:—

℞ Ferri Sulphatis gr. xij.; Extracti Gentianæ ʒj.; Pulveris Cinnamomi composita ʒss. Fiat massa in pilulas xviij. dividenda, quarum capiat ægra duas ter in die, superbibendo haustum infusi alicujus amari.

Or with aloes, where the bowels require it:—

℞ Ferri Sulphatis, Aloes, Myrrhæ, ãã ʒj. Misce optime et fiat massa in pilulas quadraginta dividenda, quarum sumantur duæ bis vel ter die.

The propriety of administering preparations of iron with vegetable astringents has been doubted, because they form inky mixtures in consequence of the production of a *tanno-gallate of iron*, which may, however, be a good and effective chalybeate. Infusion of calumba, and infusion of quassia, may be administered with the salts of iron without such effect, so that those bitters are perhaps preferable when iron is given in solution, to those which contain astringent matter; it has, however, been supposed that the absorbents may possibly take up iron more readily when combined with vegetable matter, than when in a purely mineral form.

As an external application, sulphate of iron is of doubtful value. Its solution has been applied to cancerous sores and ill-conditioned ulcers. For a time, Mr. Carmichael thought that he had found in the preparations of iron, used internally and applied externally, a certain remedy for cancerous affections. It has been used as an injection, in fluor albus, in the proportion of ℈iv. dissolved in f℥viij. of distilled water; and it has been recommended in the aphthæ of children. Where thus used, the solution should be prepared at the time it is wanted, in distilled water.

Sesquioxide of Iron. In the last London Pharmacopœia this preparation was improperly called *Subcarbonate of Iron*. It is of a reddish-brown colour, and nearly tasteless. Sesquioxide of iron is generally administered in powders, pills, or electuaries; when merely required as a tonic, it is combined with bitters and aromatics; and with myrrh, and aloes, or with valerian, and assafœtida, as an emmenagogue; it is, however, of doubtful efficacy. It has been given in doses of from five to twenty grains, or more, twice or thrice a day, but large doses are not apparently more active than small ones, and its efficacy is probably altogether dependant upon the state of the contents of the stomach. It is now used in large doses as an antidote to arsenic, which see. In the dose of from half a drachm to a drachm, or more, twice or thrice a day, the sesquioxide has been recommended by Mr. Hutchinson in tic douloureux, and by Dr. Elliotson in chorea. The following are formulæ for its administration:—

1. ℞ Ferri Sesquioxydi gr. x.; Pulveris Cinnamomi compos. gr. v. M. fiat pulvis mane et meridie sumendus.
2. ℞ Ferri Sesquioxydi gr. x.; Pulveris Valerianæ ℥ss.; Syrup. Zingiberis q. s. Fiat bolus.
3. ℞ Ferri Sesquioxydi, Extracti Anthemidis, āā ℥ss. Misce et divide in pilulas xij. quarum sumat binas ter quotidie.
4. ℞ Ferri Sesquioxydi ℥j.; Pilul. Aloes c. Myrrha ℥ss. M. et divide in pilulas xviij. duæ bis terve in die sumendæ.
5. ℞ Ferri Sesquioxydi, Confectionis Aurantii, āā ℥j.; Syrupi Zingiberis q. s. ut fiat electuarium cujus sumatur cochleare minimum bis vel ter die.

Tincture of Sesquichloride of Iron. — Take of Sesquioxide of Iron, six ounces; Hydrochloric Acid, a pint; Rectified Spirit, three pints. Pour the acid upon the sesquioxide of iron in a glass vessel, and digest for three days, occasionally agitating. Then add the spirit, and filter.

Sesquichloride of iron, when obtained by heating pure iron in

excess of gaseous chlorine, rises in the form of a crystalline sublimate composed of brown iridescent scales, and consisting of—

	Atoms.	Equivalents.	Per Cent.
Iron	1	28	34·2
Chlorine	1½	54	65·8
Sesquichloride of iron	1	82	100·0

The tincture of sesquichloride of iron (*Tinctura Ferri Muriatis* of former Pharmacopœiæ) is a definite and highly active chalybeate, and may generally be used as a substitute for other preparations of iron. It may be taken as a tonic in *doses of five to thirty drops* twice a day in a little water. In dyspepsia it may be given in small doses, in any bitter infusions, those being generally selected which are not blackened by it.

℞ Tincturæ Ferri Sesquichloridi ℥v.; Infusi Quassiæ, Aquæ Cinnam., āā fℨvj.; Tincturæ Calumbæ fℨj. M. fiat haustus mane et meridie sumendus.

Like other chalybeates, it is apt in large doses to produce headache, harden the pulse, and occasion spasmodic pains of the stomach and bowels. If it constipate, a drachm of sulphate of magnesia may be added to each draught. If it produce diarrhœa, the bowels should be cleared with a little rhubarb and magnesia, and it may then be resumed generally without ill-effect.

As a tonic after diseases of debility or depletion of the system, it requires, as well as the other preparations of iron, considerable circumspection in its use; if it induces no local inflammatory action or headache, and neither hardens nor materially quickens the pulse, it often proves eminently useful in restoring tone to the constitution.

With aloetics and antispasmodics it is an effective emmenagogue.

Like other chalybeates, it sometimes expels worms from the intestines. It is used as a styptic in internal hemorrhages, with an anemic condition of the system. In scrofulous affections it is a most valuable tonic, especially when it can be given in large doses. Dr. A. T. Thomson recommends the dose in these cases to be gradually increased up to 120 drops twice a day.

In retention of urine depending upon spasmodic stricture of the urethra, this solution of iron has been represented as having something like a specific action. Five or six drops have been recommended in such cases by Mr. Cline, every ten minutes, until nausea is produced. Dr. Davy observes that, in the cases in which he tried it, it produced no good effect till it nauseated; he recommends that, for this purpose, it should be given in a little tepid water; he could never discover traces of it in the urine, but, as it always blackens the fæces, it manifestly passes off by the bowels. Mr. Pereira has found it occasionally successful, when given in conjunction with the tincture of cantharides, in the latter stage of gonorrhœa, after other remedies had failed.

As an external application, the *Tinctura Ferri Sesquichloridi* has been applied to cancerous and other very ill-conditioned sores, but not with any marked success; it is said to be useful for the destruction of venereal warts.

There is a curious form of chloride of iron known in Germany under the name of "*Bestuscheff's Nervous Tincture,*" the secret of which was purchased and published by the Empress Catherine of Russia. It is introduced into the Parisian *Codex* under the name of *Tinctura ætherea alcoholica de Muriate Ferri*, and is sometimes known as *La Motte's Golden Drops;* it is said to be peculiarly effective as an alterative tonic, especially in nervous affections. I translate the formula for its preparation, from the *Prussian Pharmacopœia:* —

Take of iron filings any desired quantity: dissolve them in a suitable proportion of acid, three parts Muriatic and one of Nitric; and evaporate the solution. Put the dried mass in a moist air, so that it may deliquesce into a liquid of a dark smoke-colour. Mix this liquid by shaking it with double its measure of Sulphuric Æther. Then pour off the æther thus impregnated with the iron in solution, and mix it with twice its quantity of rectified spirit. Expose the mixture in long bottles, well stopped, to the sun's rays, until all its colour disappears. Use as may be requisite in a *dose* of from *twenty* to *thirty drops.*

Ammonio-Chloride of Iron. This preparation of iron has long had a place in the Pharmacopœiæ under the name of *ferrum ammoniatum;* it is the *flores martiales*, *flores auri*, *ens martis*, and *calendula mineralis* of old pharmacy. By the present process a definite combination is obtained, and it is so far an improvement upon the old method, in which it was procured by sublimation, and was of uncertain composition. It is of an orange-colour, inodorous, and of a saline and astringent taste, soluble in water and in alcohol, and composed, according to Phillips, of —

Sesquichloride of iron	15
Hydrochlorate of Ammonia	85
	100

There seems to be no good reason for retaining either the ammonio-chloride of iron, or its tincture, among the officinal preparations of iron; the sesquichloride is its active ingredient, and those who attribute any peculiar virtues to its union with hydrochlorate of ammonia might prescribe it extemporaneously. It was formerly employed not only as a tonic and alterative, but was almost regarded as a specific in epilepsy, and in hysteria; it is now rarely prescribed. Five to ten grains twice or thrice a day is an average dose.

Iodide of Iron. When excess of pure iron filings is digested with iodine in water, a rapid combination ensues and a green solution is formed, which, by careful evaporation, out of the contact of air, yields green crystals of hydrated protiodide, which include five atoms of water. The iodide is constituted of —

	Atoms.	Equivalents.	Per Cent.
Iron	1	28	18·3
Iodine	1	125	81·7
Iodine of Iron	1	253	100·0

When obtained by fusion in an anhydrous state, this iodide is of a steel-gray colour and crystallised texture, very soluble in water and in alcohol, and very speedily decomposed by the action of air, which causes the formation of sesquioxide of iron. For medical use, this iodide is never required in the solid state, so that an officinal solution of it would have been a more convenient form, and this, with a coil of clean iron wire immersed into it, may be preserved without change.

Iodide of Iron is an important therapeutic agent; it is a powerful chalybeate, and with this is combined the peculiar operation of iodine. Dr. A. T. Thomson, to whom we are chiefly indebted for our knowledge of its medicinal uses, observes, that its extreme solubility, formed of two active but little soluble bases, led him to introduce it to the notice of British practitioners, as a powerful therapeutic agent. "It is rapidly carried into the circulation, and may be detected in the urine and other secretions by testing them with chlorine and starch a short time after the iodide has been taken. It operates as a stimulant to the glandular system, while at the same time the iron supports and improves the tone of the habit. I have found it beneficial in scrofula in all its forms, chlorosis, atonic amenorrhœa, hysteria, secondary syphilis, and incipient cancer. In secondary syphilis, it may be combined with iodide of potassium; and in incipient cancer its efficacy is aided by the administration of iodide of arsenic at the same time. I have found it serviceable in atonic gastric dyspepsia, when combined with bicarbonate of potassa, and taken at the moment of admixture. The dose is from three to eight grains, or more." It has been used by Ricord as an injection in gonorrhœa; half a drachm to a drachm being dissolved in eight ounces of water. Ricord has given this article to the extent of forty grains a day. In leucorrhœa and amenorrhœa, Pierquin prescribed an ointment composed of a drachm of iodide of iron to an ounce of lard, for the purposes of friction to the inside of the thighs.

Potassio-Tartrate of Iron. A neutral prototartrate of iron may be obtained either by digesting pure iron filings in tartaric acid, or by mixing strong and hot solutions of protosulphate of iron and tartaric acid. In the latter case it forms nearly colourless crystals of a slight inky taste, and difficultly soluble in cold water. Tartaric acid has little action on sesquioxide of iron, but when solutions of tartrate of potassa and sesquisulphate of iron are mixed in definite proportions, sulphate of potassa is thrown down and a blood-red solution of sesquitartrate of iron is formed.

The process of the Pharmacopœia is not calculated to afford a very definite result: the salt prepared according to it, is stated by Mr. Phillips to contain about 18 *per cent.* of sesquioxide of iron, and should consist of:—

	Atoms.	Equivalents.	Per Cent.
Tartrate of Potassa	1	114	51·82
Sesquitartrate of Iron	1	106	48·18
Potassio-tartrate of Iron	1	220	100·00

In consequence, however, of uncertainty of composition, deliquescence, and, according to some, the tendency of its aqueous solution to decomposition, this is an inconvenient form of iron; its principal recommendation is said to be its tastelessness, but the specimens which Mr. Brande has examined have not this merit. Dr. Thomson represents it as possessing the same medicinal powers as the other preparations of iron, but from its mildness, slight taste, and ready solubility, it is a more convenient form for the administration of iron to children, and in cases of which the other saline preparations of it prove nauseating and sit uneasily on the stomach. It is advantageously given in all the cases in which chalybeates prove useful, and it is also extolled as a remedy in dropsy, in which it is supposed to exert both a diuretic and tonic power. The dose is from ten grains to half a drachm, given either in a state of solution, or in the form of powder or pill, combined with an aromatic or a bitter, such as the extract of gentian.—(*Lond. Disp.*)

The *Ammonio-Tartrate* of Iron is highly recommended by Mr. Wardleworth, (*Lancet*, and *Eclectic Journal of Medicine*, 1840,) in scrofula and chlorosis; his formula is a very simple one, viz. Ammoniated Tartrate of Iron ʒi.; Water ʒviii.—Take half an ounce three times a day. The salt itself is prepared by adding caustic ammonia to a solution of tartrate of iron, evaporated to dryness, by a gentle heat.

Several combinations of iron with vegetable acids are found in old pharmacy and in foreign Pharmacopœiæ, but none of them are worth retaining, excepting, perhaps, the *Vinum Ferri*, made by digesting filings of soft iron in sherry, madeira, or other wines. Children will often take iron in this form more readily than in any other, and although the quantity contained in it is small, it generally proves a useful tonic.

FERRI PERCYANIDUM. *Percyanide of Iron. Ferro-sesquicyanide*, or *Ferrocyanate of Iron. Prussian Blue.* This compound is obtained by the action of ferrocyanuret of potassium upon sesquisulphate of iron; it belongs to the class of *ferrosesquicyanides*, and consists of seven atoms of iron and nine atoms of cyanogen; or of—

	Atoms.	Equivalents.	Per Cent.
Sesquicyanide of Iron	4	268	62·2
Cyanide of Iron	3	162	37·8
Prussian blue	1	430	100·0

Prussian blue is used in the preparation of cyanuret of mercury, and in that of the hydrocyanic acid. It has been administered internally in intermittent and remittent fevers, with high praises of its efficacy, by Dr. Zollickoffer, of Maryland; also in epilepsy, and in neuralgia, in the dose of from four to six grains three or four times a day. An ointment composed of one drachm of Prussian blue and

one ounce of lard or spermaceti ointment, has been recommended as an application to ill-conditioned sores.

Lactate of Iron. This salt, (the process for preparing which is detailed in *Journ. de Pharm.*, March, 1840, by M. Louradour, and in *Philad. Journ. Pharm.*, July, 1840, by Mr. F. Brown; also in *Edinb. Med. and Surg. Journ.*, July, 1840,) is regarded as the most useful and efficacious of the ferruginous preparations, by MM. Fouquier, Bally, Beau, Rayer, Nonat, Bouillaud, Gelis, and Conté. It is prepared by digesting for six or seven hours in a sand bath, iron filings with lactic acid; after the liquid is brought to the boiling point, it is filtered and concentrated, when the lactate falls in crystals on cooling.

The crystals ought to be washed in alcohol by the process of displacement, dried rapidly, and excluded carefully from contact with the air. The salt is in the form of crystalline plates, of a very white, and sometimes a cream colour. It is of sparing solubility in water, has a distinct ferruginous taste, and its aqueous solution soon becomes super-oxidated, and assumes a yellow colour. It has been usually administered in biscuits, lozenges, or pastilles, the sugar of the two latter preventing its farther oxidation.

The lactate of iron may be recommended in all the diseases in which the other preparations, and especially the sesquioxide or subcarbonate, are applicable. In chlorosis and amenorrhœa it has been thought to be specially serviceable, and, as such, has been used and commended by MM. Andral, Fouquier, and others. The *dose* prescribed by the two gentlemen just named, seldom exceeds *twelve grains* a day; beginning at six grains. Mr. Bouillaud never gives more than *twenty grains* in the 24 hours. MM. Gelis and Conté, *internes* at the Charité Hospital, by whom the lactate of iron was introduced into practice, recommend its use in lozenges.

FERRULA ASSAFŒTIDA, *see* Assafœtida.

FŒNICULUM. *Fructus.* The *fruit* of the common fennel. *Fœniculum vulgare. Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

Fennel seeds are generally imported from Italy. They are praised as carminative by old writers, but dill and caraway seeds being already in the Materia Medica, they might have been omitted, for the fennel water of the Pharmacopœia is of no importance, and scarcely ever prescribed; so that when found in the apothecaries' shops it is generally good for nothing.

There are two species of fennel, the *common* and the *sweet;* it appears to be the fruit or seed of the latter which is intended to be used, although not so directed in the Pharmacopœia.

FOMENTATION. (Fomentatio.) Warm or hot water is the best fomentation, and when continuously supplied by flannel or sponge, softens, relaxes, and relieves pain from spasm or from inflammation. Medicated fomentations are not of much use, excepting that the materials of which they are composed, such as chopped herbs, or chamomile-flowers, when boiled in water and wrapped loosely in flannel, and applied to the part, serve to retain heat.

FOWLER'S SOLUTION, *see* Arsenic.

FOXGLOVE, *see* Digitalis.

FRAXINUS ORNUS, *see* Manna.

FUMIGATION. (Fumigatio.) This term is generally applied to the diffusion of chlorine and of acid vapours through the atmosphere, and to their application to clothes and other goods, with a view of destroying infection and contagion. It is also employed in reference to the therapeutic application of fumes or vapours to different parts of the body; sulphurous, mercurial, and other vapours are thus applied, in what are termed *fumigating baths*. See Bell, *on Baths and Mineral Waters*.

GALBANUM. *Gummi-resina.* The gum-resin of the *Galbanum officinale*. This substance is the produce of an umbelliferous plant which is a native of Persia. It is imported from the Levant, and is usually in mottled masses of a yellow and pale-brown colour, composed apparently of an aggregation of guttiform pieces, and generally mixed with many impurities; it has a peculiar and slightly-fetid odour, and a bitterish and warm taste. Like other gum-resins, it forms a milky mixture with water, and is only partially soluble in alcohol. It contains a volatile oil and a resin.

The medical virtues of galbanum are not very important; it forms an ingredient in some expectorant formulæ, and as an antispasmodic and deobstruent, it is placed by writers on the Materia Medica between ammoniacum and assafœtida.

Compound Galbanum Pills. — Take of Galbanum, an ounce; Myrrh, Sagapenum, of each, an ounce and a half; Assafœtida, half an ounce; Syrup, as much as may be required. Pound them together till they are incorporated.

These are useful pills, especially as relates to the myrrh and assafœtida; the galbanum and sagapenum are not of much importance to their general merits. From five to fifteen or twenty grains may be taken every night, or night and morning, in those cases in which assafœtida is prescribed; more especially in hysteria accompanied by deranged menstruation and chlorosis, and in some forms of asthma, and spasms of the stomach.

Plaster of Galbanum. — Take of Galbanum, eight ounces; Plaster of Lead, three pounds; Common Turpentine, ten drachms; Resin of the Spruce Fir, powdered, three ounces. To the galbanum and turpentine melted together, first add the resin of the spruce fir, and then the lead plaster liquefied by a gentle heat, and mix them all.

Galbanum plaster is stated to be "stimulant and suppurative, and also advantageously applied to scrofulous tumours, and in lumbago; also as a suppurative to excite indolent tumours, and to reduce the induration which often remains around discharged abscesses."—(*Lond. Disp.*) It is no doubt a good adhesive and stimulating plaster, but whether any virtues of the galbanum compensate for its disagreeable smell, seems questionable.

GALIPEA, *see* Cusparia.

GALLÆ. The diseased buds (*gemmæ morbidæ*) of the Dyer's Oak: *Quercus infectoria*. *Cl.* 21. *Ord.* 6. Monœcia Polyandria. *Nat. Ord.* Cupuliferæ.

It appears from the evidence of Olivier, that the galls of commerce are derived from the above species of oak, though there are others which also produce them. The gall comes at the shoots of the young boughs, and acquires from four to twelve lines in diameter; the insect which produces it is the *Cynips quercifolii* of Linnæus, a small hymenopterous insect with a fawn-coloured body, dark antennæ, and the upper part of the abdomen of a shining brown. The insect punctures the tender shoot with its sting, which is spiral, and deposits its egg in the puncture; this occasions a morbid irritation in the part, and the gall rises in a few hours, attaining its full size in a day or two, before the larva is hatched; the egg grows with the gall, and it is by the irritation which it continues, that the morbid excitement sufficient for the production of the gall is kept up. The galls are gathered before the larva changes to a fly and eats its way out, for then the galls are lighter and less astringent. The finest galls are imported from Aleppo and Smyrna. Their taste is extremely astringent and somewhat bitter, their surface tubercular, and of a deep blueish-gray, or olive colour. Those which are light in weight and colour, and which, instead of breaking dense and resinous, are hollow and pulverulent, are of inferior quality. Their principal active and soluble ingredients, are, according to Davy, tan and gallic acid.

Pelouze has rendered it probable that the gallic acid of the gall-nut is the consequence of the action of air upon its tannin or tannic acid. — (*Ann. de Chim. et Phys.* LIV.)

As an article of the Materia Medica, galls are a powerful astringent, but they are not often used. In relaxation of the palate and uvula the following is a good astringent gargle: —

℞ Gallarum contusarum ℥ij.; Aquæ ferventis f℥xij. infunde per horas tres, et cola.

℞ Colati Infus. f℥vij.; Spir. Vini Rectificat. f℥j. M.

By the natives of India, galls are employed in the treatment of intermittents and of dysentery. In *blind piles,* the following ointments have been used with singular advantage:—

℞ Gallarum pulver. ℥j.; Ung. Cetacei ℥vij. M.

℞ Gallarum pulveris ℥j.; Camphoræ ℥ss.; Tincturæ Opii f℥ij.; Cerati ℥j. M. fiant unguentum nocte, et mane applicandum.

℞ Morphiæ gr. ij.; Olei Olivæ ℥ij. tere optime simul, et adde Unguenti Zinci ℥j.; Pulv. Gallarum ℥j. fiat unguentum.

Or the following officinal ointment: —

Compound Ointment of Galls.—Take of Galls very finely powdered, two drachms; Lard, two ounces; Hard Opium powdered, half a drachm. Mix.

In cases of fluor albus, hemorrhoids, and *prolapsus ani*, a fomentation may be used, composed of an ounce of bruised galls, macerated for an hour in a quart of water, strained, and applied cold: as an occasional addition to astringent gargles, as well as for internal use, the following tincture of the Pharmacopœia is sometimes convenient: —

Tincture of Galls.—Take of bruised Galls, five ounces; Proof Spirit, two pints Macerate for fourteen days, and filter.

This is also a delicate test of the presence of iron, which it indicates by a blue or black cloud.

GARGARISMA (γαργαριζειν, *to wash the throat*). A lotion, or *gargle* for the throat.

GAULTHERIA. *Folia.* The leaves of the Partridge Berry. *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Eriaceæ.

The gaultheria is a well known creeping evergreen, found in woody and mountainous tracts throughout the United States. Its taste is astringent and aromatic, and has been compared to that of orange flowers. It exactly resembles that of the black birch (*Betula lenta*), in which an essential oil like that of the gaultheria is found. The medical properties of this plant have been compared to those of cinnamon—cascarilla would be more appropriate—in its being a warm, aromatic astringent, particularly useful in the secondary stage of diarrhœa. Its sensible properties more than its real efficacy have caused it to be used popularly as an emetic or emmenagogue. The *dose* is *one* to *two scruples* of the powdered leaves.

But the chief use of this medicine is, says Dr. Wood (*U. S. Dispensat.*), to impart an agreeable flavour to mixtures and other preparations. It may be conveniently administered in the form of infusion, which in some parts of the country is not unfrequently used at the table as a substitute for common tea. The oil, which is officinal, is, however, more used in regular practice than the leaves; and of its power melancholy proof has been furnished by its causing death, when taken, by mistake, in the dose of half an ounce. It is the heaviest of the known essential oils, having the specific gravity of 1·17, which affords an easy test of its purity.

GELATIN (gelare, *to congeal*). A proximate principle of animals, contained in soft solids, and especially in the cutis and membranes; it is also extracted from bone and some kinds of horn. It is insipid, and colourless, soluble in hot water, and the solution if sufficiently concentrated forms a jelly on cooling. When dry, gelatin is extremely permanent, but its aqueous solution soon petrifies; it is detected by the insoluble precipitate which is produced in its solutions by tannin, and by sulphate of platinum. Isinglass is nearly pure gelatin; it is also procured by boiling hartshorn-shavings, and when obtained from these sources is much used as an article of food: glue and size are impure varieties of gelatin.

GENTIANA (from Gentius, king of Illyria, who is said to have discovered its virtues). *Radix.* The root of the *Gentiana lutea* *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Gentianeæ.

This species of gentian is abundant in the Swiss and Austrian Alps, and in the mountainous forests of many parts of Germany; in the Pyrennees, and in North America. The root is thick, long, and cylindrical.

The best gentian roots are found in Germany and France, in contorted pieces of various sizes, covered with a brownish wrinkled epidermis. When broken, they exhibit a brown bark,

surrounding an interior yellow and more fibrous part; they should be tough and flexible, and free from worms. The roots of other species of gentian are frequently mixed with those of the officinal species: their effects, however, are analogous. Gentian is intensely bitter, accompanied by a slight sweetness, which, in fine specimens, is very manifest on touching the tongue with the broken surface of the root. Its active parts are soluble in alcohol and in water. Its proximate components are, according to Henry and Caventou, a peculiar crystallisable principle, to which its bitterness is referable, together with extractive and saccharine matter, gum, and traces of oil, acid, saline matters, and woody fibre. It is not improbable that there is a volatile principle in gentian which has narcotic properties. Dose of the powder, grs. x. to ʒss.

The following are the officinal preparations of gentian in the present Pharmacopœia: —

Extract of Gentian. — Take of Gentian, sliced, two pounds and a half; Boiling distilled Water, two gallons. Macerate for twenty-four hours; then boil down to a gallon, and strain the liquor whilst hot; lastly, evaporate to a proper consistency.

Compound Infusion of Gentian. — Take of Gentian, sliced, Dried Orange-peel, of each two drachms; Fresh Lemon-peel, four drachms; Boiling distilled Water, a pint. Macerate for an hour, in a lightly-covered vessel, and strain.

The extract of gentian is a good simple bitter extract: it is seldom employed alone, but chiefly as a vehicle for, or adjunct to, certain mineral tonics; its consistence is well adapted for pills. Good gentian yields about half its weight of it. The following pills are useful where tonics of this class are indicated: —

℞ Ferri Sulphatis ℈j.; Myrrhæ Pulver., Extract. Gentianæ, āā ʒj. Divide in pilulas xxx. sumantur ij. bis vel ter quotidie.

In cases of obstinate heartburn, with a gouty habit, the following has been found useful: —

℞ Extract. Gentianæ, Ammoniæ Sesquicarbonat., āā ʒj. M. fiat pilul. xxx. Sumantur duæ bis vel ter die.

The compound infusion of gentian is one of the most elegant and useful bitters of pharmacy, but it is apt to spoil and become decomposed in warm rooms and warm weather, and should be prepared fresh every day. In dyspepsia, attended by acidity, it may be employed as a vehicle for magnesia, or the alkalis; in other cases, it may be prescribed with acids, and where the bowels require it, with small doses of sulphate of magnesia, as in the following formula: —

℞ Magnes. Carbonat. ℈j.; Infus. Gentian. compos., Aq. Cinnamomi, āā fʒvj.; Tincturæ Cardamomi compos. fʒj. M. fiat haustus ante prandium et hora somni sumendus.

Where dyspepsia is attended by nausea, and aversion to food, the following is a good form: —

℞ Infus. Rosæ compos., Infus. Gentianæ compos., āā fʒvj.; Tinct. Gentianæ compos. fʒj.; Acid. Sulphur. dilut. ♏x. M. fiat haustus ter die sumendus.

Gentian has been largely and, as it is alleged, successfully used in intermittent fevers; it is, also, regarded as a vermifuge and a remedy in gout, hysteria, and uterine diseases.

GENTIANA CATESBÆI. *Radix.* The Root.

This plant, akin in its natural characters to the officinal gentian, resembles this latter also in its sensible properties and medicinal effects. It grows in the swampy districts of the Carolinas. Its virtue, according to Dr. Bigelow, appears to reside chiefly in an extractive principle, soluble in water and alcohol: it has, also, a resin. The native, like the imported gentian, is an active tonic, invigorating the stomach, and acting by this means on the system at large. Its reputation in this way is greatest in the southern states, the practitioners in which prescribe it in dyspepsia and other kindred and associated forms of debility.

The *dose* in powder is from fifteen to thirty grains. Dr. Wood says it may be substituted for the foreign gentian in the preparation of the officinal extract, infusion, wine and tincture.

GERANIUM. *Radix.* The root of Cranes Bill. *Cl.* 16. *Ord.* 9. *Nat. Ord.* Geraniaceæ.

This indigenous plant, commonly designated by the botanical term *geranium maculatum*, and popularly as spotted cranesbill, or crows-foot, belongs to a natural order in which astringency is a common property. It is common about woods and fences, and is conspicuous for its large purple flowers in May and June. Dr. Bigelow remarks, that it abounds with tannin, which is imparted in great quantities both to the tincture and watery solution, and which appears to be the basis of its medicinal efficacy.

As a strong astringent, this medicine is adapted to all the diseases in which this property is beneficial—including passive hemorrhages of the alimentary canal, chronic diarrhœa and cholera infantum. It is prescribed, likewise, as a gargle in aphthæ and ulcerations of the mouth and throat, frequent concomitants of chronic disease of the stomach and bowels, especially in children. Extending its use under this indication, it is applicable, as an injection, to cases of gleet and leucorrhœa, and as a wash to old ulcers.

The geranium may be given in substance, decoction, or extract. The *dose* of the powder is *twenty to thirty* grains of the decoction, made by boiling an ounce of the root in a pint and a half of water down to a pint, *one* to *two fluid ounces* may be taken for a dose.

GEOFFRŒYA INERMIS (*Andira inermis*). The Cabbage-tree. *Bark.* *Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Leguminosæ.

This tree is a native of Jamaica. Its bark has a peculiar principle, *Jamaicina*. The bark was introduced into medicine by Dr. Wright, as an anthelmintic; it has a sweetish, nauseous flavour, and operates as a cathartic; it appears also to possess the characters of a narcotic. The decoction appears to be the best form for its exhibition; it is prepared by boiling one ounce of the bruised bark in a quart of water, down to a pint; of which an ounce and a half

or two ounces, is a dose; it may be repeated every four or six hours till it nauseates. It was chiefly prescribed against the round worm (*ascaris lumbricoides*). In over-doses it occasions sickness and feverish delirium, which are removed by warm water and castor oil; it is not, however, a remedy little used.

GLYCYRRHIZA (γλυκυς, *sweet*, ριζα, *root*). *Radix recens.* The *fresh root* of *Glycyrrhiza glabra.* *Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Leguminosæ.

This plant is a native of the south of Europe. It is much cultivated for medical use near London. It has a long, round, succulent, tough root, running to a considerable extent, brown externally, yellow within, and of a peculiar sweet taste.

The principal proximate constituents of liquorice-root are woody fibre, starch, and a peculiar modification of sugar, which has been termed *glycion*, or *glycyrrhizin*, characterised by forming difficultly-soluble compounds with the acids.

Liquorice-root, and its extract, are chiefly used as demulcents; they are also often added to bitter and nauseous medicines, with a view of covering their flavour, particularly with regard to aloes. The chief consumption of liquorice is in the preparation of the extract, which is imported from the South of Europe, under the name of *Spanish juice;* it is usually burned, and otherwise carelessly prepared, and adulterated, and often contains copper, derived from the pans in which the decoction of the root is evaporated.

The *Extractum Glycyrrhizæ* of the Pharmacopœia, is prepared in the same way as the *Extractum Gentianæ.* The fresh root yields upon an average about one-fourth of its weight of extract.

GRANATUM. The Pomegranate. *Fructus Cortex.* The *bark* or *rind* of the fruit of the *Punica granatum.* *Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Myrtaceæ.

This tree is a native of Northern Africa, and naturalized in the South of Europe. Its fruit comes to most perfection in the West Indies.

In its composition, the *granadin*, which was thought to be a peculiar principle, turns out to be *mannite.*

The *decoction* or *infusion* of the bark of the pomegranate is a powerful astringent, owing chiefly to tannin, and to a minute quantity of gallic acid. It is sometimes employed as an injection in leucorrhœa, a gargle in relaxed sore throat, and a lotion in some cutaneous eruptions. In India, the decoction has long been used as a remedy for tape-worm: and by several practitioners in Europe with success. Among the last is the case in the *Archiv. Gen.*, July, 1840. The flowers are also astringent, and were formerly used under the name of *Balaustina Flowers.*

Decoction of Pomegranate. — Take of (the dried rind of the) Pomegranate, two ounces; Distilled Water, a pint and a half. Boil down to a pint, and strain. Dose a wineglassful every half hour until the whole is taken.

GUAIACI LIGNUM ET RESINA. The *wood* and the *resin*

of the *Guaiacum officinale*. *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Zygophylleæ.

The guaiacum tree is a native of Jamaica, Hispaniola, and the warmer parts of South America. It grows to about forty feet high, and four or five in circumference, with many divided knotted branches.

The *wood* is imported chiefly from Jamaica, and much esteemed, on account of its hardness, for turnery wares. Its specific gravity is 1·33; it is yellow externally, and dark-brown in its interior. When heated, it emits a slightly aromatic odour. The resin, though possessed of certain characters of the resins, is, in other respects distinct, and must be regarded as a body *sui generis* (*Phil. Trans.*, 1806). Its most remarkable property is the change of colour which it undergoes when subjected to oxydizing agents. It is sometimes met with in tears, but its usual appearance is that of large fused masses with little smell and taste, brittle, and semitransparent, and of a greenish-brown colour. The tint of its recent powder is pale-gray, but by exposure to air and light it soon becomes of a dingy-green, a change which Dr. Wollaston found was most speedily effected in the violet rays of the prismatic spectrum. It is sometimes adulterated by common resin.

Guaiacum *wood* forms one of the ingredients in the compound decoction of sarsaparilla. It derives its efficacy from the resin diffused through it. Its decoction was at one time considered as a specific against the venereal disease, but experience has annulled its pretensions, nor does it deserve any confidence in cutaneous affections, except as a part of a diaphoretic regimen.

Guaiacum *resin* forms an ingredient in the *Pulvis Aloes compositus* (page 34), and is the basis of the following formulæ of the Pharmacopœia:—

Mixture of Guaiacum. — Take of Guaiacum Resin, three drachms, Sugar, half an ounce; Mixture of Acacia, half a fluid ounce; Cinnamon Water, nineteen fluid ounces. Rub the guaiacum with the sugar, then with the mixture of acacia, and to these, whilst rubbing, gradually add the cinnamon water.

Tincture of Guaiacum. — Take of Guaiacum Resin, powdered, seven ounces; Rectified Spirit, two pints. Macerate for fourteen days, and filter.

Compound Tincture of Guaiacum. — Take of Guaiacum Resin, powdered, seven ounces; Aromatic Spirit of Ammonia, two pints. Macerate for fourteen days, and strain.

Guaiacum, conjoined with diaphoretics and stimulants, has long had the reputation of relieving chronic rheumatism, but it is of doubtful efficacy, and, where effective, the benefit is rather to be referred to the adjuncts. The average *dose* is *fifteen grains* three times a day, conjoined with nitre, antimonials, and opiates. It is best given suspended by mucilage of gum arabic, in the form of a draught, or as an electuary with honey. The above *Mistura Guaiaci* is given in the dose of one or two table-spoonsful twice or thrice a day. The *Tinctura Guaiaci composita* vel *ammoniata*, is also a favourite composition; the simple tincture is not of much use. The volatile or ammoniated tincture is highly extolled by Dr. Dewees in

dymenorrhœa, to be given during the interval, for two or three months; also in amenorrhœa. Dose, a teaspoonful, in milk, three times a day.

Guaiacum generally disagrees with the stomach, and excites dyspepsia: it is inadmissible in inflammation of the alimentary canal, and in general plethora. When, however, it is thought right to to administer it, the following formulæ may be adopted:—

1. ℞ Pulver. Resin. Guaiaci gr. xv. tere cum Mucilaginis Acaciæ ʒj. et adde Potassæ Nitratis gr. v.; Aquæ Cinnamom. fʒx.; Syrup. Papaver. fʒss. M. fiat haustus ter die sumendus.
2. ℞ Pulveris Resinæ Guaiaci, ʒij.; Pulveris Potassæ Nitratis ʒj.; Sulphuris Sublimati ʒss.; Pulv. Zingiberis ʒj.; Mellis Despum. ʒij. M. fiat electuarium; sumat coch. j. min. quater die.
3. ℞ Tinct. Guaiaci compos., Mellis, ãã ʒj. tere simul et adde; Aquæ Pimentæ fʒx. M. fiat haustus ter die sumendus.

Combinations of guaiacum are liable to change colour, especially where it is united with the *Spiritus Ætheris Nitrici*, with which it forms a vegetable chameleon, a circumstance which should be explained to the patient, who may otherwise be alarmed at the non-identity of his medicine. The resin enters into the composition of Plummer's Pills, (*pilulæ hydrarg. chlorid. comp. of the Lond. Pharm.*).

HÆMATOXYLUM. *Lignum.* The *wood* of the *Hæmatoxylon Campechianum. Logwood. Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Leguminosæ.

This tree is a native of South America, and thrives in perfection at Campeachy, in the Bay of Honduras.

Logwood has a peculiar faint smell, and a sweet astringent taste; its chief consumption is as a dye-stuff. In the Materia Medica it ranks with the astringent tonics, and as such has been used in chronic diarrhœa, dysentery, and dyspepsia. It frequently stains the stools of a deep blood-red, or purple colour. Chevreul has described the principle upon which the colour of logwood depends, under the name of *hæmatin*, or *hæmatoxylin*.

The *extract*, prepared according to the direction of the Pharmacopœia, is the best form for the administration of logwood; it may be given in the *dose* of from *ten to twenty grains*.

℞ Extracti Hæmatoxyli gr. x.; Misturæ Cretæ, Aquæ Cinnamomi, ãã fʒvj. Misce pro haustu bis terve in die sumendo.

Or in the form of mixture:—

℞ Extracti Hæmatoxyli ʒj.; Misturæ Cretæ fʒvij.; Aquæ Cinnam. ʒij. Fiat mistura cujus sit dosis cochlearia tria magna subinde.

HELENIUM, *see* Inula.

HELLEBORUS. *Radix.* The *root* of the *Helleborus niger. Cl.* 13. *Ord.* 6. Polyandria Polygynia. *Nat. Ord.* Ranunculaceæ.

This is commonly termed *black hellebore*, from the dark colour of its root: the plant is also known in our gardens under the name of *Christmas rose;* it is the *Melampodium* of the ancients. It flowers from December till February. It is a native of Austria

and of Italy. It has a perennial, rough, knotted root, black externally, whitish within, and sending off many strong, round, long fibres.

The root of this species of hellebore has a bitterish and acrid flavour, producing a peculiar tingling upon the tongue; it is virulently cathartic, and consequently hydragogue and emmenagogue. "It is one of the most ancient articles of the Materia Medica. Ctesias, who lived in the time of Plato, and anterior to Hippocrates, speaks of it as a medicine of important virtues. By the Greek and Roman physicians, it was highly esteemed as a remedy in mania. The extraordinary cures performed at the island of Anticyrus, famous for its hellebore, are celebrated by poets and historians of antiquity."—(Paris. *Pharmacologia.*)

Ten grains to ℈i. of the powdered root is an active *dose; three* to *six grains* are given when a milder effect is required; but the only form in which it is ever prescribed in this country is the *tincture*, the dose of which is from twenty minims to a drachm; it is regarded as alterative and emmenagogue. Dr. Mead, who thought highly of its emmenagogue powers, used to give two teaspoonsful of the tincture twice a day, in a glass of warm water. The remedy is only allowable in lymphatic temperaments, and in persons whose uterine system is in an atonic or torpid state. In purgative doses the other cathartics are preferable, and the cases are rare which justify its use. Some, on account of its drastic operation, and its stimulating the portal system of vessels, are partial to it in dropsy. Dr. Paris states that it forms an ingredient in several quack medicines.

Tincture of Hellebore.—Take of Hellebore Root, bruised, five ounces; Proof Spirit, two pints. Macerate for fourteen days, and filter.

In overdoses, hellebore acts as an acro-narcotic poison. Orfila found that two drachms killed a dog in eighteen hours when taken by the mouth, and in two hours when applied to a wound. Two cases are quoted by Dr. Christison from the bulletins of the *Société Médicale d'Emulation* (Avril, 1818), which arose from the ignorance of a quack doctor. After taking a decoction of the root, both persons were seized in forty-five minutes with vomiting, then with delirium, and afterwards with violent convulsions. One died in less than two hours, and the other in two hours and a half.

In another case, cited by the same author, upon the authority of Dr. Fahrenhorst, a German physician, and where the patient recovered, the symptoms were those of irritant poisons generally, that is, burning pain in the stomach and throat, violent vomiting, to the extent of sixty times in the first two hours, cramps in the limbs, and cold sweating. The most material symptoms were at this time quickly subdued by sinapisms to the belly, and anodyne demulcents given internally. The dose here was a table-spoonful of the root in fine powder. Of the other species of hellebore, the *helleborus fœtidus* is said to be the most poisonous; they all probably possess similar properties.

HELONIAS, *see* SABADILLA.

HENBANE, *see* HYOSCYAMUS.

HIRUDO. The Leech. *Hirudo medicinalis. Div.* 3. *Cl.* 1. Articulata Annelidæ (Cuvier). *Iatrobdella Medicinalis* (Blainville).

The medicinal leech is found in ponds and lakes, and appears not uncommon over the whole world. The London market was at one time chiefly supplied from Norfolk and Suffolk; afterwards they were imported from France and Lisbon, but are now chiefly from Hamburgh. The prevalence of the doctrines of Broussais caused such an enormous consumption of leeches in France, that the home supply was unequal to the demand, and they were imported from Spain, Italy, Hungary, and even from Algiers and Tunis. They are abundant in the United States. They are caught either by disturbing the water, when they come to the surface, and are taken by the hand, or by people who walk into the pools and suffer them to fix upon their legs.

The back of the genuine leech is very dark-olive, with six longitudinal ferruginous stripes, and six lateral lines; the belly is pale-olive, and spotted. The mouth consists of two lips, placed in the centre of a horseshoe-shaped sucker, and within it are three rows of small cartilaginous teeth, by which they make a triangular puncture in the skin. They are oviparous and androgynous; each egg produces nine leeches, which escape from it in about twenty-eight days. The eggs are deposited upon the margin of pools, and are hatched by the sun's heat. During winter, leeches remain attached to the roots of aquatic plants, but in warm weather they move about, and are said always to be upon the surface during a thunder-storm.

Method of keeping Leeches. Though they are denominated aquatic worms, water should not be considered as essential to their existence, for they live a long time in moist ground or mud, or in moss, impregnated with water. We have seen a proof of the propriety of this remark, in a reservoir of these animals, containing several thousands, and consisting only of a humid earth, mixed with rushes and moss, in which they burrow like earth-worms, and are dug out for use. M. Derheims says, "they frequently perish if deprived entirely of earth; whence he infers, that water serves to maintain their suppleness, by keeping the mucus, with which they are invested, of a proper consistence, and a due condition of which is essential for their health and existence." Their natural habitation, according to the French author, is in pure still water, as fresh ponds, and if they be sometimes found in running streams, it is rather accidental than natural for them.

"They are commonly carried for sale in earthen jars, or little casks or runlets of wood, or in hair-cloth bags; always, however, accompanied with moss well moistened; or small bits of sponge, as when sent for sale beyond sea."

Leeches are kept for use in jars filled with pure water, of (from

64° to 68° F.) which ought to be frequently renewed; in summer, every day, and in winter twice a week. The number in a quart vessel ought not to exceed twelve or fifteen. When collected in large numbers they should be kept in large tanks lined with potter's clay, in which the leeches deposit their eggs during the summer, and bury themselves during the winter. In hospitals, infirmaries, &c., the best means of preserving these animals during the summer, is to put them into large pots, or jars, containing clay or river sand, the water in which is continually renewed by a syphon: in cold weather running water is prejudicial to them; then, they are best kept in moist sand, which is washed daily with tepid water. M. Derheims says, that when leeches are crowded together, it is very important that they should be cleansed of the mucus which adheres to them, and without being freed from which they cannot be healthy: hence the utility of the moss, of which this author so frequently speaks, by their crawling over and through it, and thus undergoing a salutary detergent process. Sometimes leeches, in reservoirs, die in large numbers, as if victims of an epidemic disease. Charcoal is represented to be a good disinfecting agent, under these circumstances; placed in pieces mixed with moss and pebbles as a flooring; or if considerable numbers are sick, let them be well washed in several waters, then placed in a separate wide-mouthed vessel, and covered with powdered charcoal: after being left in this state three or four hours, water may be freely added; they are next to be carefully lifted out, exposed to the air for a few minutes, and then safely committed to their cleansed habitations, floored as above.

The consumption of leeches in England and France is enormous. Some years ago, says Pereira, it was stated that four principal dealers in London imported, on an average, 600,000 monthly, or 7,200,000 annually. Fée says, it is estimated that 3,000,000 are annually consumed in Paris; and as the population of Paris is to that of the whole of France as one is to thirty-three, it follows that, independently of exportation, 100,000,000 are consumed annually, which is equivalent to three leeches annually for each person. Now, if we estimate the average price at fifty francs per thousand, we shall have the enormous sum of five millions of francs (about a million of dollars), paid for this one article of our Materia Medica.

Method of Applying Leeches. Some preliminary cautions are necessary respecting the substances repugnant to the leech, and which would either prevent its taking hold or cause to fall off. The presence of grease, vinegar, and salt, will prevent their biting. Derheims says, that leeches will not bite those under the influence of sulphur, on account of the evolution of sulphuretted hydrogen by the skin. The effluvia or vapours of the room, as the fumes of tobacco, sulphur, vinegar, &c., will prevent their biting, or even cause them suddenly to fall off.

If by chance they slip into cavities, as into the back part of the

mouth, or the stomach, rectum, &c., salt water or vinegar injections should be had recourse to; and where it is in the stomach, it may be detached by an emetic. There are instances of violent, and even fatal hemorhages by the animal sucking to repletion, and then leaving orifices in internal mucous surfaces, to which it has thus accidentally got access.

Mode of Application. When leeches are to be applied, the part should be made perfectly clean and dry, and the leech, after having been well wiped in a soft towel, should be so held as to enable it to fix upon the spot required, which, if necessary, may be touched with a drop of cream, fresh milk, or beer. It is generally most convenient to apply the leeches successively by the hand, but where many are required, and the surface to which they are to be applied extensive, they may be put into a wine-glass, or small tumbler, or pill-box, and so held to the part till they fix. When applied to a very limited spot, the leech may be put into a short glass tube, open at both ends, or the part may be covered with a piece of linen, in which a hole is made of the exact size of the part to which the leech is to be applied. It is sometimes necessary to make a small puncture with the point of a lancet, or to put a drop of blood upon the spot. The average quantity of blood which a leech extracts is from two drachms to half an ounce; when full they fall off, or may at any time be made to drop by touching their heads with salt; the bleeding may then be kept up by bathing the orifices with a sponge dipped in warm water, or by fomenting the part with warm and moist cloths, or a cataplasm; when it does not stop spontaneously, it may be checked by the application of a piece of soft dry lint. It, however, sometimes happens, that the hemorrhage from a leech-bite is extremely troublesome, and has even proved fatal in the cases of young children; in such obstinate cases, a ligature of thread must sometimes be resorted to: among the most effectual styptics a strong solution of alum seems to answer best: creosote, touching the orifice with nitrate of silver, or with the point of a knitting-needle at a white heat, are other means for arresting the hemorrhage. In some cases, simple flour put on the bleeding vessel will answer. In some persons the bites produce great local irritation, and œdema; this is especially the case in erysipelatous habits. There are also particular kinds of leeches which are said to produce troublesome and even dangerous sores, but common attention will prevent such occurrences. When it is desired to preserve leeches for second use, they are made to disgorge by the application of salt, or vinegar, or merely by drawing them gently between the fingers, and if then put into clean water, which requires to be repeatedly changed, they gradually recover. It has recently been ascertained that sprinkling a little of the powder of ipecacuanha on the back of the animal will cause it to vomit the blood with which it was gorged.

Quantity of Blood taken by a Leech. In a brief review of *Derheims on the natural and medical history of leeches, &c.*, in the *North Amer. Med. & Surg. Jour.*, Vol. I., the writer says: "We

receive some [leeches] in this country from France, Spain, Portugal, and Italy; but our best leechers are satisfied with those of our own waters, and find that they, in general, answer nearly as well as the foreign sorts, and can be afforded much cheaper." "Twenty French leeches might take about ℥xx. of blood — our own do not take so much; but from vascular parts of the skin, the bleeding is often very free. Mr. Ripperberger measured on one occasion ℥xxiii. of blood which flowed from seventeen bites made by American specimens: probably *hirudo decora* (*decorata* of Long's 2d Expedition, vol. ii., 268). This is an extreme case, for the majority of them take from two to three drachms each, which is usually considered in the prescription for their employment." I have heard another and much lower estimate made by a good leecher, who stated that a dozen of leeches would extract about an ounce of blood: probably this would apply to their use in the winter, when they are generally feebler and less voracious for blood. M. Derheims states, that a middling-sized officinal French leech, weighing about one drachm, will extract upwards of seven drachms (30 grammes) of blood. M. Martin Solon (*Dict. de Med. et de Chirurg. Prat. Art. Sangsues*) says, that the quantity varies from one to a few drachms. M. Verniere estimates that on an average each leech will draw off about a drachm of blood. But in directing leeches to be applied, we must take into count the loss of blood from the orifices which they have made after they fall off. Various calculations have been made as to the quantity which is lost in this way. Each wound has been supposed to allow of the discharge of one and a half times the amount sucked in by the animal itself, which would be a drachm and a half. Adding this to the former, and we have two drachms and a half of blood lost in consequence of the application to the skin of a leech, which has fairly and fully performed its office; so that three leeches would give rise to the detraction of nearly an ounce of blood. This estimate applies to the French leech, which, I should say, is equal to three American leeches. The quantity of blood taken by an English (foreign) leech is estimated to be two drachms, and the subsequent loss about as much more, making half an ounce of blood taken by this means. A ready resource offers, when the discharge of blood is not equal to our wishes, in the application of a cupping-glass over the punctured part.

Medical Uses of Leeches. The immediate and secondary effects of leeching are very analogous to those of hemorrhage, viz., loss of blood from a membranous tissue, accompanied with an afflux of fluids and some turgescence in the part, and a diminution of the force of the heart's contraction. But there is this great advantage of the artificial hemorrhage, or that by leeching, over the common morbid varieties; in our being able to select the region, commonly some part of the skin and contiguous mucous membrane, and to determine the amount of blood to be lost. Sometimes this vicarious hemorrhage represents very closely that which is physiologi-

cal, or that which, when it occurs in disease, is critical and curative; or has by habit become, in a measure, necessary to health. Thus, for example, suspended or suppressed menstruation will be brought on by leeches to the vulva; the violence of headache in certain catarrhal affections is promptly relieved by even slight epistaxis occurring spontaneously, and with equal promptness by the detraction of blood from the lower part of the nasal mucous membrane by the application of leeches to the part. So, also, a plethoric habit with great determination to the head, or to the thoracic or abdominal viscera, occurring after the suppression of hemorrhoidal discharges, will be relieved by stimulating these latter, by means of the application of leeches to the borders of the anus: and metritis, with great local plethora of the organ, which sometimes is mitigated by menorrhagia, will be cured with more certainty and less risk by the hemorrhage caused by leeches applied to the inside of the vagina and the *os tincæ*.

On occasions, the afflux of fluids to the part and the temporary thickening of tissue in consequence, after the application of leeches, is followed by uneasy sensations, and even positive pain, as when they are applied to hemorrhoidal tumours and to the borders of the eyelid and conjunctiva, or even near the external canthus, in acute ophthalmia.

But the hemorrhagic effect, if we may use the language, is not manifested merely at the part in which leeches open the minute bloodvessels, but it is repeated in other and distant regions; and hence, a therapeutical precaution, not to have recourse to this remedy where there is a tendency to internal hemorrhage.

As directly detracting blood from the circulation, leeches are placed on the same line after venesection; with this alleged difference in their favour, that, whereas they draw away the blood gradually, the great vessels and the heart have time to accommodate themselves to the diminished amount of their contained fluid:—and hence, we are told, that in cases of doubt, or where the system is much depressed, and yet the call for relieving a congested inflamed organ is imminent, leeching, or the somewhat analogous operation of cupping with scarificators, is preferable to venesection. As yet, however, it is not by any means a settled point, that less debility is produced by leeching than by bloodletting in equal quantity: some allege that the reverse is true, and assign as a probable cause, the detraction of blood from capillaries, and a portion of them arterial, and a consequently greater loss of the vitalizing and nutritive portion than is found in venous blood. I have heard, every now and then, patients complain as much of a feeling of debility after leeching as they did after venesection—the quantity of blood lost in both ways being supposed to be nearly equal: and I have seen a patient thrown into incipient syncope by a large application of leeches as completely as if a vein were opened and the blood flowing freely from the orifice. When,

therefore, we have recourse to leeching in disease, we direct the operation with a view to the production of effects analogous to, and in some respects identical with, those anticipated from venesection; unless the number of leeches be so small or the animals so feeble, that little more than an afflux of blood and other fluid to the parts is the consequence. But whilst the impression on the heart and great vessels, and in the circulatory apparatus in general, is not materially different in the two cases, very different is the effect on an inflamed organ, in the phlegmasiæ or in fevers. In these latter cases, leeches applied near the part or on the region of the skin in more direct relation with it, display often a very marked curative operation. In cerebral affections, requiring the remedy, some have attempted an explanation of its effects when applied to the scalp, by pointing out the connexion between the superior longitudinal sinus and the exterior of the cranium, through the parietal foramina by the veins of Sautorinus; and, also, an analogous connexion along the sagittal suture. At the occipital region a still more evident communication exists between the external teguments and the lateral sinus by means of a large branch which joins the occipital vein. But as we have no corresponding anastomosis between the skin covering the abdomen, for example, and the gastric and intestinal mucous surface; and that over the thorax and the bronchial mucous membrane, we must content ourselves with admitting, as an ultimate fact, the influence which both leeches and cups, as well as blisters and fomentations, exert over particular viscera and internal membranes, when they are applied to particular regions of the skin.

Having assured himself that venesection, which is also a prompt, and as regards the quantity of blood taken, a certain operation, has been carried as far as prudence will justify, or that it is not admissible in the case, owing to the small impression which it is expected to produce on the inflamed spot, compared with the great and alarming prostration of the general system, the physician may prescribe leeches in the manner and with the intention laid down in my preceding remarks on this subject. If he have gastritis to combat, he will direct the leeches to be applied on the epigastric region; if enteritis, on the umbilical region; if colitis, either on the right or left iliac fossa, or even the arch of the colon, &c. Symptoms indicating protracted derangement of the chylopoietic viscera, with heat and occasional pain in the abdominal cavity, will be met, especially in subjects of middle or advanced life, by the application of leeches to the anus. In cerebral disease, the temples and behind the ears, and over the mastoid processes, are the spots usually selected for leeching. In young subjects, whose skin is thin and the subcutaneous veins numerous, care must be taken, after the leeches fall off from the temples, that the bleeding does not continue from one or more of the opened veins and exhaust the patient far beyond the wants of the case. In *laryngitis stridu-*

losa or croup, leeches, after V.S. applied, from under the angles of the jaw down on each side of the larynx, are often of great utility. Here the precaution just given will also, on occasions, be necessary, with the addition, that care should be taken not to apply a leech to the external jugular vein. In infants of such tender age that venesection cannot be practised, and who are sufferers from croup or bronchitis, leeches applied to the throat, or in the latter disease under each clavicle, will often, as I have found from personal experience, save life.

It is sometimes desirable to apply leeches to internal surfaces, which could not admit of their use by the hand of the operator. In such cases, as when they are directed to the *cervix uteri*, a *speculum* is had recourse to, both to dilate the passage and to expose the spot to the light, so as to allow of a channel for the introduction and application of the leeches. They are inapplicable to those cases of uterine disease in which there is open cancerous or ulcerative sores, or other abrasion of membrane.

Leeching is not proper in persons of a hemorrhagic diathesis, or who are labouring under scurvy and chronic dropsy; and commonly European writers caution us against this remedy in erysipelas. That, in the tainted air of large hospitals, leeches are apt, at times, by the mere irritation of their bite and the afflux of blood to the part, consequent upon their use, to aggravate erysipelas, I will not pretend to deny; but I know, full well, and in this experience am supported by that of many American practitioners, that leeching the margin of the affected skin has, in not a few cases, given very manifest relief, and has largely contributed to a resolution of the inflammation. When the remedy is resorted to, it ought to be early in the disease.

But, I should far exceed the bounds allowed to a single article in a work like the present, were I to mention even, without dilating on the pathology of the diseases which demand, and the therapeutical changes which justify, their application, all the circumstances in which leeches are used in the practice of medicine. In local disease, such as enlarged glands and various tumours, leeches are often of indispensable necessity; and either alone, or, in some cases followed by blisters, they are among our best discutients. It is a matter of experience, and worthy of being repeated here, that tumours which have been very little influenced by iodine or mercury rubbed on them and taken internally, have become very soon obedient to these remedies after leeching the part once or twice.

As respects the quantity of blood to be drawn by leeches in young subjects, the following table, given by Dr. James Blundell, is not without its value; although it must be regarded as merely approximative, since it indicates a greater loss than in general it will be prudent to subject them to. Guersent asserts, that, in infants up to two years of age, more than three or four ounces of blood ought never to be drawn in twenty-four hours: —

Ages.	Quantities.
2 Months	1 oz. to 1½ oz.
4	1½ . . 2 .
8	2 . . 3 .
12	3 . . 4 .
18	4 . . 5 .
3 Years	8 . . 10 .
6	10 . . 12 .

HORDEUM. *Semina integumentis nudata.* The *decorticated seed* of the *Hordeum distichon.* *Cl.* 3. *Ord.* 2. Triandria Digynia. *Nat. Ord.* Gramineæ.

The native country of barley has not been accurately ascertained. It is cultivated over the whole of Europe, and there are several species, but the above is that which is usually grown in this country. It has a long spike with a double row of male florets on each flat side, and a single row of fertile flowers on each edge. The valves of the calyx are linear, and one half shorter than the corolla, which terminates in a straight serrated awn. When ripe, the husk is coriaceous and angular, and adheres to the grain, which is ovate and grooved. It is decorticated by a machine, which slightly rounds the grain; hence the term *pearl barley.* Barley contains about 90 *per cent.* of nutritive matter, which is chiefly of the character of starch, with a little gluten, gum, and sugar. When boiled or infused in water, it yields a useful beverage for the table of the invalid, and when mixed with milk, is often used in the diet of infants; but great attention should always be paid to its cleanliness and freshness, for if in the least acescent, it is apt seriously to derange children's bowels, and if too thick, and passed, as it often is, through a dirty strainer, it is quite unfit for the fastidious palate of the valetudinarian.

The Pharmacopœia gives us the two following recipes for *barley water;* they are good vehicles for the alkalis, in cases of lithic diathesis, and for various demulcents, also for acids, borax, nitre, and similar applications in the form of *gargle.* They are, however, both of them subjects of culinary, rather than of pharmaceutical art; we may, therefore, refer to the following remarks upon them by the late ingenious author of the "*Cook's Oracle,*" whose laudable attempt at the introduction of weight and measure into the art of cookery, deserves more patronage than it has hitherto received.

"These drinks," he observes, "are intended to assuage thirst in ardent fevers and inflammatory disorders, for which plenty of mild diluting liquor is one of the principal remedies; and if not suggested by the medical attendant, is frequently demanded by honest instinct, in terms too plain to be misunderstood. The stomach sympathises with every fibre of the human frame, and no part of it can be distressed without in some degree offending the stomach: therefore it is of the utmost importance to soothe this grand organ, by rendering everything we offer to it as elegant and agreeable as the nature of the case will admit of. The barley drink, prepared according to

the second receipt, will be received with pleasure by the most delicate palate."

Decoction of Barley. — Take of Pearl Barley, two ounces and a half; Water four pints and a half. First wash away with water the foreign matters adhering to the barley, then, having poured upon it half a pint of water, boil a little while. Having thrown away this water, pour upon it the remainder, previously made boiling hot; then boil down to two pints, and strain.

Compound Decoction of Barley. — Take of Decoction of Barley, two pints; Figs, sliced, two ounces and a half; Liquorice Root, sliced and bruised, five drachms; Raisins, two ounces and a half; Water, a pint. Boil down to two pints, and strain.

HUMULUS, *see* LUPULUS.

HYDRACIDS. A class of acids resulting from the combination of *hydrogen* with certain simple bodies, such as with chlorine, iodine, bromine, fluorine, sulphur, &c., forming the hydrochloric, hydrobromic, hydriodic, hydrofluoric, and hydrosulphuric acids; or, with compound bases, such as with cyanogen, forming the hydrocyanic acid, &c. In these acids, one atom of hydrogen is combined with one atom of the other elements, or, what amounts to the same thing, with an equal volume. Of these acids, the most important in reference to their medical uses are the *hydrochloric* and the *hydrocyanic.*

HYDRARGYRUM (υδραργυρος, from υδωρ, *water*, and αργυρος, *silver*). Quicksilver. Mercury.

This is a brilliant white metal, liquid at common temperatures, but solid and malleable at –40°. It boils at a temperature of 670°. Its specific gravity at 60° is 13·5; in the frozen state its specific gravity is 15·6. Its equivalent number, or atomic weight, is 200. The principal ore of mercury is the *sulphuret*, or native *cinnabar;* the metal is procured by distilling it with quicklime or iron, or with a mixture of the two; it is also found in metallic globules disseminated in the sulphuret; and in the form of a *chloride*, or *native calomel*, but the latter is rare. The principal mines of mercury are those of Idria, Carinthia, and the Palatinate; of Almaden, near Cordova, in Spain; and of Guanca Velica, near Potosi, in Peru. It is chiefly imported in iron bottles, each containing from sixty to a hundred pounds weight; that from Austria was formerly contained in leather bags of thirty-one pounds each, two or three of which were packed in each cask.

There is no better indication of the purity of mercury, than its brilliancy and perfect fluidity; for, when it contains lead, tin, or bismuth, even in very minute quantities, it drags a tail and soon tarnishes. When, as is often the case, mercury is dirty and dusty, it may be cleansed by pouring it into a funnel and suffering it gradually to run out through the tube, which should be partially closed by the finger; the foreign matter collects upon the surface, and may be retained in the funnel. Or the mercury may be pressed through a piece of fine linen or flannel.

The chemical equivalent, or atomic weight, of mercury (upon the hydrogen scale), is 200. It forms two salifiable oxides.

Medical Uses. So long as mercury remains in the metallic state, it exerts no action upon the system, and when administered in its usual fluid form, and in large quantities, it generally passes off by the bowels, and produces no further effects than those resulting from its weight. It was at one time not unfrequently administered in cases of obstinate constipation, in doses of a pound or more, in the hope of forcing a passage. If the intestinal canal were a straight tube, such a plan might possibly succeed; but when we consider the contortions and windings, the ascents as well as the descents of the passage, its absurdity is evident. Mercury was also formerly celebrated as an alterative, and was used in the reign of Charles II. of England, in small doses to beautify the complexion, remove freckles, and perform the usual functions of cosmetics. It is said, that in those days the sweepings of the drawing-room were among the servants' perquisites, and that no inconsiderable quantity of second-hand mercury was thus collected.

But, if mercury remain for a long time in the stomach and bowels, or if it be very finely divided, it then becomes active, apparently in consequence of its being absorbed in that form into the system, or of its oxydizement; and there are cases in which violent salivation has ensued from a large dose of the metal, in consequence, apparently, of its meeting with something which has oxydized or dissolved it. Mercurial vapour, too, when absorbed either by the lungs or skin, is actively poisonous, as will appear from the toxicological history of mercury and its compounds.

Much discussion and difference of opinion have existed respecting the *modus operandi* of mercury. There seems to be little doubt that it is susceptible of absorption into the blood, and that it is in that way carried into the secretions, and occasionally deposited in the textures of the body. It is even said to have been actually detected in the blood, saliva, bile, and urine; and in the substance of the brain, bones, lungs, &c.: the authorities upon which these statements are made, are to be found in Dr. Christison's work on Poisons; it must, however, be admitted, that the evidence is not quite satisfactory,

The *medical properties and uses* of mercurials are generally though not satisfactorily referable to a peculiar stimulant power, the effects of which vary with the nature, quantity, and mode of exhibition of the preparation which is selected, and with the *adjuncts*, or remedies with which it is conjoined. Its pharmacological history, therefore, is somewhat complicated, and the cases in which it is useful, not less varied than numerous.

Mercurials seem to act as stimulants upon the secretory organs, and especially upon the liver and intestines, upon the salivary glands, and the kidneys; but the extent of this action is extremely variable in different constitutions and habits, and of course materially dependent upon the dose which is administered, and the frequency and extent of its repetition. They also exert a peculiar stimulant power over the absorbent system, diminishing dropsical accumula-

tions, and removing glandular indurations. Where they act as purgatives, a great part of their effect is thought to be referable to increased secretion of bile; but their action on the liver is secondary to that on the gastro-duodenal mucous surface: they are often powerful diuretics, but in this respect their chief value is in combination with vegetable remedies belonging to that class. As sialagogues, the mercurials are pre-eminent, and in the numerous cases in which they are administered, it is necessary to pay the minutest attention to their effects upon the mouth and its secretions. They consist, first, in a peculiar taste, in increased moisture, and in a slight redness and tumefaction of the gums; the flow of saliva is then manifestly augmented, the salivary glands become tender, and afterwards swollen, and the odour of the breath disagreeable. By due attention to the quantity and quality of the mercurial employed, and to the management of the patient as to air, clothing, warmth, and diet, these symptoms may be kept up to a moderate extent, and become a valuable test of the constitutional affection; otherwise they go on to produce pain and tumefaction of the gums, tongue, and parts adjacent, difficulty of swallowing, a peculiar fetor of the mouth, and a flow of saliva to such an extent as to amount in some cases to several pints in the course of the day; this is attended by debility and emaciation, and if the mercury be further persevered in, the mouth becomes ulcerated, and the teeth loosen, and alarming symptoms, indicating a peculiar affection of the nervous system, ensue. These effects are also often associated with diarrhœa, nausea and vomiting, perspiration, and increased flow of urine. They obviously constitute a peculiar diseased state of the system, induced by mercury. This remedy, however, in modern practice, is never pushed to such an extent as intentionally to bring on the latter symptoms; when the mouth is to a certain extent affected, and the flow of saliva moderately increased, all the curative indications of a mercurial course are usually safely and effectively attained, and it is only in neglected cases, or in peculiar states of constitution, or of idiosyncrasy, that the effects of excessive ptyalism are witnessed. There are many diseases in the treatment of which mercurial medication forms an essential feature, the extent to which it is to be carried depending upon a number of causes, some of which will be noticed under the history of the individual preparations of mercury.

Independently, however, of ptyalism, and of those other effects of mercury just mentioned, there are some which may require special notice and treatment. One of these is a vesicular eruption, which has been termed *erythema*, and *eczema mercuriale:* it consists in a copious eruption of minute vesicles, giving a sensation of roughness to the parts, and generally terminating in desquamation. It is usually attended by fever, cough, and some difficulty of breathing; and has terminated fatally. In the worst cases, a copious discharge ensues, and the epidermis, together with the hair and nails, fall off.

In certain habits, or where mercury is incautiously used, a particular dysenteric affection, attended by distressing tenesmus, a feeble quick pulse, and symptoms of typhoid fever, ensue, attended by intestinal ulceration. There are some constitutions that scarcely bear mercury in any form; as soon as ptyalism commences, great depression of strength and spirits ensues, attended by irregular pulse, and fainting; these symptoms are sometimes followed by a kind of ague, in which the cold fit predominates in some instances, and which in others assumes the character of an inflammatory remittent, but the pulse remains small and quick; the stomach and bowels are disordered; the countenance fallen; there is disinclination to exertion, and in this state the patient has almost suddenly expired.

Much mischief is occasionally done by the incautious use of mercury in cases which are not venereal; and instances are on record in which ulcerated sore throat, cruptive disorders, and osseous or ligamentous tumours, have not only been greatly aggravated by mercury, but in which salivation has been pushed to such an injurious extent as permanently to ruin the already debilitated constitution. Among the lower order of persons, who consult empirics and use their remedies, such cases are not unfrequent; and when we recollect the analogies that sometimes subsist between the mercurial and the venereal diseases, we shall not be surprised at the occasional occurrence of doubtful and difficult cases in regular practice. The term *pseudo-syphilis* has sometimes been applied to the mixed cases of venereal and mercurial disease.

We may now proceed to examine the preparations of mercury in most general use.

Hydrargyrum cum Cretâ (*Mercury with Chalk*).—Take of Mercury, three ounces; Prepared Chalk, five ounces. Rub them together till the globules are no longer visible.

When this preparation, which is in the form of a gray powder, is heated, the mercury evaporates, and pure chalk remains, which is of course colourless, and soluble, with effervescence, in acetic acid. If any other metal than mercury were present, it would either remain undissolved by acetic acid, or, if dissolved, the solution would be discoloured by the test of sulphuretted hydrogen.

The addition of a little water considerably accelerates the comminution of mercury, a very small portion of which (if any?) is converted into *protoxide* during the trituration.

Different opinions are entertained respecting this mercurial; some maintain that it is inert, and others consider it as an effective though mild remedy. There are cases in which *very small doses* of mercury are productive of good effect, and such are suited to this preparation, which may be taken in doses of from five grains up to twenty or thirty. The beneficial effect of very minute doses of mercury, where the usual mode of administering it produces bad consequences, as is frequently the case in those forms of dyspepsia

which are attended by disordered bilious secretion, has been well pointed out by Dr. Wilson Philip (*Treatise on Indigestion*). As far as respects the remedy we are now considering, it is certainly, in equivalent doses, less active than the *Pilulæ Hydrargyri*, and its activity seems to be more dependant upon the state of the secretions of the stomach and bowels. It is much esteemed by some judicious practitioners as correcting the biliary secretion in children, and especially as increasing it when the stools are clay-coloured or pale. The extreme mildness of this mercurial, generally requires that its use should be continued for some time, but the good effects which result are often more permanent than when larger doses are employed; and not unfrequently the latter fail, while the former succeed in restoring healthy action.

In the cholera and *tabes* and *atrophia* of children, and in some of their cutaneous affections, this mercurial has been preferred as an alterative; in these cases the varying susceptibility of different constitutions to the effects of mercury must not be lost sight of; and when the gums become in the least affected, it should be suspended, or the dose duly diminished.

Pilulæ Hydrargyri (*Pills of Mercury*). — Take of Mercury, two drachms; Confection of Red Rose, three drachms; Liquorice, powdered, a drachm. Rub the mercury with the confection till globules can no longer be perceived, then, having added the liquorice, pound all together till incorporated.

In the wholesale manufacture of this preparation, commonly known under the name of *blue pill*, substances are occasionally added to accelerate the incorporation of the mercury; but these additions are prejudicial, and tend to render the operation of the medicine uncertain. At Apothecaries' Hall, a machine impelled by the steam-engine is employed for triturating the ingredients, consisting of a circular iron trough, in which revolve four wooden cylinders, having also a motion on their axes; in this way the admixture of mercury is perfectly and unexceptionably effected.

Mercurial pill, when properly prepared, is of a good consistence for the formation of pills, and when rubbed upon paper, should not exhibit visible mercurial globules; it is supposed to become more active by keeping. It is an excellent, and at the same time mild, mercurial, calculated to fulfil most of the intentions with which the metal is exhibited. It is probable that the mercury in this pill is only in a state of extreme mechanical division, and of intimate mixture with the inert ingredients; we have at all events no direct evidence that in this and other analogous mercurials, any actual oxidizement of the metal has been effected, and it is probable that they derive their activity from the extremely comminuted state of the mercury, which, being a fluid metal, is peculiarly susceptible of infinite division.

Mercurial pill when given as an alterative, is used in doses of from *one or two to four or five grains*, two or three times a day. When intended as a purgative, from ten to twenty grains may be

administered; but it generally requires the aid of a little extract of colocynth, or some similar adjunct: or a mercurial pill of five or six grains may be taken at bed-time, and a draught of infusion of senna and sulphate of magnesia early the following morning. It is also used in the cure of syphilis and other disorders requiring salivation; to this intent, a pill of five grains may be taken thrice a day; or five grains in the morning and ten grains at night; and as this dose is apt to act upon the bowels, it commonly requires to be combined, especially at night, with an adequate dose of opium.

There are many cases of torpidity of the bowels connected with hypochondria, with impaired digestion, loss of appetite, lassitude, drowsiness, and general inactivity of the system, in which, apparently as an hepatic stimulant, small doses of blue pill are extremely effective, especially conjoined with rhubarb or with aloes, as in the two following formulæ :—

℞ Pilulæ Hydrargyri, Extracti Rhæi, āā ʒj. Misce optime et divide in pilulas xxx. Sumatur una bis die.

℞ Pilulæ Hydrargyri ʒj.; Aloes pulveris ʒss. Divide in pilulas xxiv. quarum sumantur duæ omni nocte.

In chronic dysentery, and in chronic bronchitis, in leucorrhœa, and, in fine, in all chronic inflammations of mucous surfaces, including those of the eyelids, as in conjunctivitis, small doses of blue pill with, in the cases of bronchial and intestinal disorder, the use of demulcents and simple regimen, are often followed by the best results. In irritable habits suffering from dyspepsia, and disturbed sleep, the addition of hyosciamus extract is beneficial — as in a pill to consist of two grains and a half of each of these articles. Two of these may be taken in the evening.

Oxide of Mercury.—Take of Chloride of Mercury, an ounce; Lime-water, a gallon. Mix and frequently shake them; set aside, and when the oxide has subsided, pour off the liquor. Lastly, wash it in distilled water until nothing alkaline can be perceived, and dry it in the air, wrapped in bibulous paper.

Note. — *Oxide of Mercury* (*gray*). — Digested for a short time with hydrochloric acid and filtered, nothing is precipitated by the addition of solution of potassa or of oxalate of ammonia. It is entirely soluble in acetic acid. By heat it is totally evaporated.

When the above oxide is pure, diluted hydrochloric acid converts it into protochloride of mercury, or calomel, which is insoluble in that acid. If, on the other hand, it contain any of the binoxide or red oxide of mercury, it will be dissolved by the acid, and will be thrown down in the form of an orange-coloured precipitate, by solution of potassa. The presence of lime, or carbonate of lime, in the oxide, is indicated by a white precipitate when oxalate of ammonia is added to the hydrochloric solution. If undecomposed protochloride of mercury be present, it remains insoluble in acetic acid; and other impurities are indicated by their want of volatility. The theory of the decomposition of calomel by lime-

water (affording the *black lotion* of surgery), is stated under the article *Chloride of Mercury*. The above oxide consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	96·2
Oxygen	1	8	3·8
Protoxide of Mercury	1	208	100·0

The *protoxide*, or *black oxide* of mercury, is scarcely ever used internally; the *Hydrargyrum cum Cretâ*, and the *Pilulæ Hydrargyri*, may in all cases be substituted for it. It is liable to be decomposed by exposure to light, and the evil of this decomposition is, that metallic mercury and *peroxide* appear to result; and as the latter is a virulent mercurial, the above oxide is, so far, highly objectionable. Some of my medical friends are partial to this preparation. I used it myself for a time, but found its operation to be unequal and occasionally harsh.

Mr. Abernethy employed the protoxide of mercury as a source of mercurial vapour for fumigation, and states that, when properly applied, it has excited salivation in the course of forty-eight hours: his directions for its use are as follow: place the patient in a vapour-bath in a suit of under-garments, with a cloth round the chin; then put two drachms of the oxide upon a heated iron within the machine in which the patient is seated. After continuing in the bath for fifteen or twenty minutes, the body is found covered with a whitish powder; the patient should then be put to bed, and remain in the same clothes till morning, and then use a tepid bath.

Mr. Donovan has proposed to use this oxide for the preparation of a mercurial ointment, as a substitute for the *Unguentum Hydrargyri*.

Binoxide of Mercury.—Take of Bichloride of Mercury, four ounces; Solution of Potassa, twenty-eight fluid ounces; Distilled Water, six pints. Dissolve the bichloride of mercury in the water; filter, and add the solution of potassa. Having poured off the liquor, wash the precipitated powder in distilled water till nothing alkaline can be perceived, and dry it by a gentle heat.

Note.—*Binoxide of Mercury* (*red oxide* or *peroxide*).—By the action of heat it emits oxygen, and the mercury either unites into globules, or entirely evaporates. It is wholly soluble in hydrochloric acid.

To this *Note* Mr. Phillips adds the following *Remarks:* "When it is dissolved in nitric acid no precipitate is yielded by nitrate of silver; or if there should be any, either it has not been sufficiently washed, or the bichloride of mercury has been imperfectly decomposed and consequently precipitates the silver of the nitrate of silver as a chloride."

The theory of the above process will be found under the article *Bichloride of Mercury;* it is an objectionable mode of preparing the binoxide, if intended for internal use, and an unnecessary one, if merely for its external employment. This oxide was formerly obtained by exposing mercury in a long-necked mattrass to the action of heat, when it gradually becomes converted into a red crys-

talline oxide, which assumes a bright red colour when finely powdered, and when heated becomes nearly black, but regains its former hue as it cools. It has a slightly-metallic taste, and is very sparingly soluble in water: it consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	92·12
Oxygen	2	16	7·88
Binoxide of Mercury	1	216	100·00

This oxide, formerly called *red precipitate per se*, or *calcined mercury*, is not calculated to fulfil any indication which cannot be attained by other mercurials, and is liable to act virulently upon the stomach and bowels, sometimes in doses of a single grain.

As an escharotic and stimulant application to sores, it is sometimes employed, as being milder in effect than the nitrico-oxide, and in the same way. For these purposes it should be reduced to the finest state of powder, and either sprinkled in substance upon the diseased surface, or applied in the form of ointment, or diffused through water thickened with a little mucilage of gum arabic.

Nitric Oxide of Mercury. — Take of Mercury, three pounds; Nitric Acid, a pound and a half; distilled Water, two pints. Mix them in a proper vessel (a cast-iron pot), and apply a gentle heat till the mercury is dissolved. Boil down the solution, and rub what remains into powder. Put this into a shallow vessel; then apply a gentle heat, and gradually increase it till red vapour ceases to escape.

Note. — *Nitric Oxide of Mercury.* — On the application of heat it emits no nitric vapours. Neither lime-water, nor hydrosulphuric acid, being added, throw down anything from water in which it has been boiled or washed. In other respects it resembles the preceding (*Hydrargyri binoxidum*).

If nitric vapour arise on heating this preparation, it indicates the presence of nitric acid, which should have been previously expelled: if nitrate of mercury is present, it is precipitated by lime-water or by hydrosulphuric acid from the water in which the nitric oxide has been boiled. 100 pounds of mercury with 48 pounds of nitric acid (sp. grav. 1·48) yield 112 pounds of nitric-oxide of mercury. Here 3 pounds of nitric acid must have remained in combination with the oxide.

Nitrico-oxide of mercury (*red precipitated mercury*, or *simply red precipitate*), is of a brilliant red colour, with a shade of orange; when not in very fine powder it has a glistening scaly appearance; at a red heat it is decomposed and entirely dissipated, provided it be not adulterated, as it sometimes is with red-lead; it has an acrid taste, is very sparingly soluble in water, and readily soluble, without effervescence, in nitric acid. The proportion of subpernitrate of mercury remaining in this preparation is variable; but some is always to be detected, for when decomposed by heat, the evolved oxygen is found to be mixed with a portion of nitrogen; it therefore should not be used as a substitute for pure peroxide of mercury. When washed with and triturated in a dilute solution of potassa, edulcorated with distilled water, and carefully dried, it may be

regarded as a nearly pure peroxide of mercury. In this state it is called *Arcanum Corallinum* in some of the older Pharmacopœiæ.

Medical Uses.—Nitrico-oxide of mercury is only employed as an external application, either alone, finely levigated, or mixed with ointment. Sprinkled upon the surface of old or indolent sores, it not unfrequently stimulates them to more healthy action; sometimes it irritates, and may then be diluted with two or three parts of starch, or other inert matter. It is sometimes used as an escharotic mixed with powdered savine, burnt alum, and various stimulants; and mixed with eight or ten parts of finely-powdered sugar, is one of the remedies which some oculists direct to be blown upon the eye for the removal of specks in the cornea.

Ointment of Nitric Oxide of Mercury. — Take of Nitric Oxide of Mercury, an ounce; White Wax, two ounces; Lard, six ounces. To the wax and lard melted together add the nitrico-oxide of mercury, rubbed into a very fine powder, and mix.

This ointment undergoes decomposition by keeping; it changes from red to gray. It is astimulant, and, independently of its application to indolent ulcers and excoriations, is of use in conjunctival inflammation and opacity in the cornea. The utmost attention should be paid to the levigation of the nitrico-oxide. It is generally applied upon a piece of lint, of the size of the sore, covered by another piece spread with spermaceti ointment.

Chloride of Mercury (*Calomel*). — Take of Mercury, four pounds; Sulphuric Acid, three pounds; Chloride of Sodium, a pound and a half; Distilled Water, as much as may be sufficient. Boil two pounds of the mercury with the sulphuric acid, in a proper vessel, till dry bipersulphate of mercury remains; when this is cold rub it in an earthenware mortar with two pounds of mercury, so that they may be well mixed. Then add the chloride of sodium, and rub them together till globules can no longer be discerned; then sublime. Rub the sublimate into a very fine powder, and wash it thoroughly with boiling distilled water, and dry it.

Note. — *Chloride of Mercury.* — A whitish powder, which, on the addition of potassa, blackens, and heat being applied runs into globules of mercury. It is also entirely vaporised by heat. On the addition of nitrate of silver, or lime-water, or hydrosulphuric acid, to water in which it (the chloride of mercury), has been either washed or boiled, nothing is thrown down.

Tests.—When chloride of mercury is decomposed by potassa, chloride of potassium and protoxide of mercury are the results; the latter is blackish, and when heated, evolves oxygen, and is reduced to the metallic state. When pure, chloride of mercury is entirely volatilised by heat, and is perfectly insoluble in boiling water; so that if the above-mentioned tests afford any precipitate or even discoloration in water that has been boiled upon it, and afterwards carefully filtered off, the presence of bichloride of mercury, or other impurities, is indicated; the nitrate of silver would in that case throw down a white precipitate of chloride of silver; the lime-water would produce a yellowish precipitate, and the hydrosulphuric acid a black one. Iodide of potassium produces at first a grayish, afterwards a greenish-yellow precipitate (iodide of mercury).

The term *Hydrargyri Chloridum* is now substituted for the

improper one of *Hydrargyri Submurias*, which was formerly applied to this compound, so well known under the name of *Calomel*. It is a protochloride of mercury, and consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	84·6
Chlorine	1	36	15·4
Protochloride of Mercury	1	236	100·0

In the process for its preparation, a *persulphate of mercury* (that is, a sulphate of the peroxide of mercury, composed of 2 atoms of sulphuric acid and 1 atom of peroxide of mercury) is first formed by boiling two pounds of the metal with three pounds of sulphuric acid, to dryness. This process may be performed in the large way, in a cast-iron vessel, which should be properly arranged for the escape of the sulphurous acid developed by the action of the mercury, and which may be got rid of by suffering it to pass through a long flue and lofty chimney, mixed with abundance of coal smoke. The *persulphate* of mercury is then triturated with a sufficient quantity of metallic mercury to convert it into a *protosulphate*, and lastly mixed with a due proportion of common salt, and subjected to sublimation.

The directions in the Pharmacopœia for the sublimation, levigation, and washing of calomel are insufficient; but this is not a matter of much importance, as it is only made by the wholesale chemist or manufacturer, and when procured from a respectable source, is always pure and well prepared. It varies considerably in appearance with the temperature at which it is sublimed, and the rapidity with which its vapour is condensed. If slowly sublimed into a small condenser, it is often in the form of a corneous mass, or fibrous crystalline cake, which, when scratched, exhibits a peculiar buff-coloured streak, and its surface frequently is covered with brilliant prismatic crytals. When it is rapidly condensed in a capacious receiver, it is in the form of a white powder. Calomel should be perfectly tasteless, inodorous, and insoluble in water. Its specific gravity is about 7·2. At a heat somewhat below redness, it rises in vapour, and fuses when subjected to a higher heat and pressure. When rubbed in the dark, it is phosphorescent. It is decomposed by the fixed alkalis, and by ammonia, and protoxide of mercury is one of the results. When thus decomposed by *lime-water*, it yields, as above stated (page 236), a black oxide, and the mixture is often employed under the name of *black wash*, as an application to venereal and other sores.

It is generally stated that calomel is discoloured by long exposure to light, but Mr. Brande kept it hermetically sealed in a glass tube, without undergoing any such change, so that the contact of air or its impurities is probably concerned in its change of hue.

Beguin, in 1608, is the first European author who describes calomel; he calls it *draco mitigatus;* corrosive sublimate having

been known to the alchymists under the name of "the dragon." It appears, however, from Mr. Hatchett's experiments and observations on the calomel of Thibet, published in *Nicholson's Journal* for June, 1803, that this substance had long been known to, and prepared by, the natives of Upper India. Among other names given to calomel by the older pharmaceutical chemists are *aquila alba*, *panchymagogum minerale*, *panacea mercurialis*, *manna metallorum*, and *sublimatum dulce*. It was once customary to give it various names according as it had been more or less frequently sublimed, but it is now known that these repeated sublimations, so far from dulcifying, as was supposed, the product, tend rather to the decomposition of a part of it, and to the formation of perchloride of mercury.

Much difference of opinion exists respecting the etymology of the word *calomel*, or *calomelas*, a name which is stated to have been conferred upon it by Sir Theodore Mayerne, and to be derived from καλος, and μελας, *white*, and *black*, perhaps because a white sublimate is obtained from a black powder; for the old method of preparing it consisted in triturating corrosive sublimate with metallic mercury, till the mixture was reduced to the state of an uniform dark-gray powder, which, by sublimation, yielded calomel. Others say that Sir Theodore named it in honour of his favourite black servant; and others, that it was called calomel as being a *good* remedy for *black* bile.

Chloride of mercury, or *calomel*, is sometimes used as an antisyphilitic, more especially combined with opium, when it salivates without purging. Its chief use, however, is as a purge, conjoined with other aperients, and as an alterative: for the former purpose it is administered in doses of five to ten grains, with jalap, senna, cathartic extract, scammony, rhubarb, or other laxatives. A customary form is four or five grains of calomel, in a pill, at night; and a draught of infusion of senna, with some saline aperient, early in the morning: for this purpose the common *black dose* is an effective prescription, of which the following is one of the usual forms: —

℞ Magnesiæ Sulphatis ℥iij.; Infus. Sennæ compos. f℥xiv.; Tincturæ Sennæ f℥ij.; Olei Menthæ Piper. ♏ij. M. fiat haustus laxans. The senna tincture may be omitted without loss, and infusion of Serpentaria, half an ounce, substituted for it.

This is generally followed by two or three bilious motions.

Purgative doses of calomel have long been resorted to as anthelmintics, but mercury has no specific action upon intestinal worms, and if effectual, it operates merely as a purge. In this way it is, however, often effective, especially if conjoined with gamboge, scammony, or jalap. I have frequently used it with success, combined with the hydrated sesquioxide of iron; say five grains of calomel and twenty of the sesquioxide, with a little ginger or cinnamon powder, to be followed by castor oil.

As an alterative, calomel is used in chronic hepatitis, and various glandular diseases, and in some cutaneous affections; although, in

many cases of this nature, the blue pill is preferred as less apt to irritate the bowels. Combined with diuretics, calomel singularly contributes to their activity; hence its use in dropsies, united with squills and digitalis, or with hydragogue purgatives, such as elaterium and jalap; and when conjoined with antimonials, it determines their diaphoretic action. In these cases, calomel acts as a dirigent, the usual dose being from a quarter of a grain to two grains, night and morning, modifying it, and that of the medicines combined with it, according to circumstances. Purgatives, including calomel, are also very effectual in a variety of febrile disorders; and in typhoid fevers, calomel, especially in connection with antimony, sometimes effects a surprising amelioration of the symptoms, especially when the mouth is slightly affected. Calomel, or blue pill, and sulphate of quinia, form a good combination in congestive fevers. In febrile affections of children, symptomatic of a disturbed state of stomach and bowels, purges of calomel and rhubarb are almost always effectual in affording relief; they usually bring away a large quantity of offensive mucus from the bowels; and where this is the case, they should be repeated in intervals of two or three days, till the motions assume a more healthy aspect; but calomel purges are not to be indiscriminately and unnecessarily given to children, as they often are. Calomel in fractional doses, as an eighth, or a tenth, or twelfth of a grain, with a little gum arabic, is one of the most approved and useful remedies against cholera infantum.

In epilepsy, tetanus, and other convulsive disorders, a combination of opium and calomel is an efficacious antispasmodic; and, by some, direct sedative effects have been ascribed to it when given in large doses. In yellow fever and hydrocephalus, four or five grains have been given every two or three hours, till salivary irritation has been induced. In croup and bronchitis calomel is a valuable secondary remedy.

In cutaneous affections, in some forms of venereal eruptions, in chronic rheumatism, a compound of calomel and sulphuret of antimony is sometimes employed, under the name of *Plummer's Pill;* or the following substitute for it, which has a place in the *London Pharmacopœia:*—

Compound Pills of Chloride of Mercury. — Take of Chloride of Mercury, Oxysulphuret of Antimony, of each, two drachms; Resin of Guaiacum, powdered, half an ounce; Melasses, two drachms. Rub the chloride of mercury with the oxysulphuret of antimony, then with the resin of guaiacum, and the melasses, that it may form a mass.

The following are formulæ illustrative of some of the applications of calomel: —

1. Purgative.

1. ℞ Extracti Colocynthidis compos. ʒss.; Pil. Aloes c. Myrrhâ ʒj.; Hydraryri Chloridi ʒss. Misce optime et divide in pilulas xxiv. Sumantur duæ pro dosi.

This is a good form of purging pill, taken at night, and followed up in the morning by an aperient draught. But it often happens

that calomel, either alone, or with cathartic extract, produces nausea and vomiting, either in the course of the night or the following morning, an effect which is frequently prevented by the addition of a little opium; in such cases the following pills must be substituted for the above: —

2. ℞ Hydrargyri Chloridi gr. iv.; Opii crudi gr. ss.; Caryophilli pulver. gr. iij. Misce et divide in pilul. ij. hora somni sumendus.

3. ℞ Hydrargyri Chloridi grana x.; Scammon. pulver., Jalap. pulv., āā ℈j.; Sacchari albi ℈ij. Misce et divide in partes decem æquales.

The preceding powders are a useful calomel purge for children, each containing one grain of calomel, two of scammony, and two of jalap; this dose may be given in a small teaspoonful of gruel, or in a little raspberry jam.

2. Diuretic.

1. ℞ Pilul. Scillæ compos. ℥j.; Hydrarg. Chloridi grana v. Misce et divide in pilulas xx. quarum sumantur duæ singulis noctibus.

2. ℞ Folior. Digitalis pulver. gr. ss.; Scillæ pulver. gran. j.; Hydrargyr. Chloridi gr. ss.; Confect. Rosæ Gall. q. s. Ut fiat pilula semel vel bis die sumenda, superbibendo haustum sequentem.

3. ℞ Potassæ Carbonatis ℈j.; Succi Limonis f℥ss.; Misturæ Camphor. f℥j.; Spt. Ætheris Nitrici f℥j.; Syrupi Zingiberis f℥ss. Misce.

3. Diaphoretic.

1. ℞ Hydrargyri Chloridi gr. ss.; Pulv. Ipecacuanhæ compos. gr. x. Misce: fiat pulvis hora somni sumendus.

2. ℞ Hydrargyri Chloridi, Antimonii Potassio-tartratis, āā gran. iij.; Sacchari grana ℥ss. Misce accuratissime et divide in partes sex æquales, quarum sumatur una hora somni.

These formulæ must be accompanied by other diaphoretic treatment, such as hot water-gruel, or barley-water, taken with them at bed-time; sufficiency of bed-clothes; and occasionally a draught composed of saline diaphoretics, with camphor.

Bichloride of Mercury (*Corrosive Sublimate*). — Take of Mercury, two pounds; Sulphuric Acid, three pounds; Chloride of Sodium, a pound and a half. Boil the mercury with the sulphuric acid in a proper vessel till dry bipersulphate of mercury remains; when this has cooled, rub it with the chloride of sodium in an earthenware mortar; then sublime by a gradually increased heat.

Note. — *Bichloride of Mercury* (*crystallised.*) — It fuses, and is sublimed by heat. It is entirely soluble in water, and in sulphuric ether. That which is thrown down from this solution by potassa or lime-water becomes red, or, if a sufficient quantity be added, it is yellow; this, by heat, emits oxygen, and runs into globules of mercury.

If not entirely volatile, some impurity is present; if it contain chloride of mercury, it is not entirely soluble in water. The yellow precipitate thrown down by potassa is hydrated binoxide of mercury, which, when heated in a retort, is resolved into oxygen and metallic mercury, and is totally vaporisible by heat.

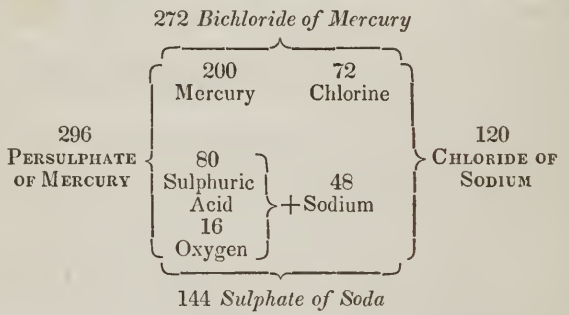
The term *hydrargyri Bichloridum* is now substituted for *Hydrargyi Oxymurias; Corrosive Sublimate*, or *Mercurius corrosivus Sublimatus*, is perhaps a better pharmaceutical denomination for this compound. It consists of —

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	73·5
Chlorine	2	72	26·5
Bichloride of Mercury	1	272	100·0

In this, as in the process for the production of calomel, the first step consists in the formation of a persulphate of mercury, by boiling the metal with sulphuric acid. During this operation, part of the acid is decomposed and deoxidised by the mercury, its water is evaporated, sulphurous acid is evolved, and the peroxide of mercury which is formed combines with the remaining anhydrous sulphuric acid to form a dry sulphate of peroxide of mercury, composed of—

	Atoms.	Equivalents.	Per Cent.
Peroxide of Mercury	1	216	73
Sulphuric Acid	2	80	27
Persulphate of Mercury	1	296	100

This is then mixed with 2 atoms of chloride of sodium, and on the application of heat in a proper subliming vessel, mutual decomposition ensues, attended by the formation of 1 atom of bichloride of mercury, which rises in vapour, and 2 atoms of sulphate of soda, which is the residue, as shown in the following diagram:—



The persulphate of mercury is generally prepared upon a large scale, by heating the acid and metal in an iron pot, as described in reference to the preparation of chloride of mercury, and similar means may be adopted to carry off the fumes of sulphurous acid arising from the decomposition of a portion of the sulphuric acid, during the peroxidizement of the mercury. The whole is then evaporated to dryness, and the subsequent sublimation performed in glass, earthenware, or iron vessels, their form and arrangement being dependent upon the quantity of materials employed.

Properties and Tests. Bichloride of mercury has an acrid nauseous taste, leaving a permanent metallic and astringent flavour upon the tongue. Its specific gravity is 5·2. It is usually met with in the form of white semitransparent and imperfectly crystallised masses. It is soluble in twenty parts of water at 60°, and boiling water takes up about one-third its weight: alcohol at 60°

dissolves half its weight, and ether about one-third its weight. When heated, it sublimes in the form of a dense white vapour, powerfully affecting the nose and mouth. With caustic potassa an alkaline chloride is formed, and metallic mercury is sublimed and condensed in the form of globules on the sides of the tubes. It dissolves without decomposition in hydrochloric acid, but is insoluble in concentrated nitric and sulphuric acids. Hydrochloric acid of the specific gravity 1·158, at 60° dissolves about its own weight, and the solution, when cooled to about 40°, concretes into a mass of acicular crystals. When solutions of *potassa*, *soda*, or *lime*, are mixed with solution of bichloride of mercury, a yellow precipitate falls, which is hydrated peroxide of mercury. The alkaline carbonate throws down a brick-dust coloured sediment; the bicarbonate a white one. Such a mixture of eight ounces of lime-water, with half a drachm of the bichloride, was formerly used as an application to venereal ulcers, under the name of *Aqua Phagedænica*. It is, in fact, a solution of chloride of calcium mixed with peroxide of mercury, *two* atoms of lime being required for the decomposition of *one* atom of the bichloride. When solution of bichloride of mercury is decomposed by *ammonia*, the result is not peroxide of mercury, but a white precipitate, the *Hydrargyri Ammonio-Chloridum* of the Pharmacopœia. *Iodide of potassium* occasions a scarlet precipitate of the biniodide of mercury.

Protochloride of tin occasions, with bichloride of mercury, a white precipitate of calomel, while perchloride of tin remains in solution. Very shortly this protochloride of mercury is converted into reguline mercury, which falls down in a finely-divided state as a grayish powder. *Hydrosulphuric acid* (*sulphuretted hydrogen gas*) in excess passed through a solution of bichloride of mercury, occasions a black precipitate of the bisulphuret of mercury: a solution of hydrochloric acid is formed. If the hydrosulphuric acid be not in excess, a white precipitate of the *chlorosulphuret of mercury* is obtained, and which consists of two atoms of bisulphuret of mercury and one of the bichloride.

Ferryocyanide of potassium causes a white precipitate (ferrocyanide of mercury). *Albumen* is another test for corrosive sublimate, though not one of much value, since it will produce the same white precipitate, with many other substances.

Galvanism furnishes a good aid for the detection of corrosive sublimate. Drop the solution on a piece of gold, as one of our coins, and apply a key, so that it may touch simultaneously the gold and the solution, which is done by applying the barrel of the key to the edge of the coin whilst it touches the solution on its surface; an electric current is immediately produced, the bichloride is decomposed, the mercury attaches itself to the negative electrode (or pole) to form chloride of iron. The silver stain left on the gold is readily removed by heat. In Dr. Christison's work will be found other methods of applying galvanism; but the one just mentioned is perhaps the most useful, since it can always be

readily made use of; whereas a more complicated apparatus is found in the hands of a few persons only. Thus it might be applied at a moment's notice to detect corrosive sublimate in the matters vomited by a patient. — (*Pereira.*)

The relative delicacy of some of these tests is thus stated by Devergie (*Med. Leg.* II. 676) :—

	Degrees of Dilution.
Ferryocyanide of potassium . . . Stops at .	1,500
Lime-water	4,000
Potassa or its carbonate	7,000
Iodide of potassium	8,000
Ammonia	36,000
Hydrosulphuric acid, or hydrosulphate of ammonia .	60,000
Protochloride of Tin or galvanic pile	80,000

Hydrochlorate of ammonia considerably increases the solubility of the bichloride of mercury, 1 part rendering 5 parts soluble in rather less than 5 of water. Such solutions are occasionally useful for the internal exhibition of this bichloride. Boerhaave's solution had a place in the *Edinburgh Pharmacopœia* of the year 1783; it was as follows:—

℞ Mercurii Sublimati Corrosivi gr. vj.; Salis Ammoniaci gr. xij. Solve in Aquæ destillatæ, libra una.

The solubility of bichloride of mercury is also increased by common salt. A solution composed of 7 parts of salt and 20 of water, dissolves 32 parts of the bichloride; it deposits rhamboidal crystals, probably composed of 1 atom of each of the chlorides.

Bichloride of mercury is decomposed by several of the metals: they generally abstract half the chlorine, and convert it into protochloride.

Solution of Bichloride of Mercury. — Take of Bichloride of Mercury, Hydrochlorate of Ammonia, of each, ten grains; Distilled Water, a pint. Dissolve the bichloride of mercury and the hydrochlorate of ammonia together in the water.

This solution furnishes a convenient means of subdividing bichloride of mercury into small doses for internal use; each fluid ounce contains half a grain, and each fluid drachm one-sixteenth of a grain, of the bichloride; the solution is permanent, and not easily changed or decomposed by any of the vehicles in which it is commonly administered.

Medical Uses. — Bichloride of mercury, or corrosive sublimate, was formerly more employed, as an internal remedy, than at present. If given incautiously, it is apt to bring on dyspeptic symptoms, attended by pains of the stomach, and diarrhœa: these effects are remedied by opium; and such a combination is sometimes employed to excite salivation. Some difference of opinion has, however, arisen as to its antisyphilitic powers, and it is now never exclusively selected for the cure of the venereal disease; but it is frequently an effectual adjunct to other mercurials, in the treatment of the flying pains and cutaneous eruptions which attend some forms of that disease. At one time it was largely used. Thus

Van Swieten, in his *Commentaries*, tells us that, in a period of eight years, 4880 patients were cured by this remedy at St. Mark's hospital, Vienna, without any person having died or experienced any painful or dangerous symptom from its use. But the prescriber, Maximilian Locker, was very cautious and careful in its employment, and always desisted from its use on the first appearance of salivation. Dryonde of Halle has revived the practice.

The dose at the commencement should not exceed from one-sixteenth to one-eighth of a grain, and it is best administered in solution:—

℞ Liq. Hydr. Bichloridi f℥j.; Aquæ Pimentæ f℥j. Misce fiat haustus bis die sumendus.

To the above, a few drops of the tincture of opium may be added, if the state of the bowels renders it necessary.

In conjunction with cinchona, sarsaparilla, and other vegetable decoctions and infusions, bichloride of mercury is given as an alterative: and though sometimes more or less decomposed in these compounds, it remains an effective mercurial.

Applied externally, bichloride of mercury acts as a powerful stimulant; but its solubility enables it to be used in any state of dilution. It is sometimes employed for the relief of cutaneous eruptions, but is very apt to irritate; dissolved in bitter-almond milk it forms the basis of *Gowland's Lotion*, which is probably rendered more bland in its operation, by the presence of vegetable albumen. If used in ointment, care should be taken to insure its complete division and mixture, by triturating it with its weight of hydrochlorate of ammonia, adding a little water, and then gradually rubbing it up with purified lard or spermaceti ointment.

The poisonous effects of this mercurial salt on animals are the same with those observed on man, and are briefly stated by Dr. Christison in the following terms: "Corrosive sublimate causes, when swallowed, corrosion of the stomach; and in whatever way it obtains entrance into the body, irritation of that organ and of the rectum, inflammation of the lungs, depressed action, and perhaps also inflammation of the heart, oppression of the functions of the brain, and inflammation of the salivary glands." Pereira adds, that mercurial fetor and salivation have been observed in horses, dogs, and rabbits.

Antidote.—Several substances which decompose corrosive sublimate have been employed as antidotes. The chief are *albumen, gluten of wheat* (as contained in flour), *milk*, and *iron filings. Meconic acid* may be mentioned on this list, as an affair of curiosity, but not of use. Thenard, the celebrated chemist, swallowed inadvertently a concentrated solution of corrosive sublimate, but by the immediate use of whites of eggs suffered no material harm. Peschier states, that one egg is required for every four grains of the poison.

Corrosive sublimate, with the occasional addition of white arsenic, is effective in the destruction of bugs. The bedsteads

should be taken to pieces, and every joint and crevice anointed and brushed over with the following solution of ointment :—

Dissolve one ounce of Corrosive Sublimate in a pint of rectified Spirit of Wine, and add four ounces of Linseed Oil, and four ounces of Oil of Turpentine. Reduce one ounce of Corrosive Sublimate and one of White Arsenic to a fine powder; mix it with one ounce of Sal-Ammoniac in powder, two ounces of Oil of Turpentine, two ounces of Yellow Wax, and eight ounces of Olive Oil: put these ingredients into a gallipot placed in a pan of boiling water, and when the wax is liquefied, stir the whole in a mortar till cold.

To prevent accidents, the above compositions should be distinctly labelled—Bug Poison.

Ammonio-Chloride (*White Precipitate*) *of Mercury.* — Take of Bichloride of Mercury, six ounces; Distilled Water, six pints; Solution of Ammonia, eight ounces. Dissolve the bichloride of mercury, by the aid of heat, in water. To this, when it has cooled, add the solution of ammonia, occasionally stirring. Wash the precipitated powder till it is tasteless; lastly, dry it.

Note. — *Ammonio-Chloride of Mercury.* — By heat it is entirely vaporised. When digested with acetic acid, nothing either yellow or blue is thrown down on the addition of iodide of potassium. Its powder when triturated with lime-water does not blacken. It is perfectly soluble in hydrochloric acid without effervescence. When heated with solution of potassa, it exhales ammonia, and acquires a yellow colour.

Tests.—To this *Note* Mr. Phillips adds the following *Remarks:* "If it contain any fixed impurity it would not evaporate by heat. The nonproduction of yellow or blue colour by iodide of potassium in the acetic solution shows it contains neither oxide of lead nor starch, for this oxide would yield a yellow iodide of lead, and the starch would give a blue precipitate. If lime-water imparted blackness to it, it would indicate the presence of protoxide (protochloride?) of mercury. If it dissolve without effervescence in hydrochloric acid, no carbonate of lime or other carbonate has been mixed with it. There is no other white substance which when heated with potash, yields ammonia and becomes yellow."

According to Professor Kane (*Trans. Royal Irish Acad.* xvii.), this compound, commonly known under the name of *white precipitate of mercury*, is composed of 2 atoms of bichloride of mercury, 2 atoms of ammonia, and 1 atom of peroxide of mercury. Mr. Phillips considers it as containing 1 atom of peroxide of mercury, 1 atom of bichloride of mercury, and 2 atoms of ammonia.

This *ammonio-chloride* is an insipid white powder, insoluble in water, but soluble in sulphuric, nitric, and hydrochloric acid; it is limited to external use, and employed either alone or mixed with a little powdered starch, to destroy vermin, which it effects without much cuticular irritation. The following ointment is also employed for the same purpose, and for the cure of the itch and herpetic eruptions: it is also used in psorophthalmia and other affections of the eyelids.

Ointment of Ammonio-Chloride of Mercury. — Take of Ammonio-Chloride of Mercury, a drachm; Lard, an ounce and a half. To the lard, melted over a gentle fire, add the ammonio-chloride of mercury, and mix.

The white precipitate is largely adulterated with sulphate of lime, and, also, sometimes with carbonate of lime and of lead.

Iodide (or *protoiodide*) *of Mercury.*—Take of Mercury, an ounce; Iodine, five drachms; Alcohol, as much as may be sufficient. Rub together the mercury and iodine, alcohol being gradually added till globules can no longer be seen. Dry the powder immediately by a gentle heat, access of light being excluded, and keep it in a well-stopped vessel.

Note. — *Iodide of Mercury.* — Recent, it is yellowish; heat being carefully applied, it sublimes in red crystals which soon become yellow, and then, light being admitted, they blacken. It is not soluble in chloride of sodium.

Pills of Iodide of Mercury. — Take of Iodide of Mercury, a drachm; Confection of Dog-Rose, three drachms; Ginger, powdered, a drachm. Pound them together till incorporated.

Biniodide of Mercury. — Take of Mercury, an ounce; Iodine, ten drachms; Alcohol, as much as may be sufficient. Rub together the mercury and the iodine, alcohol being gradually added, till globules are no longer visible. Dry the powder by a gentle heat, and keep it in a well-stopped vessel.

Note. — *Biniodide of Mercury.* — Heat being cautiously applied, it sublimes in scales which soon become yellow, and when they have cooled, redden. A portion is soluble in boiling rectified spirit, which, on cooling, is deposited in crystals. By iodide of potassium and bichloride of mercury it is alternately dissolved and precipitated. It is totally soluble in chloride of sodium.

Ointment of Iodide of Mercury. — *Ointment of Biniodide of Mercury.* — These are prepared in the same way as the *Ointment of Nitrico-Oxide of Mercury.*

The above iodides of mercury and their preparations are now, for the first time, introduced into the Pharmacopœia.

The iodide or protiodide of mercury is composed of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	61·5
Iodine	1	125	38·5
Protiodide of Mercury	1	325	100·0

The biniodide or periodide consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	44·5
Iodine	2	250	55·5
Biniodide of Mercury	1	450	100·0

These iodides are powerful alteratives, and partake, in their therapeutic effects, of the properties of both their constituents. They have been used with success in the treatment of scrofula, and of scrofulous and indolent tumours, and in the cure of syphilis in scrofulous habits: they generally affect the mouth more speedily than other mercurials. They are most conveniently administered in the form of pills, or dissolved in alcohol or ether, and in the dose of from one-tenth of a grain to a quarter or half a grain twice or thrice a day. As alteratives, in the case of secondary syphilitic symptoms, and in the treatment of diseased bone and periosteum, they are most effectually given in conjunction with iodide of potassium; they require, however, the utmost circumspection in their use.

The ointment of either iodide is applied to ulcers and ill-conditioned sores, and is sometimes successfully rubbed in upon tumours and swelled joints where the object is to promote the action of the absorbents of the part; also as a stimulant to the nerves, or on the ophthalmic branch of the fifth for amaurosis.

The *Bicyanide* or *Cyanuret* of *Mercury* consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	79·25
Cyanogen	2	52	20·75
Bicyanide of Mercury	1	252	100·00

Bicyanide of mercury forms prismatic crystals of a metallic taste and very poisonous; they are much more soluble in hot than in cold water, and very sparingly soluble in alcohol. When heated, cyanogen is evolved.

It has been given in doses of from *one-sixteenth* to *one-eighth of a grain*, as a mercurial alterative: it is, however, rarely employed, and its chief use is as a source of hydrocyanic acid.

Bisulphuret of Mercury.—When in mass, it is of a gray colour, and somewhat metallic lustre, but when powdered, and especially when levigated, it acquires a brilliant red hue; it is commonly known under the names of *cinnabar*, and *minium*, and, when in powder, of *vermilion*, and consists of—

	Atoms.	Equivalents.	Per Cent.
Mercury	1	200	86·2
Sulphur	2	32	13·8
Bisulphuret of Mercury	1	232	100·0

Cinnabar is inodorous and tasteless, and unchanged by air and water. When heated to dull redness in the air, sulphurous acid is formed and mercury evaporates. The only use to which it is applied in pharmacy, is for mercurial fumigation, but the sulphurous acid at the same time produced is sometimes objectionable, so that the protoxide of mercury is preferably employed. It was formerly given as an alterative and deobstruent, especially in cutaneous diseases and in chronic rheumatism; but, according to Orfila, it is perfectly inert. It forms an ingredient in certain nostrums for gout, rheumatism, and the bites of rabid animals; and according to Dr. Paris, to whom we are indebted for exposing the composition of several quack remedies, it is the leading ingredient in *Chamberlain's Restorative Pills; "The most certain cure for the scrofula or king's evil, fistula, scurvy, and all impurities of the blood."*

Sulphuret of Mercury with Sulphur.—Take of Mercury, Sulphur, of each, a pound. Rub them together till globules are no longer visible.

Note.—*Sulphuret of Mercury with Sulphur* (*black*).—By heat it is entirely vaporised, no carbon or phosphate of lime remaining.

Sulphuret of Mercury with Sulphur.—This is the *Æthiops Mineralis* and *Black Sulphuret of Mercury* of former Pharmacopœiæ, but the only true protosulphuret of mercury (composed of 200 mercury and 16 sulphur) is obtained by passing sulphuretted hydrogen through a dilute solution of protonitrate of mercury.

The *hydrargyri sulphuretum cum sulphure* consists of about 42 sulphur and 58 bisulphuret of mercury. In regard to its medi-

cinal employment, it is an inert and useless remedy. From *five* to *thirty grains* have been prescribed as an alterative, and certain obstinate cutaneous affections are said to have yielded to its powers. Some have recommended it in scrofulous affections of the glands, and others have ascribed to it peculiar sedative powers; in consequence of its mild and slow operation, it has been especially selected for children; its efficacy is, however, so doubtful, that scarcely any practitioner employs it with confidence, and it might have been rejected from the Pharmacopœia.

Stronger Ointment of Mercury. — Take of Mercury, two pounds; Lard, twenty-three ounces; Suet, an ounce. Rub the mercury first with the suet and a little of the lard, till globules can no longer be discerned; then add the remainder of the lard, and mix.

It is generally supposed that in this ointment, as in the mercurial pill, the mercury is only in a highly divided state, and not oxydized. Mr. Donovan, however, has adopted a contrary opinion, and has suggested the use of the protoxide instead of metallic mercury in its preparation (*Annals of Philosophy*, November, 1819). Rancid lard, turpentine, and some other substances, are occasionally, but improperly, employed in this preparation, to facilitate the mixture of the mercury. In warm weather, especially, it is extremely difficult to incorporate the materials; but any of the above additions are apt to render the ointment irritating, and induce an eruption of small pimples, which interfere with the continuance of the mercurial friction. The apparatus mentioned under the article *Pilula Hydrargyri*, is very successfully employed in the formation of this ointment.

In cases requiring the introduction of mercury into the system through the medium of the superficial absorbents, from one to two drachms of the above ointment may be rubbed in every night, upon the inside of the thighs and upon the calves of the legs: its consequences must be carefully watched, and the quantity and repetition of the friction adjusted according to the salivation or other effects which are produced. The inunction should, if possible, be performed by the patient himself, in a warm room or before the fire, till the ointment nearly disappears; and in case of irritation or eruption upon the skin, the place of friction should be varied. If the ointment fails of producing the desired effect, two or three grains of camphor added to each drachm will sometimes excite the absorbents to its reception. Mercurial frictions are chiefly prescribed in the venereal disease, in obstinate hepatic obstructions, in chronic rheumatism of the joints, neuralgia, and in some dropsical affections with a view to the general excitement of the absorbent system. A slight course of mercurial inunction is also sometimes resorted to in conjunction with alterative remedies, especially in those cases where sarsaparilla is prescribed.

Milder Ointment of Mercury. — Take of stronger Ointment of Mercury, a pound; Lard, two pounds. Mix.

This is an unnecessary formula, for, although it is often required

to dilute the stronger ointment, the extent and nature of the dilution must vary.

Syphilitic and other sores are occasionally dressed with these ointments: they have also been administered internally, the stronger ointment being given in the dose of from two to five grains, made into a pill with powdered liquorice root, or other inert adjunct; it is said that half a drachm of the ointment thus given in the course of twenty-four hours, will excite salivation; if this be the case, it may be useful where the system is not easily affected by other mercurials.

Compound Liniment of Mercury. — Take of stronger Mercurial Ointment, Lard, of each, four ounces; Camphor, an ounce; Rectified Spirit, a fluidrachm; Solution of Ammonia, four fluid ounces. First rub the Camphor with the spirit, then with the lard and ointment of mercury; lastly, gradually dropping in the solution of ammonia, mix them all.

This is a good stimulating liniment in chronic tumours and affections of the joints, where the object is to excite the action of the absorbents. In its employment, its occasional tendency to excite salivation must not be overlooked.

Ointment of Nitrate of Mercury. — Take of Mercury, an ounce; Nitric Acid, eleven fluidrachms; Lard, six ounces; Olive Oil, four fluid ounces. First dissolve the mercury in the acid; then, whilst the solution is still hot, mix the oil and the lard melted together.

This ointment, when prepared according to the above formula, is apt to become hard and brittle, in consequence of the action of the acid upon the lard; a preferable compound is obtained when only half the quantity of lard is employed. It is a stimulating ointment, very effective in many cutaneous diseases, and often usefully applied to indolent sores. When diluted with spermaceti ointment, or lard, they should be carefully liquefied in a water bath. It is a good remedy in purulent ophthalmia, and in the treatment of ulcerated eyelids, to which it should be carefully applied by a camel-hair pencil.

Plaster of Mercury. — Take of Mercury, three ounces; Plaster of Lead, a pound; Olive Oil, a fluidrachm; Sulphur, eight grains. To the oil, heated, gradually add the sulphur, constantly stirring with a spatula till they unite; afterwards rub the mercury with them till globules are no longer visible; then gradually add the plaster of lead, melted, over a slow fire, and mix them all.

Plaster of Ammoniacum with Mercury. — Take of Ammoniacum, a pound; Mercury, three ounces; Olive Oil a fluidrachm; Sulphur, eight grains. To the oil, heated, gradually add the sulphur, constantly stirring with a spatula, till they unite; afterwards rub the mercury with them, till globules are no longer visible; lastly, gradually add the ammoniacum, melted, and mix all.

These plasters are occasionally applied to glandular swellings, and to venereal buboes and nodes, when not very painful to the touch; they are also used in hepatic affections applied over the region of the liver, and in analogous visceral engorgements.

Toxicological Remarks.—Poisoning by mercury is by no means uncommon, especially by corrosive sublimate, and by its gradual introduction into the system in consequence of its employment in

some of the arts, and from the mining and metallurgic operations, by which it is obtained from its ores.

Dr. Christison arranges the cases of poisoning by mercury in the human subject under three heads:—In one variety the leading symptoms are those of irritation of the alimentary canal. In another, these are conjoined with salivation, or other disorders incident to what is called mercurial erethism. In a third variety, the irritation of the alimentary canal is wanting, and the symptoms are entirely those of some form of erethism. The first and second varieties are the consequence of large doses of soluble mercurial salts; the third may be caused by any form of mercury.

The symptoms of the first resemble those of arsenical poisoning, but, with regard to corrosive sublimate, they begin sooner, and its taste and acrimony are such, that the sickness, inflammation, and pain during deglutition are much greater, and when the dose is large and not much diluted, it sometimes occasions such tightness and burning in the throat as actually to prevent swallowing. These differences arise from the greater solubility of corrosive sublimate, and its more powerful action upon the animal textures. Dr. Christison also observes, that it is more apt than arsenic to occasion bloody purging and vomiting, and that it more frequently gives rise to urinary irritation, and to nervous affections, during the first stage; and that, "instead of the contracted ghastly countenance observed in cases of poisoning by arsenic, (but which, it will be remembered, is not invariable in that kind of poisoning,) those who are suffering under the primary effects of corrosive sublimate have frequently the countenance much flushed, and even swelled." Lastly, the effects of mercurial poisons are, on the whole, more curable than those of arsenic, and deviations from the ordinary course of the symptoms more rare.

For particular cases, illustrative of these effects of corrosive sublimate, I must refer to Dr. Christison's work, and to the authorities which he has quoted. In respect to the usual duration of this variety of mercurial poison, he observes, that in ordinary cases it is from twenty-four to thirty-six hours; though a few may last three days. In cases of recovery, the symptoms may last very long, but they then often pass into the other variety of this kind of poisoning.

In illustration of the second modification of mercurial poisoning, Dr. Christison cites the following case (from the *Lond. Med. & Phys. Journ.*, XLI., 204). The patient, a stout young girl, swallowed, soon after supper, a drachm of corrosive sublimate, dissolved in beer, and in a few minutes she was found on her knees in great torture. All the primary symptoms of this kind of poisoning were present in their most violent form; burning in the stomach, extending towards the throat and mouth, followed in no long time by violent vomiting of a matter, at first mucous, afterwards bilious and bloody; by purging of a brownish fetid fluid; suppression of urine, and much tenderness of the urethra and bladder; small, contracted, frequent pulse, anxious countenance, and considerable

stupor, interrupted by fits of increased pain. All these symptoms were developed in four hours. Subsequently, the pain in the stomach became much easier, but that in the throat much worse. At length, in the course of the second day, the teeth became loose, the gums tender, the saliva more abundant than natural; profuse ptyalism, and great fetor of the breath ensued, and the patient expired towards the close of the fourth day.

The third variety of mercurial poisoning includes certain secondary or chronic effects, some of which are termed *mercurial erethism* (from ερεθιζειν, *to excite*). It has already been stated that particular habits or constitutions are sometimes remarkably affected by mercury, while others are almost unsusceptible of its usual effects; hence the caution with which, in all cases, mercurial remedies should be watched over. In further illustration of this curious subject, it may be mentioned that two grains of calomel have caused ptyalism, ulceration of the throat, exfoliation of the lower jaw, and death (Dr. Crampton, *Trans. Dub. Coll. Phys.*, iv., 91), and that fifteen grains of blue-pill, taken in three doses, one every night, have excited fatal salivation (Dr. Ramsbottom, *Lond. Med. Gaz.*, i., 755). Three drachms of mercurial ointment, externally applied, have occasioned violent ptyalism and death in eight days (Dr. Christison), and similar effects have resulted from small doses of corrosive sublimate.

The improved methods of treating the venereal disease in modern times, have rendered cases of excessive salivation from the improper continuance of mercury comparatively rare; yet, from the peculiarities just mentioned, and occasionally from carelessness on the part of the practitioner or of the patient, they do occur. In such cases death may ensue from several causes, such as exhaustion from the excessive flow of saliva, or gangrene of the throat or mouth, or laryngeal phthisis. In discussing this subject in a medico-legal point of view, Dr. Christison observes that a preternatural flow of saliva may be derived from other causes than mercury; these it is not necessary here to advert to in detail; among them, we may enumerate certain preparations of gold, copper, antimony, and arsenic; croton oil, iodine, foxglove, and opium; in some cases of common sore throat, too, there is profuse salivation, and when accompanied by ulceration, the fetor of the breath resembles that from mercury. Salivation also forms an idiopathic disease; but, in general, an attentive inquiry into the concomitant symptoms will enable the practitioner to distinguish these from mercurial cases.

Another of the secondary effects of mercury is, that which attacks persons whose business exposes them to the operation of the poison, such as miners, gilders, mirror-silverers, barometer-makers, and some chemical manufacturers, and in whom it produces a species of *shaking palsy*. This disease is usually gradual in its progress, beginning with tremors and convulsions, which generally first attack the arms; loss of memory and great restlessness ensue; the skin is dry and brown, and the pulse slow, and the patient becomes

delirious, and sinks, if not removed from the source of his malady. This disease, if timely attended to, is rarely fatal, unless, indeed, conjoined with salivation.

The miners of Almaden, and of Idria, furnish frequent specimens of this form of mercurial poisoning, especially those who are inattentive to cleanliness; their teeth loosen, the salivary glands swell, and pustular eruptions and tremors ensue. It would, indeed, appear, that exposure to mercurial fumes, for a short time only, may produce such effects. Dr. Christison cites the case of a barometer-maker and one of his workmen, who were exposed one night, during sleep, to the vapours of mercury from a pot on a stove in which a fire had been accidentally kindled; they were both most severely affected, the latter with salivation, which caused the loss of all his teeth, the former with shaking palsy, which lasted his whole life. That mercury at common temperatures emits vapours, is shown by its condensation in the upper ends of barometer-tubes; or by suspending a piece of gold leaf over its surface, which soon becomes amalgamated. A curious example of the effects of mercury, apparently so diffused, occurred on board the ships *Triumph* and *Phipps*, in 1810; they were carrying home a quantity of mercury, when, by some accident, several of the packages burst, and the crews of both vessels were severely salivated; two died; all the copper utensils became amalgamated, and nearly all the animals on board were destroyed. Another case, showing that mercury carried about the person may induce poisonous effects, is stated by Dr. Scheel. A man applied to him with violent salivation, which proved fatal, but the cause of which was not ascertained till after his death, when it was discovered that he had been in the habit, for six years, of carrying a small leathern bag, containing a few drachms of mercury, hanging at his breast, as a protection against itch and vermin, and that during that time he had had frequent occasion to renew its contents (*Medizinisch-chirurgische Zeitung*, 1833, iv.). Lastly, the soluble compounds of mercury may excite mercurial action by simple contact with the skin; ptyalism has been induced by a warm bath holding corrosive sublimate in solution, and violent mercurial symptoms have been brought on by the application of spirituous solutions of sublimate to the sound skin. In a case described by Professor Syme, a solution of the nitrate, rubbed by mistake upon the hip and thigh, instead of camphorated oil, occasioned intense pain, shivering, and suppression of urine for five days, during which urea was found in the blood: profuse ptyalism ensued on the third day, followed by exfoliation of the alveolar portion of the lower jaw; nevertheless, recovery slowly took place.

The *treatment*, in cases of poisoning by mercurial preparations, will of course vary with the symptoms and their causes. Where corrosive sublimate has been swallowed, the white of egg is a valuable antidote; the gluten of wheat is also effectual; and when neither of these is at hand, milk may be resorted to. Iron filings

have been successfully administered in these cases; they appear to operate by reducing the mercury to the state of metal.

The treatment of *profuse salivation* has already been mentioned; cool air, nourishing diet, and mild aperients, are leading remedies; small doses of emetic tartar, so as to act upon the skin, have been recommended by Dr. Finlay, of Ohio; and Mr. Daniell advises acetate of lead as an effectual antidote in these cases; large doses of the latter have been found effectual by Dr. Christison. Meconic acid, and the soluble meconates, have also been represented as antidotes to the effects of mercurial poisons, hence the corrective influence of opium over corrosive sublimate. But as this acid and its compounds cannot be obtained in adequate quantities for the purpose, and as opium must itself be given in poisonous doses, to decompose any quantity of corrosive sublimate, these preventives are practically useless. Iodide of potassium, in solution, has been also recommended.

HYDRATES. Definite compounds of substances with water. The term is generally applied to precipitates containing a definite proportion of water after having been dried at a certain temperature; or to substances which, like potassa and soda, retain water even after having been exposed to a red heat. The definite quantity of water which forms a component part of many crystals is usually designated *water of crystallization.*

HYDROCHLORIC ACID. ACIDUM HYDROCHLORICUM. *Muriatic Acid.*

This acid may be produced by the direct union of its component gases, hydrogen and chlorine; when mixed *in equal volumes*, they combine when exposed to light, heat, or the action of the electric spark, and produce a corresponding volume of hydrochloric acid gas: it is, however, generally obtained by the action of liquid or hydrated sulphuric acid upon chloride of sodium, during which hydrochloric acid gas is abundantly evolved, and may be collected over mercury, if required in the gaseous state, or condensed in water so as to form the liquid acid. During the action of hydrated or common sulphuric acid upon salt, the sodium of the salt combines with the oxygen of the water of the acid, to form soda, whilst the chlorine of the salt unites to the hydrogen of the water to form hydrochloric acid; the soda and the sulphuric acid forming sulphate of soda.

The composition of hydrochloric acid is —

	Atoms.	Equivalents.	Per Cent.	Volume.
Hydrogen	1	1	2·75	1
Chlorine	1	36	97·25	1
Hydrochloric Acid	1	37	100·00	2

Hydrochloric acid retains its gaseous form at all common temperatures and pressures, but is liquid under a pressure of 40 atmospheres, at the temperature of 50°. It is intensely acid, unrespirable, and uninflammable: 100 cubic inches weigh 39·4 grains; it has a strong affinity for water, and when it escapes into the air it forms

visible fumes, in consequence of its combination with the aqueous vapour of the atmosphere. Water takes up about 480 times its bulk of this gas, so that a few drops of water thrown up into a jar of hydrochloric acid gas standing over mercury, immediately absorbs it, heat being at the same time evolved. Many of the metals and their oxides decompose it both in the gaseous and liquid state; when decomposed, for instance, by potassium or by zinc, chloride of potassium or of zinc is formed, and hydrogen gas evolved; and when potassa or oxide of zinc act upon it, water and metallic chlorides are the products.

For all pharmaceutical and medical purposes, hydrochloric acid is used in aqueous solution, which is usually obtained either by condensing the gas into water, or by distilling a mixture of salt and diluted sulphuric acid, as in the process of the Pharmacopœia.

Diluted Hydrochloric Acid. — Take of Hydrochloric Acid, four fluid ounces; Distilled Water, twelve fluid ounces. Mix them.

Note. — *Hydrochloric Acid* is colourless; it is entirely evaporated by heat. Mixed with distilled water, nothing is precipitated either by chloride of barium or by ammonia, or by sesquicarbonate of ammonia. Strips of gold, even when heated in it, are not acted upon by it. It does not destroy the colour of solution of sulphate of indigo. Its specific gravity is 1·16. 132 grains of crystals of carbonate of soda are saturated by 100 grains of this acid.

Hydrochloric acid is seldom perfectly colourless; it generally has a yellow tint, derived in some cases from the presence of a little iron. The object of the above tests is to show that it contains no fixed substance, and that neither sulphuric acid nor metallic oxides are held in solution by it. The non-action upon gold and upon sulphate of indigo, proves the absence of free chlorine. When 100 parts saturate 132 of carbonate of soda, it contains about 40 *per cent.* of hydrochloric acid gas.

Hydrochloric acid is used in a few pharmaceutical preparations only, and is not of much importance in its medical applications. In doses of from ten to thirty drops in an ounce and a half or two ounces of water, it is used as a tonic refrigerant, and in cases of white deposits in the urine: in such cases, it is best given in barley-water. As a tonic, it may be combined with bitters, but it is apt to relax the bowels. It is a good remedy in some cases of typhus and scarlatina, and in malignant sore throat, both internally, and as a gargle:—

℞ Acid. Hydrochlorici f℥jss.; Decoct. Cinchonæ lancifol., Infus. Rosæ compos. āā f℥iijss.; Mellis Rosæ f℥j. M. fiat gargar.

In scorbutic ulceration of the gums, the following application, conjoined with proper general treatment, has been found effective:—

℞ Acid. Hydrochloridi f℥j.; Mellis, Aquæ Rosæ, āā f℥j. M. fiat linctus ter vel quater die gingivis applicandus.

It is, according to Dr. Paris, an efficacious remedy, after purges, for preventing the generation of intestinal worms, for which purpose infusion of quassia is its best vehicle.

This acid was at one time supposed to possess a curative power over syphilis, but experience has by no means justified such an opinion. It is sometimes taken as a *poison*, or by mistake, in *poisonous doses;* in such cases, *solution of soap*, or sufficient doses of *magnesia*, are the best remedies: chalk should be avoided in consequence of the deleterious properties of chloride of calcium, which would be formed in the stomach. It is readily recognised by the curdy precipitate which it produces in solution of nitrate of silver, and which is soluble in ammonia; but in these cases the constant presence of free hydrochloric acid in the stomach must not be overlooked.

HYDROCYANIC ACID. ACIDUM HYDROCYANICUM. *Prussic Acid.* This curious compound was first obtained from Prussian blue, by Scheele, in 1782, but its components were not accurately determined till the discovery of *cyanogen*, in 1815, by Gay-Lussac. In its purest form, hydrocyanic acid is obtained by distilling cyanuret of mercury with hydrochloric acid; or by passing hydrosulphuric acid over that cyanuret. It is a limpid and highly volatile liquid, smelling very strongly like bitter almonds; it has an acrid taste, and is eminently poisonous; its specific gravity is 0·7. It boils at 90°, the specific gravity of its vapour being, (compared with air,) 0·947. It is soluble in all proportions both in water and in alcohol. It forms but few salts, and they are very unstable. It is a compound of 1 atom of cyanogen with 1 atom of hydrogen, its ultimate elements being —

	Atoms.	Equivalents.	Per Cent.		Atoms.	Equivalents.
Carbon	2	12	44·4	=Cyanogen	1	26
Nitrogen	1	14	51·9			
Hydrogen	1	1	3·7	Hydrogen	1	1
Hydrocyanic Acid	1	27	100·0		1	27

Hydrocyanic acid is only used in medicine in a very diluted state: it may be thus obtained by distilling cyanuret of mercury with dilute hydrochloric acid; or by condensing the vapour of the pure hydrocyanic acid in any required quantity of water.

Impurities.—If diluted hydrocyanic acid leaves any residue on evaporation, it contains impurities; and if it powerfully and permanently reddens litmus paper, it contains some other acid; if discoloured by hydrosulphuric acid, it contains some metallic salt. If hydrochloric acid be present in it, the precipitate which it affords with nitrate of silver is insoluble in nitric acid, being chloride of silver. Mr. Phillips states that "any acid mixed with the hydrocyanic acid decomposes the iodocyanide of potassium and mercury, and forms biniodide of mercury, which is of a red colour."

Medical Properties and Uses.—Dr. Granville was the first who introduced hydrocyanic acid to the notice of British practitioners, as a sedative and antispasmodic, more especially useful in spasmodic coughs, and hooping-cough, and in the treatment of common and epidemic catarrh; and on the other side of the channel, Magendie has most directed attention to its effects, and devised modes of its administration. It has been successfully prescribed in some cases

of palpitation of the heart, and in allaying some of the symptoms of aneurism of the aorta. Dr. A. T. Thomson has recommended it as an adjunct to tonics in those forms of dyspeptic irritability of stomach which are accompanied with heat and soreness of the tongue; he also states that he has witnessed its powers in those affections of the trachea which are often confounded with phthisis, and are not less fatal, but that his experience does not enable him to say much in its favour in true tubercular phthisis; in that disease, however, it diminishes the frequency and violence of the cough, allays the dyspnœa, and facilitates expectoration. The sedative and narcotic powers of this acid are available in many cases of nervous irritability, but it has not answered the expectations of those who have used it in painful nervous affections; in such cases, however, it always deserves a careful trial.

Mr. Lonsdale, in "An Experimental Inquiry, &c., into the Physiological Action, the Poisonous Properties, and the Therapeutical Effects of the Hydrocyanic Acid" (*Edinb. Med. and Sur. Journ.* Jan. 1839), reaches the following conclusions: "To give a summary of what has been written on the therapeutical properties of the hydrocyanic acid, it may be stated that this medicine is proved to be of some importance in certain forms of dyspepsia, and spasmodic affections of the respiratory organs, and in those cutaneous diseases attended with itching and irritability. That it may form a useful adjuvant to other remedies in allaying some of the troublesome symptoms of phthisis, in mild dysentery, where irritability is the principal cause, and in some neuralgic affections.

"The observations of numerous authors, combined with what I have myself frequently observed in the administration of the acid in dyspepsia, &c., lead me to believe, that it is not necessary that the physiological action of the medicine should be induced before its therapeutic effects are manifested."

The dose of the hydrocyanic acid of the Pharmacopœia varies from *two to about ten minims*, much depending upon the state of dilution in which it is administered. It may be given in distilled water or almond emulsion, and the proportion of the vehicle should be comparatively small. It may be occasionally given with small doses of digitalis, and with hemlock, and should not generally be prescribed in the form of a *mixture*, lest, as is common in such cases, the doses should not be very accurately apportioned; owing, among other causes, to its less specific gravity than water. The particular formulæ, also, according to which this and other powerful remedies are presumed to be prepared, should be specified, as those of different Pharmacopœiæ are considerably at variance.

℞ Acidi Hyrocyanici (*Pharm. Lond.*) ♏iv.; Syrupi Aurantii f℥ss.; Aquæ Destillatæ f℥j. Misce fiat haustus quarta quâque hora sumendus.

℞ Acidi Hydrocyanici (*Pharm. Lond.*) ♏v.; Mistur. Amygdalæ ℥j.; Extract Conii grana iij. Misce fiat haustus bis vel ter die sumendus.

℞ Misturæ Camphoræ f℥j.; Acid Hydrocyanici (*Pharm. Lond.*) ♏iv.; Syrupi Papaveris f℥j.; Vini Ipecacuanhæ ♏xx. Misce fiat haustus hora somni sumendus et ter die repetendus sine syrupo papaveris.

Taking into view the great difficulty of preserving it of a suitable and equal strength; the danger from differences in recognised formulæ; and the uncertainty of therapeutical effect under the most careful administration, together with the repeated disappointments which every practitioner who has prescribed the hydrocyanic acid must have experienced, we are led to the inference that he who does not prescribe it at all, does wisely.

Hydrocyanic acid has been applied externally, more or less diluted, in some cutaneous diseases. Dr. Thomson long ago recommended it as a means of allaying the itching and tingling attendant on impetiginous affections. (*Med. and Phys. Journ.*, February, 1822.) In these, and all other cases in which it is prescribed, all substances tending to combine with or decompose it, must be carefully avoided, and the most simple vehicles should be selected. When applied as a cataplasm, the crumb of bread may be soaked in a mixture of half an ounce of the acid with three ounces of water; and the following lotion may be applied in cases of cutaneous irritation:

℞ Aquæ Rosæ f ℥viiss.; Acidi Hydrocyanici f ℥ss. Misce.

Toxicological History.—Hydrocyanic acid, and certain vegetable products containing it, such as the oil of bitter almonds, the distilled water of the common laurel, and of a few other plants, rank among the most powerful and rapidly-acting poisons; and of late years, especially, their effects have frequently become the subject of medico-legal inquiry, in consequence of their having been employed as means of suicide and murder; there are also several cases on record in which they have accidentally proved fatal. The varying strength of the officinal hydrocyanic acid, and of the compounds containing it, and their liability to decomposition, must be borne in mind, in reference to the quantities of them which are required to produce fatal consequences. It has been well observed by Dr. Christison, that it is important to determine with some degree of precision the shortest period which elapses before the poison begins to operate, as well as the shortest time in which it proves fatal; and his experiments, with those of other physiologists, have produced some curious and interesting evidence upon these points. A single drop put into the mouth of a rabbit killed it in eighty-three seconds; three drops killed a strong cat in thirty seconds, and began to act in ten; another was affected by the same dose in five, and died in forty seconds. Three drops projected into the eye of a cat, acted in twenty seconds, and killed it in twenty more; and the same quantity dropped on a fresh wound in the loins acted in forty-five, and proved fatal in one hundred and five seconds. In the slower cases there were regular fits of tetanus: but in the very rapid cases, the animals perished just as the fit began to show itself with retraction of the head. In rabbits, opisthonotos, in cats, emprosthotonos, was the chief tetanic symptom. These experiments appear to have been made with the *pure* and *undiluted acid.* With the diluted acid the effects are the

same, when the doses are very large, but somewhat different with inferior doses. When an animal is poisoned with a dose not quite sufficient to produce death, it is seized, in about a minute, with giddiness, salivation, convulsions, and gradually-increasing insensibility; after lying in that state for some time, the insensibility goes off and is succeeded by a few attacks of convulsion and giddiness: the whole duration of which varies from half an hour to a day or more. When the dose is larger the animal perishes either in tetanic convulsions or comatose, generally between the second and fifteenth minute. Sometimes, however, the diluted acid acts with a rapidity scarcely surpassed by the pure poison. The appearances on dissection are generally unimportant. In eight experiments on cats and rabbits, with the pure acid, Dr. Christison found that the heart contracted spontaneously, as well as under stimuli, for some time after death, except in the instance of a rabbit killed by twenty-five grains, and one of the cats killed by three grains, applied to the tongue; in these the pulsation of the heart ceased with the short fit of tetanus preceding death; in the rabbit the heart was gorged, and its irritability quite extinct. Experiments have shown that the acid in its diluted state acts with most energy through the serous membranes, and next upon the stomach; that it has no effect upon the trunks or cut extremities of nerves, or when applied to a fissure in the brain or spinal marrow; that its action is not prevented by previously dividing the nerves, but that it is prevented when the vessels of any part are tied before the application of the poison. Notwithstanding, therefore, its extraordinary rapidity of action, it is probable that it acts through the medium of the blood, in which it may often be detected by its odour, and yet from the experiments of Robiquet and Emmert, it appears probable that hydrocyanic acid may excite a deleterious action even through the sound cuticle. Robiquet observed that when the finger was applied to the open end of a glass tube containing the vapour of the acid it became benumbed, and remained so longer than a day. A single inspiration of the vapour of the acid has caused a person to fall as if knocked down. These facts would seem to favour the doctrine of the sympathetic action of the hydrocyanic acid. It affects all animals nearly in the same manner, and is poisonous in most, if not in all, of its soluble combinations. But the ferrocyanurets, and probably many of the cyanurets, are not poisonous.

The effects of hydrocyanic acid upon the human subject closely resemble those which it produces upon animals. When it has been given medicinally in overdoses, it has produced nausea, salivation, ulceration of the mouth, quick pulse, great anxiety, and a sense of weight and pain in the head. In a case reported by Hufeland, a man who swallowed an ounce of alcoholised acid, containing about forty grains of the pure acid, immediately staggered a few steps, and then sank down apparently lifeless; the pulse was not to be felt, and breathing was for some time imper-

ceptible. After a short interval, he made a forcible expiration; the legs and arms then became cold, the eyes prominent, glistening, and quite insensible, and after one or two convulsive expirations, he died, five minutes after swallowing the poison.

The following case of a French physician is quoted by Dr. Christison, (from the *Revue Médicale*, 1825), as conveying a good idea of the operation of this poison when not quite sufficient to kill. Very soon after swallowing a teaspoonful of the diluted acid, he felt confusion in the head, and soon fell down insensible, with difficult breathing, small pulse, bloated countenance, dilated insensible pupils, and locked jaw. Afterwards, he had several fits of tetanus, one of them extremely violent. In two hours and a half he began to recover his intellect, and rapidly became sensible; but for some days he suffered much from ulceration of the mouth, and violent pulmonary catarrh, which had evidently been excited by the ammonia given for the purpose of rousing him. He had eructations with the odour of the acid, three or four hours after he took it.

Hydrocyanic acid does not appear to accumulate in the system, as is the case with some other poisons. From very large doses, death may ensue in a few seconds, or minutes, but if the individual survive for forty minutes, he will generally, though not always, recover. The smallest fatal dose has not been satisfactorily determined, and will, of course, vary with the state of dilution, the vehicle, the strength of the person, and the fulness or emptiness of the stomach at the time. When its vapour is accidentally snuffed up the nostrils, it is extremely powerful, producing almost immediate insensibility.

The action of hydrocyanic acid, in poisonous doses, is, Mr. Londale thinks, chiefly exerted on the brain and spinal marrow; and indirectly on the heart by diminishing its contractility.

The accounts of the morbid appearances observed in the human subject, after death occasioned by hydrocyanic acid, are somewhat at variance among each other; much stress has been laid upon one of its effects, namely, that of producing a prominent and glistening eye, as if the person were alive; but this does not always hold good, and may succeed other causes of death: when, however, it is accompanied by the odour of the acid in the contents of the stomach, or in the blood or viscera, it becomes corroborative of the cause of death. This odour, indeed, is almost the only unequivocal proof in such cases, though it is said not to be always present, and to be occasionally perceptible in the blood, brain, or lungs, when it is not to be discerned in the stomach, in consequence, probably, of the over-powering odour of other matters, or from its having entered into combination with substances accidentally there present. Schubarth states that, if the dose has caused death within ten minutes, the odour will always be found in the blood of the heart, lungs, and great vessels, provided the examination be made within a moderate interval, and the body not exposed to a current

of air, or to rain; but that if the dose has been small, so that life is prolonged from fifteen to thirty minutes, it may be impossible to remark the odour, in consequence of the acid having, as he supposes, been emitted by the lungs; and that even when the dose has been so large as to kill in four minutes, if the body has been left in a spacious place for two days, or exposed to a shower for a few hours, the odour may not be perceptible. Turgescence of the vessels of the brain, fluidity and blackness of the blood, venous fulness, whilst the heart and great arteries are empty, are also occasional appearances; but these, and some other peculiarities which have been occasionally observed, are by no means constant or characteristic effects.

Of the means of detecting the hydrocyanic acid, the most important and unequivocal is its characteristic odour, which is perceptible, according to Orfila, where chemical agents fail in its discovery. The salts of the protoxide of iron, common protosulphate of iron, or green vitriol, for instance, are delicate tests of the presence of this acid when it has been previously rendered slightly alkaline by potassa; they then produce with it a gray or greenish precipitate, which becomes deep-blue on the addition of a little diluted sulphuric acid. When sulphate of copper is added to hydrocyanic acid rendered alkaline by potassa, a greenish-blue precipitate ensues, which, on the addition of a little hydrochloric acid, becomes nearly white, and is cyanide of copper. Nitrate of silver occasions a white precipitate of cyanide of silver with hydrocyanic acid, which is distinguished by its solubility in hot nitric acid, by its exhaling the odour of hydrocyanic acid when acted on by hydrochloric acid, and by the evolution of cyanogen when it is dried and heated. These are sufficiently delicate tests of hydrocyanic acid, when it is not encumbered with much foreign admixture; but when it is to be looked for in the dead body, they will often fail, especially where the corpse has undergone decomposition; there is evidence, however, of the poison having been satisfactorily discovered seven days after death, by the following process. The contents of the stomach are to be filtered, neutralised, if alkaline, by diluted sulphuric acid, then distilled from a water-bath till an eighth part has passed over; the odour of the acid is often perceptible in the distilled product, though it could not be previously perceived; and its presence may be further verified by the iron test.

The treatment of persons poisoned by hydrocyanic acid consists in the exhibition of *ammonia*, as suggested by Mr. John Murray (*Edinb. Phil. Journ.*, VII., 124); it should be assiduously applied to the nostrils, and may also be administered internally; but, in either case, care must be taken that it is adequately diluted, so as not to excoriate. *Chlorine* also appears to be a powerful antidote, inspired in a duly diluted state. Lastly, *cold affusion* has also been shown, in some cases, to have averted the fatal effects of hydrocyanic acid. To these remedies it may sometimes be right

to add venesection, and more especially of the jugular, so as to relieve the right side of the heart.

HYDROGEN (ὑδωρ, *water*; γεννάω, *I generate*).

This gaseous body was first examined in a pure form by Cavendish, in 1766. It is generally obtained, though not perfectly pure, by the action of granulated zinc upon common sulphuric acid, diluted with about six times its bulk of water. It is highly inflammable, burning with a very pale flame. When mixed with twice its bulk of oxygen, and inflamed by a taper, or by the electric spark, it detonates, and *water* is the result. Hydrogen is generally assumed as *unity* in reference to the combining weight, or *chemical equivalents*, of other substances, for it is that which combines with others in the smallest proportion; hence other bodies are represented by numbers which are multiples of that appropriated to hydrogen.

It is the lightest known form of matter. 100 cubic inches of pure hydrogen gas, at mean temperature and pressure, weigh only 2·1318 grains; compared, therefore, with air, its specific gravity is as 0·0694 to 1·000. Compared with oxygen gas, its specific gravity is exactly as 1 to 16. When perfectly pure, hydrogen gas is inodorous; as, for instance, when liberated by electrolytic action from pure water; but, as usually obtained, it has more or less of a disagreeable smell.

HYDROSULPHURIC ACID. *Sulphuretted Hydrogen.* Although this acid has no place in the *London Pharmacopœia*, it has occasionally been used, in aqueous solution, as an alterative, and especially as a lotion in some obstinate cutaneous eruptions; it also forms an ingredient in Harrogate, and similar mineral waters, of which those in Virginia are most celebrated among us,* and is in frequent employment in the pharmaceutical laboratory as a reagent. It is obtained by the action of hydrochloric acid upon fragments of sesquisulphuret of antimony; or from protosulphuret of iron and sulphuric acid, diluted with four or five times its bulk of water. It may be collected over water, but must be preserved in stoppered bottles, for water, when agitated with the gas, takes up about thrice its bulk, and forms a solution extremely useful as a test of many of the metals. This gas has an extremely nauseous and highly diffusible odour, so that a single cubic inch, escaping into the atmosphere of a large apartment, soon becomes everywhere perceptible. It is permanently elastic at common temperature and pressure, but becomes a liquid under a pressure of 17 atmospheres at the temperature of 50°. In the state of gas, 100 cubic inches weigh 36 grains. It extinguishes the flame of a taper, but is itself inflammable, and burns slowly in contact with air, depositing a portion of its sulphur, and producing water and sulphurous acid. Mixed with one volume and a half of oxygen it detonates; water

* See Bell on *Baths and Mineral Waters.* Philadelphia.

and one volume of sulphurous acid gas are formed. It is composed of—

	Atoms.	Equivalents.	Per Cent.
Hydrogen	1	1	5·9
Sulphur	1	16	94·1
Hydrosulphuric Acid Gas	1	17	100·0

Sulphuretted hydrogen is a powerful narcotic poison, and as it is occasionally generated by the decomposition of organic matters in privies, sewers, and drains, cases of its deleterious and fatal effects are not very uncommon (*see* CHRISTISON, chap. XXXI.). Thenard and Dupuytren found that a bird died immediately in air containing only $\frac{1}{150}$th part of it; $\frac{1}{800}$th killed a dog, and $\frac{1}{150}$th was fatal to a horse. Chaussier's experiments show that it is fatal whether inhaled, or merely injected into the cellular texture, stomach, or anus, or applied to the skin. When respired in any degree of concentration, it produces faintness, insensibility, and death; if the individual be quickly extricated, vomiting and hawking of bloody froth ensue. Sometimes the exhalations containing sulphuretted hydrogen occasion coma, and sometimes convulsions and tetanic spasms. After death, the blood is fluid and black, the lungs gorged, and the whole body rapidly putrefies. Further details of the effects of the vapours of privies, which generally contain ammonia and sulphuretted hydrogen, will be found in HALLE, *Recherches sur la nature du Méphitisme des Fosses d'Aisance*, 1785.

HYOSCYAMI FOLIA ET SEMINA. The *leaves* and *seeds* of *Henbane. Hyoscyamus niger. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ.

Henbane is a common biennial in England, growing on commons and waste grounds, and flowering in July: it is naturalized in the United States.

In their recent state, the leaves of henbane have a very peculiar nauseous odour, and a bitter taste, both of which qualities are much impaired by drying. The activity of henbane as a narcotic, is said to depend upon an alkaloid, called, by Brandes, *Hyoscyamia*, and which appears to exist in greatest quantity in the seeds: he obtained it by adding a small quantity of lime to a strong alcoholic tincture of the seeds; the precipitate was digested in dilute sulphuric acid, filtered, and the solution, containing sulphate of hyoscyamia, was decomposed by carbonate of soda. The hyoscyamia thus precipitated, was dried on bibulous paper, redissolved in absolute alcohol, filtered through a little animal-charcoal, and evaporated, a little water being added towards the end of the process. It forms silky crystals, difficultly soluble in water, readily soluble in alcohol and ether, and yielding crystallisable salts. It has an acrid and nauseous taste, is powerfully narcotic, and when applied in dilute solution to the eye, occasions dilated pupil. The fixed alkalis decompose it, with the evolution of ammonia (Geiger and Hesse. *Journ. de Pharm.*, XX., 92).

The officinal preparations of henbane are an *extract*, which is directed to be prepared in the same way as the *Extract of Aconite*, and a *tincture*.

Tincture of Henbane. — Take of Henbane Leaves, dried, five ounces; Proof Spirit, two pints. Macerate for fourteen days, and strain.

The *extract*, when carefully prepared, is the best form for the administration of henbane; the average produce is from four to five pounds from 112 pounds of the fresh herb. The tincture is sometimes resorted to as a substitute for opium, and is given in the dose of one or two drachms; a more certain preparation is obtained by using the seeds instead of the dried leaves in its preparation.

Henbane was used by the ancients as a narcotic remedy, and when given in proper doses, it somewhat resembles opium in its general effects, but instead of having a tendency to constipate, it rather relaxes the bowels. It generally somewhat increases the flow of urine and the perspiration, and in overdoses brings on the symptoms occasioned by narcotic poisons. The infusion, or solution of extract of henbane, applied to the eye, dilates the pupil in the same way but less certainly than belladonna.

Extract of henbane has a dark and dingy-green or olive colour, a strong, heavy, and somewhat fetid odour, and a bitterish and slightly saline taste: as its strength, however carefully prepared, is liable to vary, the proper dose must be learned by trial: from two to five grains at bed-time generally prove effectual: some giddiness and nausea are apt to follow a full dose. I have frequently prescribed ten grains in the course of the evening: in some cases the quantity may be extended to ℈i. given in divided doses at short intervals. The cases in which it is found most useful are those in which opium disagrees, either by producing headache, sickness, or constipation. Sometimes it may be usefully combined with opium, and also with hemlock. According to Dr. Paris, the griping and irritating tendency of colocynth is mitigated by the addition of extract of henbane, and its energies as a purgative, though rendered more mild, are not less efficacious. Hence the occasional advantage, especially in cases of habitual costiveness, of the following formula:—

℞ Extract. Colocynth. compos. ℈ij.; Extract. Hyoscyami ℈j. Misce et divide in pilulas xij. Sumatur una pro re nata.

Independently of its more ordinary uses, extract of henbane is of service in allaying the irritation occasioned by red sand in the kidneys, the constipation produced by opium being in such cases sometimes very prejudicial; it may be administered in union with diuretics, or with alkaline remedies, in doses of about five grains at bed-time, either alone, or as follows:—

℞ Sodæ Carbonatis exsiccatæ, Extract. Hyoscyami, āā gr. v.; Ol. Juniperi ♏ij. Divide in pilulas tres; sumantur horâ decubitûs.

In chronic rheumatism small doses of extract of henbane with mercurial pill and compound powder of ipecacuanha, may be given

every four or six hours; or the following may be taken when the pain comes on in the night, and is relieved by perspiration:—

℞ Pilul. Hydrargyri, Pulveris Ipecacuanhæ compos., Extract. Hyoscyami, āā gr. v. Fiat massa in pilulas iij dividenda. Sumantur horâ somni.

In coughs and pulmonary irritation, Dr. Paris prescribes the following as an effectual palliative:—

℞ Extracti Conii, Extracti Hyoscyami, āā gr. v.; Mucilaginis Acaciæ f℥i. Tere simul donec quam optimè misceantur, et deinde adde Liquoris Ammoniæ Acetatis, Aquæ Puræ, āā f℥ss.; Syrupi Rhæados f℥j. Fiat haustus quartâ quâque horâ sumendus.

Dr. Thomson states that henbane combined with camphor, may be used with decided advantage in mania.

Poultices containing extract of henbane, and fomentations of the decoction of its leaves, have been prescribed for the relief of scrofulous and cancerous sores; and the dried leaves, smoked in the manner of tobacco, are among the remedies for the toothache.

In spasmodic stricture and chordee, the tincture or ointment of the extract rubbed on the perineum is useful; and in piles the ointment, and in rectal and vesical irritation an enema of the watery solution of the extract, are beneficially prescribed.

The effects of henbane as a poison have been described by Choquet as they occurred in two soldiers, who ate the young shoots in a salad; they became giddy and speechless, and the eyes were so insensible, that when the cornea was touched the eyelids did not wink; the pupils were much dilated; the pulse feeble and intermitting, the breathing difficult, and the jaw locked; the limbs were cold, the arms convulsed, and there was that union of coma and delirium called typhomania. One of them vomited freely, under the influence of an emetic, and soon recovered; the other became violently delirious, and continued so till the succeeding evening, when the operation of a brisk purge restored him to his senses. The roots of henbane, which are very poisonous when the plant is fully grown, have been sometimes mistaken for parsneps. The history of a family of six persons thus poisoned, has been related by Mr. Wilmer (*On the Poisonous Vegetables of Great Britain*). They became delirious, and one woman irrecoverably comatose; she died the ensuing morning. Loss of speech, therefore, dilated pupil, delirium, and coma, are the leading symptoms of poisoning by henbane. Emetics and purgatives are the most effective remedies.

HYPNOTICS (ὑπνος, *sleep*). Medicines which cause sleep.

INCOMPATIBLES. This term is frequently applied to medicines which either decompose, or unite with each other, so as to form a compound which is either inert or has distinct properties and effects. Thus, sulphuric acid, and the soluble sulphates, are properly said to be *incompatible* in prescriptions with the soluble salts of lead, inasmuch as they produce an insoluble and inert sulphate of lead: upon the same principle chlorine and chlorides are incompatible with the soluble salts of silver. But it is not to be

presumed that substances are always incompatible, because they mutually act upon each other. Emetic tartar and chalk mutually decompose each other, but they are by no means improperly prescribed together; the former also occasions precipitates in many vegetable infusions, yet the compound retains activity. An important part of the art of prescribing consists in avoiding unintentional combinations which either destroy or exalt each other's activity.—(*See* TABLE OF INCOMPATIBLES *prefixed to this work.*)

INFUSA. *Infusions.* (Infundo, *I pour in.*) Solutions of the active principles of vegetable substances, obtained by the action of hot or cold water. In the present Pharmacopœia all the infusions are directed to be prepared with boiling distilled water. They are generally made in earthenware jugs with covers, but the kind of vessel should have been specified, as clean metallic vessels retain the heat longer than those of earthenware, and will, consequently, in many instances, yield a stronger infusion.

Substances containing soluble matter, and of which the properties are liable to injury by boiling, are those best adapted for infusion; but, generally speaking, remedies of a very active nature ought not thus to be administered, as the strength of infusion is liable to vary.

Soft, or distilled water, should be used in preparing infusions; it should be poured boiling hot upon the ingredients, which should be either finely bruised or sliced; if in powder, which may sometimes be expedient, the infusions require filtration through paper, but generally they may be stained through tow, flannel, or linen: they are always to be used cold.

The greater number of the infusions directed in the Pharmacopœia are liable to decomposition in warm weather—a circumstance which should not be forgotten by the prescriber; they should always be prepared fresh for use. Infusion of calumba, and the compound infusions of gentian and of senna, are very liable to change; but in prescriptions, spirituous and saline substances are often dissolved in them, and contribute to their preservation. They are not always proper vehicles for metallic salts, some of which they decompose, modifying their activity, and in some instances rendering them nearly inert; but, because in these cases precipitations and decompositions may ensue, we are not always to conclude that the substances are improperly prescribed in conjunction. Such mixtures may be unchemical or incompatible, but they are not always inactive.

INULA. *Radix.* Elecampane root. *Inula Helenium. Cl.* 19. *Ord.* 2. Syngenesia Superflua. *Nat. Ord.* Compositæ.

This plant, though a native of England, is usually cultivated in the gardens.

Elecampane root has been analysed by Rose, who extracted from it a peculiar vegetable principle, which has been called *Inulin.* A more detailed analysis of the root was afterwards published by Funke.

This root was formerly supposed to possess considerable expectorant and diuretic powers, but it has long fallen into disuse, and

there seems no good reason for retaining it in our present Materia Medica. It forms a prominent ingredient in Ward's paste for the piles. (*See* PIPER.)

IODINIUM. Iodine. (ιωδης, *violet-coloured.*) This elementary body was discovered in 1812, by M. Courtois; Vauquelin, Gay-Lussac, and Davy, subsequently examined its properties and combinations. It is chiefly obtained from the substance termed *Kelp*, which is the residue of the combustion of sea-weed; the kelp is powdered and lixiviated with water; the solution so obtained is evaporated till it deposits crystals, for which purpose it is set aside. The crystals are chiefly chloride of potassium; the mother-liquor is decanted off, supersaturated by sulphuric acid, and allowed again to crystallise; the residuary mother-liquor is then mixed with a sufficient quantity of black oxide of manganese, and distilled in a retort, when the iodine passes over along with the vapour of water, forming violet-coloured fumes, which condense in the neck of the retort and in the receiver, in the form of steel-gray crystals, and of a metallic lustre. Iodine is soft, has a peculiar odour somewhat resembling that of chlorine, an acrid taste, and tinges the skin brownish-yellow. Its specific gravity is 4·94. It is extremely volatile, rising in vapour at a temperature of 120° or 130°; when heated to 220° it fuses, and produces dense violet-coloured fumes. The specific gravity of its vapour, compared with that of air, is 8·7; compared with hydrogen, the specific gravity of its vapour is as 125 to 1. It is slightly soluble in water, and the solution is pale-brown; in alcohol, and in ether, it is much more soluble, and the solutions are deep reddish-brown.

The character by which iodine is most distinctly recognised, is that of yielding a dark-blue compound with starch. These last properties are those by which iodine is defined in the *Notes* of the Pharmacopœia; it should have been added, that it is liable to adulterations, and that it is frequently sold in a very moist state, as is shown by pressing it between folds of blotting-paper. If it contain charcoal, plumbago, or oxide of manganese, it is neither entirely volatile, nor perfectly soluble in alcohol, the impurities being left behind. It often contains lead.

Of the officinal preparations of iodine, its compounds with iron and with mercury have already been mentioned. Its compounds with lead and zinc will be described under the heads of those metals (*vide* PLUMBUM ET ZINCUM). Of the others we begin with the following: —

Iodide of Potassium (*Hydriodate of Potassa*). — Take of Iodine, six ounces; Carbonate of Potassa, four ounces, Iron Filings, two ounces; Distilled Water, six pints. Mix the iodine with four pints of the water, and add the iron, stirring them frequently with a spatula for half an hour. Apply a gentle heat, and when a greenish colour occurs, add the carbonate of potassa, first dissolved in two pints of the water, and filter. Wash what remains with two pints of boiling distilled water, and again filter. Let the mixed liquors be evaporated, so that crystals may be formed.

NOTE. — *Iodide of Potassium* (*crystals*). — Totally soluble in water and in alco-

hol. It changes the colour of turmeric either not at all or only slightly. It does not change the colour of litmus. Subjected to heat it loses no weight. Sulphuric acid and starch being added to it together, it becomes blue. 10 grains of this salt are sufficient for the decomposition of 10·24 grains of nitrate of silver, and that which is precipitated is partly dissolved by nitric acid, and partly altered in its appearance; which does not occur when ammonia is added.

The entire solubility of iodide of potassium in water and in alcohol is probably intended to show the absence of certain foreign salts with which it might otherwise be adulterated; and its non-action upon turmeric and litmus indicates its neutrality. When thoroughly deprived, by drying, of adherent and interstitial water, it is anhydrous, and does not therefore lose weight when heated. It is decomposed, and iodine is evolved, by the action of sulphuric acid; consequently, the free iodine then forms a blue compound with starch. If it decomposes more nitrate of silver than above stated, it probably contains chloride of potassium. The iodide of silver which is formed, is insoluble in ammonia, by which it is distinguished from chloride of silver. The object of the statement that it is partly altered in appearance, and partly dissolved, by nitric acid, is not very evident.

Iodide of potassium is readily obtained by dissolving iodine in solution of potassa till the liquid begins to acquire a brown colour, evaporating the solution to dryness, fusing the residue, dissolving it in water, and again evaporating so as to form crystals. It may also be obtained by the decomposition of iodide of zinc (which is easily formed by the mutual action of iodine and zinc filings) by carbonate of potassa; the precipitate is separated by filtration, and the filtered liquor evaporated till it yields crystals of the iodide of potassium. These processes are in some respects preferable to that of the Pharmacopœia.

Iodide of potassium forms deliquescent cubic crystals, of a pungent bitterish taste, extremely soluble in water, sparingly soluble in anhydrous alcohol, but more soluble in common alcohol or rectified spirit. The aqueous solution of this salt readily dissolves iodine. Iodide of potassium consists of —

	Atoms.	Equivalents.	Per Cent.
Potassium	1	40	24·2
Iodine	1	125	75·8
Iodide of Potassium	1	165	100·0

Medical Properties and Uses of Iodine.— The discovery of iodine has furnished the medical practitioner with a highly important and peculiar remedial agent, respecting the safety and operation of which there is, however, much difference of opinion. All evidence seems to concur in the dangerous effects of free or uncombined iodine, taken in quantity. Orfila states that, having taken it in a dose of four grains, it produced constriction in the throat, sickness, and colic. Dr. Gairdner (*Essay on Iodine*) mentions the case of a child four years old, to whom twenty grains proved fatal. Foreign

authors (cited by Dr. Christison) describe the effects of overdoses of iodine to be pain, vomiting, bloody diarrhœa, shivering, and rapid pulse. In a case in which two drachms and a half were taken for the purpose of self-destruction, it immediately produced a sense of burning and dryness in the œsophagus, lacerating pain in the stomach, and efforts to vomit; and in an hour, when the relater first saw the patient, there was suffusion of the eyes, excessive pain and tenderness of the epigastrium, and sinking of the pulse. Vomiting was then brought on by warm water, copious yellow discharges, having the smell of iodine, took place, and in nine hours the patient was well. In fatal cases, the appearances after death are those of the effects of an irritant poison, such as redness and excoriation of the villous and of the peritoneal coat of the stomach, gangrenous discolorations of it and of the intestines, adhesions, and in some cases enlargement and inflammation of the liver.

Dr. Zink (*Journ. Complem. du Dict. des Sciences Med.* xviii. 231) examined a female who died from the excessive use of the tincture. He found the bowels inflated with gas; in some parts of their track highly inflated; in others exhibiting an approach to sphacelation, both within and without. The large and distended stomach was mottled with spots and phlogosis, and was abraded externally to the extent of two square inches. The inner membrane displayed redness, growing deeper from the cardiac towards the pyloric orifice, where the organ looked as if it had undergone corrosion. The mesentery was observed to be singularly spotted; the liver large and of a pale rose-red colour; the spleen covered with dark lenticular spots, penetrating to the depth of a line; the lungs pale, small and spotted in like manner; the trachea and heart natural. Dr. Jahn examined two fatal cases — in one, that of a female, death was preceded by enteritis, consequent on the use of the tincture; while the other subject, a male, had suffered from indulging too freely in the same solution for a cancer on the stomach. He notices the absence of fat, a faded and flabby state of all the organs, including the mucous glands of the intestines, the liver, spleen, and ovaries, and even atrophy of the cellular tissue (*Journ. Complem.* xxxv. 362).—Cogswell, Experimental Essay, &c., on Iodine and its Compounds, p. 32–3.

Iodine has been made by Joerg and his associates (*Journ. du Progrès des Sci. Med.* 1830, ii. 13) the subject of experiments on their own persons, of which the following are the published conclusions. The positive effect of the tincture of iodine consists in an excitement of the *whole alimentary canal.* With persons in health, there occurs a saline taste in the mouth, an augmentation of the salivary secretion, increase of appetite, sensible motion of the bowels, slight pains, flatulent evacuations. But this effect is transmitted also to the *brain*,—as is the case with all substances which considerably affect the intestinal canal,— whence arise weight and heaviness of the head, occurring sometimes in one part, sometimes

in another. Iodine has no less influence in augmenting the flow of blood towards the *lungs* and *trachea*, which it either rouses to a state bordering on inflammation, or actually inflames. The irritation seems to extend itself to the *nostrils*, where, as well as in the bowels, the secretion of mucus is much increased. As iodine acts so powerfully on the digestive tube, it should also, in large doses, affect the urinary organs; many of the experimenters decidedly experienced these secondary effects. Moreover, since iodine acts not only upon the surface of the intestines, but also on that of the parts which open into them, on the *glands* of the mouth and stomach, it should increase the salivary, gastric, pancreatic, and biliary secretions. It must, therefore, modify in a high degree the processes of *assimilation* and *nutrition*, if properly employed. Its administration (the experimenters refer to the tincture of iodine) requires the greatest caution; two, three, six or eight drops will be the ordinary dose, repeated only every twenty-four or forty-eight hours, and taken each time in a little water.

When, some years back, I was in the habit of prescribing the saturated alcoholic tincture of iodine, I have heard at different times my patients speak of a sensation of heat and sometimes burning in the stomach; and one of them, who took the medicine for a local disease, said that he could feel the impression produced by it, from the mouth to the anus. Frequently I have been obliged to desist from the administration of iodine, even in the form of hydriodate of potassa, when I had prescribed it to females with amenorrhœa, on account of the irritation, and almost threatened phlogosis of the stomach, to which, indeed, some of them were prone before taking the medicine.

On the nervous system, I know, from personal experience, that the iodine has a strong effect. It produced a feverish excitement, headache, and wakefulness: giddiness is a common symptom with many. Its action on the salivary glands, even to undue salivation, has been noticed at different times: constant spitting I have myself seen. Another and still more unpleasant result from the use of iodine, is atrophy of the mammæ and testicles, of which there are some well attested cases. But it has been well said that such histories are far from common. Mr. Pereira says, that he has seen iodine exhibited hundreds of times with no such unhappy effect, and to the same purport are the remarks of Magendie and others. In a large experience of the operation and effects of iodine for these fifteen years past, I am not aware of any case in which the organs above mentioned have suffered by diminution or wasting. That it exerts a favourable influence over the nutritive system, I am well convinced: it increases the appetite and digestion, and, ultimately, if given and continued in moderate doses, contributes to give increased fulness to the external habit of the person using it.

Occasionally, from excessive doses, or peculiarity of constitution, the effects of iodine are either those of irritation, such as vomiting, purging, foul tongue, rapid and extreme emaciation, cramps, and

tremulous pulse; or in other instances extreme debility, anxiety, faintness, palpitation, and in females absorption of the mammæ. These and other symptoms constitute a form of disease which has been termed *iodism:* it has been described by Dr. Jahn as attended by absorption of the fat, increased excretions, dingy skin, clammy sweat, hurried anxious breathing, diuresis, and an appearance of oil floating upon the urine, feeble pulse, and impaired digestion. But we are not to suppose that these are by any means common effects from the therapeutical employment of this medicine: and it will be more correct to attribute many of those on record to gastro-enteritis in some of the patients, and to extreme constitutional irritability in others. Dr. Coindet attributes the *iodic* symptoms to the *saturation* of the system with iodine — an explanation, to a certain extent, proved by an experiment made by Dr. Cogswell, in which he detected iodine in the tissues of an animal five days after it had ceased taking this substance. That very large doses will be tolerated without bad effects following their use, we have, among other proofs, the case of Dr. Kennedy's patient, who took (for obstinate bronchocele) within twenty days no less a quantity than 953 grains of iodine in the form of tincture; the doses having been so proportioned towards the last that the patient used to take eighteen grains for the daily allowance. The health of the patient, a girl, did not seem to be in any way particularly affected. — (Cogswell, *op. cit.*, p. 23.) Farther, as we learn from the same source, Mr. Delisser alleges, that in two months time he gave 1019 grains of iodine to a female labouring under cancer of the mammæ, the doses at certain intervals amounting to thirty grains every twenty-four hours. The consequences were, anorexia, quick pulse, ulceration of the mouth and fetor of the breath, of a different kind, however, from that which arises from mercury, but ptyalism is not mentioned. The same writer, continues Mr. Cogswell, informs us of a child three years old, that, within a less space of time, had 222 grains of iodine given to it in the form of tincture. In the other instance, the drug was made into pills. Dr. Edward Jenner Coxe has given an account of a case of ascites with ovarian tumour (*North Am. Med. and Surg. Journ.*, vol. III., p. 39), in which he and Dr. Schott gave thirty grains of the hydriodate of potassa every day, for 21 days, making, in this period, 630 grains, "without occasioning one unpleasant symptom."

If we inquire into the *modus operandi* of iodine, we shall be led to the conclusion that this substance is absorbed; thus, whether it be applied externally or taken inwardly, it is detected not only in the blood but the secretions. Cantu (*Journ. de Chim. Med.*) has discovered it in the urine, sweat, saliva, milk, and blood. In all cases it is found in the state of iodide or hydriodide; from which circumstance he concludes that its influence on the body is chemical, and consists in the obstruction of hydrogen. Dr. Buchanan detected iodine in abundance in the synovial fluid taken from a dropsical knee-joint five hours after the patient, a boy, had taken

ten drachms of the hydriodate of potassa (*Medical Gaz.*, xxiii., 519).

Referring first to my own experience of the use of iodine in disease, (part of which I recorded several years back in the *North Am. Med. and Surg. Journ.*, vol. vi., 1828,) I would say, that in all chronic affections of the mucous membranes, marked either by morbid secretions, thickening of tissue, or ulcerations, this medicine exerts a beneficial influence; both when given alone, and, as is my frequent practice, in combination with the compound syrup of sarsaparilla, or alternating with some of the narcotics, such as the extract of hyosciamus or of belladonna. These remarks apply to ulcerated sore mouth and throat, simple or syphilitic, chronic diarrhœa and dysentery, leucorrhœa and gonorrhœa, chronic bronchitis and chronic laryngitis. In scrofulous enlargements of the lymphatic glands, and sometimes in scrofulous ulcers of these parts, I have derived good effects from iodine; but, in common with other practitioners, I must also admit that it has failed to cure this troublesome disease. On the secreting glands, especially the liver, I have frequently seen its curative influence in morbid states, particularly chronic disease of this organ. As an emmenagogue, I can also certify to its power; and what has not, I believe, been dwelt upon by other writers on iodine, I may add that I have found its administration for a period, and that not always a long one, to be followed by such an amended condition of the uterus, in married women who had been before childless, that they soon conceived and had healthy children. The cases of this nature which have come under my observation, have been sufficiently numerous and of women of different temperaments and constitutions, to satisfy me that the above results were not accidental, but were really dependent on the iodine which I had prescribed. I well know that my experience in this matter is opposed to that of one or two other physicians, who would persuade us that iodine causes barrenness. Analogies certainly are in favour of the effects of iodine on the uterus and its appendages similar to those which I have just described; when we reflect on the beneficial operation of this substance on the glands and secretions generally, correcting those which are morbid, and placing them in the most favourable situation to be acted on, both by their specific stimulants and by the blood, in their nutritive life. Hence, also, it is a well ascertained fact, that iodine has been most successfully employed in chronic diseases of the uterus accompanied with induration and enlargement.

The virtues of iodine have been fully tested in the successful reduction and resolution of enlarged and chronically inflamed glands, as of the liver, mammæ, and testicles, and not less so in indurated spleen. On the fibrous tissues, when in that morbid state constituting at one time rheumatism and gout, at another secondary syphilis, iodine has frequently exerted a remedial effect superior to that of mercury in its immediate action, and happily exempt from the subsequent distressing complications which so often follow the

use of the different preparations of this metal. As an alterative generally, both in the diseases now under notice, as well as in that large class of chronic gastro-hepatic ones so common in the southern portion of our Union, iodine is entitled to a preference over mercury, which latter is yet, I fear, prodigally administered by many practitioners in that region.

Iodine is, according to Mr. Key (and others have corroborated his experience), one of the most powerful remedies we possess in controlling the ulcerative process, so that the most active phagedenic ulcers, threatening destruction of parts, are often found to yield in a surprising manner to the influence of this medicine, and to put on a healthy granulating appearance (*Medico-Chirurg. Transact.*, vol. xix.).

In chronic skin diseases, such as *lepra, psoriasis,* &c., iodine has been used with very good effect. My attention was first directed to this fact by the observation of a woman in middle age, to whom I had prescribed iodine for the cure of gonorrhœa, contracted from a profligate husband; viz., that since she had been taking the medicine, she had got entirely clear of an eruption (herpetic) in her arm, which had more or less troubled her for a period of thirty years. This person was cured, I may add parenthetically, of her gonorrhœa by a solution of the hydriodate of potass; ʒi. of the salt to ℥i. of water—dose, thirty drops a day in some sweetened water. Since then, I have frequently prescribed iodine for various chronic diseases of the skin, and often with excellent effect, more especially so when syrup or decoction of sarsaparilla has been used freely at the same time.

Of the external and topical employment of iodine in various forms, I shall have occasion to speak when describing their mode of application and relative advantages. As yet I have referred to the efficacy of the substance without specifying whether it was given in its simple state or in combination. At first I used the iodine alone, in the form of tincture or pill for internal use, and of ointment externally. The tincture was made of iodine ℈ij.; rectified spirit, an ounce. Dose, five to ten drops, gradually increased to twenty or thirty, three times a day. In pill, the iodine is given in a dose of from one-eighth of a grain to a grain. The ointment was made of ten to twenty grains of iodine incorporated with an ounce of lard.

Of late years, a very general preference is indicated for either the iodide of potassium or the compound solution of this salt with iodine, over the iodine either in substance or in tincture, notwithstanding the doubts which some have entertained, whether the iodide of potassium be really an agent of any activity, on the supposition that the iodine like an acid or chlorine combining with alkali so as to form a neutral salt, loses its distinctive properties to the taste, and no longer display sits customary operation on the animal economy. But this *à priori* chemical objection is refuted by the fact, that the salt is soon decomposed either in the stomach, or at any rate before it enters

the circulation and reaches the secretory organs and tissues, for in all these has iodine been found in animals and individuals of our own species to whom the iodide of potassium had been administered. The experiments of Devergie on dogs (*Med. Leg.* t. ii. p. 536), and those of Dr. Cogswell on rabbits, show that the above salt is a poison to these animals. It operates as a local irritant, and thereby inflames the tissues with which it is placed in contact. Dr. Cogswell injected three drachms beneath the skin of the back of a dog; the animal died on the third day; and on chemical examination, iodine was detected in the blood from the heart, in the brain and spinal cord, the liver, spleen, stomach, muscles, tongue, and the bones freed from their appendages; likewise in the contents of the bladder (*op. cit.*, p. 91). To these experiments should be added the fact, that both the physiological effects and the therapeutical uses of iodide of potassium, show that the operation of this salt is analogous to that of iodine. On myself the exciting effects of the former, even in moderate doses, are nearly identical with those caused by the latter. Mr. Pereira has repeatedly remarked that the pocket-handkerchiefs used by patients who are taking this salt, acquire a distinct odour of iodine.

Iodide of potassium, as admitting of large solution in water, and of being more readily absorbed, and less irritating to the mucous tissues, is entitled to a preference very generally over the iodine itself; and there is hardly a disease, to which the medicine in its simple state is applicable, that has not been cured by the salt. In dropsy, and diseased kidney in which albuminous urine is secreted, the iodide should always be preferred. The *dose* has varied in the practice of different physicians from three grains to half an ounce. Dr. Elliotson has carried the administration of it to the extent of six drachms daily for many weeks (the dose being two drachms) without inconvenience; and Dr. Buchanan tells us that half an ounce may be given at a dose without producing pain of the stomach or bowels, purging, or any hurtful effect. Still we may readily suppose, whilst receiving implicitly these statements as true, that they evince the tolerating power of some individuals more than the propriety or even safety of the administration of such large doses of the iodide in common. From *two to ten grains* twice, or even thrice, a day, dissolved in an ounce or two of water, or other proper vehicle, such as an aromatic or bitter infusion, is a quantity which, if repeated in a proper period, will be found equal to most of the exigencies for which it is administered. Dr. Graves is in the practice of prescribing the iodide of potassium in doses of ten grains, gradually increased to thirty, three times a day, towards the termination of acute rheumatism. In the chronic variety of this disease, this medicine is entitled to no little confidence.

Dyspeptic symptoms, restlessness, and slight salivation, are the most common consequences of iodide of potassium, when it has been given for some days, or even weeks, in moderate doses; it sometimes appears to constipate, and sometimes slightly relaxes

the bowels; but its curative effects proceed in the generality of cases independent of any others worth mentioning, and persons who are fully under its influence usually require no particular care, except such as relates to diet; excess of food, greasy and indigestible dishes, and the stimulation of wine, should be avoided.

Iodide of potassium is sometimes prescribed in pills; but they are an injudicious form for its administration. It is best given in solution, and substances likely to modify or decompose it, should of course be considered as incompatible.

1. ℞ Potassii Iodidi grana ij.; Infusi Aurantii compos. f℥x. Misce; fiat haustus bis die sumendus, meridie scilicet, et horâ ante prandium. (Augeatur dosis iodidi gradatim, si opus sit.)
2. ℞ Potassii Iodidi gran. x.; Aquæ Cinnamomi, Aquæ destillatæ, āā f℥iijss.; Syrupi Zingiberis, f℥ij. Misce sumatur tertiam partem ter quotidie.

But frequently as the iodide of potassium is administered at the present time, its combination with iodine in watery solution has gained still more general favour. A solution of the salt readily dissolves free iodine, and the compound thus formed is usually denominated *ioduretted iodide of potassium:* it is the *compound solution of the iodide of potassium.* The proportions are two grains of the salt to one grain of the iodine, as in the following formula of the London Pharmacopœia: Iodine, gr. v.; Iodide of Potassium, gr. x.; Distilled water, ℥xx. It is a brown-coloured solution; and may, on account of the large dilution of the active principles, be usefully employed in the diseases of children. *Dose*, for adults, from two to six, or more, fluid drachms. Commonly the prescriber will find it convenient, if he wishes to increase the strength of the solution without rendering it proportionably irritating, to introduce a larger proportion of the iodide of potassium. The ioduretted iodide of potassium is adapted to all the diseases already specified in which iodine has been found serviceable; and its use has in a great measure superseded that of the tincture of iodine. Even the small proportion of this substance in the compound solution will be found too irritating to some patients, and it must consequently be withheld, in favour of the simple solution iodide of potassium.

Another preparation, called the *ioduretted mineral water* of Lugol, made by him of three different degrees of strength:—

	No. 1.	No. 2.	No. 3.
Iodine . . .	gr. ¾	1	1¼
Iodide of Potassium	gr. 1½	2	2½
Distilled Water . .	℥viii	℥viii	℥viii

The solutions are yellowish, or orange-coloured, and are quite transparent. When sweetened they are readily taken by children, but the sugar should be added at the time of administration, as in the course of a few days it effects a chemical change in the solution. From *six to eight ounces* may be taken daily by an adult.

The *compound tincture of Iodine* of the London Pharmacopœia, consists of, Iodine ℥i.; Iodide of Potassium ℥ij.; Rectified Spirit Oij. Macerate till they are dissolved, and filter. This solution may be mixed with water, without any deposition of iodine. The *dose*, at the commencement, is *ten drops*, which may be gradually increased. This preparation is better adapted to patients of a lymphatic temperament, with little gastric sensibility, than to the nervous and the sanguine.

Another form of iodine, strongly recommended by Dr. Buchanan, is the *iodide of starch*. He prepares it for medical use by triturating twenty-four grains of iodine with a little water, and gradually adding an ounce of finely-powdered starch. The whole is well rubbed together till the compound assumes a perfectly uniform and very deep blue colour, and then carefully dried by a heat so gentle as to run no risk of driving off iodine: it should be kept in a well-stopped phial. Dr. Buchanan commenced the use of this compound in the cautious dose of ten grains; equivalent to half a grain of iodine: this was gradually increased to four scruples, or four grains of iodine, in the course of the day, without exciting any unpleasant symptom. Proceeding in the same gradual manner, the dose was augmented to four drachms, equivalent to twelve grains of iodine daily, and no gastric irritation was induced, although the secretions were deeply impregnated with iodine. In this and other cases this same dose was long continued without bad consequences; the quantity, therefore, was gradually increased, first to half an ounce, and then to one ounce, three times a day, equivalent to seventy-two grains of iodine daily; still no symptoms of gastro-intestinal irritation, and no other symptoms of an unpleasant kind, showed themselves, while the secretions, and more especially the urine, were very deeply impregnated, becoming as black as ink when tested by nitromuriatic acid and starch. Dr. Buchanan goes on to say, that having satisfied himself of the safety of such doses, he has been in the habit, in persons not labouring under any dyspeptic ailment or constitutional delicacy, and whom he wished to put under the influence of iodine, of commencing with half-ounce doses of the above iodide of starch, and increasing them immediately afterwards to ounce doses if necessary.

From the above statement it has been assumed that the iodide of starch must be inert, or pass off unaltered by the bowels; but iodine is always found abundantly in most of the secretions, such as the urine especially, the saliva, and nasal mucus and tears; but not in the perspiration, and never in the feces. No good evidence can, however, we think be adduced in favour of the enormous doses of iodine here alluded to; nor does there seem any good reason for preferring the iodide of starch to the iodide of potassium, especially when the latter can be easily procured, and in a state of purity.

Dr. Buchanan presumes in these cases that the iodine is con-

verted into hydriodic acid, and that even iodide of potassium undergoes a similar change; that, consequently, the medicinal effects of iodine are referable principally, if not entirely, to the formation of that acid in the stomach; he was therefore led to the exhibition of hydriodic acid, with a view of determining how far it agreed in its general medicinal properties with the other iodic compounds. See p. 291, for the mode of preparing it.

Of this acid, Dr. Buchanan gave three drachms, equal to fifteen grains of iodine, in the course of the day, and gradually increased it to an ounce and a half daily; this was his ordinary dose; though in some instances he gave as much as one ounce, three times a day, equal to two drachms of iodine daily. During the use of this acid, iodine was found abundantly in the urine, but not in the prespiration, nor in the purulent secretion of sores. In the generality of cases, the patients employing these large doses of iodine enjoyed good digestion and appetite, and were improved in *condition*. It is much better to begin in a *dose* of *half a fluid drachm*, to be gradually increased. "Of the two great alterant medicines we possess, iodine and mercury, it is certainly a most important advantage of the former over the latter, that it admits of being given freely, not only without injury, but with advantage, to the general health; while mercury given in full doses, is always a dangerous medicine, and often the means of doing irreparable injury to the constitution. The iodide of starch frequently caused costiveness, attended with griping pains of the bowels, and with a paleness, approaching to a clay-colour, of the alvine discharges."

Without meaning to recommend them in practice, I have thought it right to give these evidences of the comparative inertness of large doses of iodic compounds: they seem to corroborate the statement that where iodine proves mischievous in small doses, it is owing to its being in a free state, and that it then operates as a corrosive poison.

With a view of preventing gastric irritation, and especially in persons who have much gastric sensibility, it is better to give the iodine after a meal; when the topical action of the medicine will be much diminished. This is especially the case if potatoes, bread-pudding, rice, sago, tapioca, or other amylaceous substances have been taken; since, says M. Pereira, an iodide of starch (which possesses very slight local influence), is immediately formed in the stomach.

Externally, iodine has been largely and variously employed; viz., in morbid growths and tumours of nearly all kinds — cellular, glandular, and articular; and chronic cutaneous eruptions and ulcerations, particularly to those of a scrofulous kind. Iodine, iodide of potassium, and iodurettted iodide of potassium, have been severally used for this purpose in the form of ointment and liniment; also, the iodine in tincture, and the iodurettted iodine in solution. Under the head of morbid growths *bronchocele* is en-

titled to specific mention, as the disease for the cure of which iodine, both by inunction, and taken internally, was first brought into use. Of the glandular tumours I may instance those of the lymphatic glands of the neck, the mammæ, liver, ovaries, and prostate. Indurated and enlarged spleen has been treated by the same means. Chronic articular inflammation, in which the synovial capsules, as well as the fibrous textures of the joint, are implicated, as we find in rheumatism, gout, and white swelling, is often greatly relieved, and, at times, completely removed by the application of some of the forms of iodine ointment to the part affected. But in all these organic changes and morbid growths the effect of the iodine, externally applied, is greatly increased by the internal use of the remedy; and it not unfrequently happens that a successful result is procured by this conjunction, when either alone would have failed.

The ointment of iodine has been already spoken of. That of the iodide of potassium consists of from *half a drachm to a drachm* of the salt, and *an ounce* of lard; adding to the former a few drops of rectified spirit to aid in its more complete incorporation with the lard. *Iodine liniment* is made by adding the tincture of iodine to soap liniment. The *compound ointment of iodine*, or the ointment of ioduretted iodide of potassium, is made by rubbing *half a drachm of iodine* with *a drachm* of *iodide of potassium* and a fluid *drachm of rectified spirit*, and then mixing with *two ounces of lard.*

Stimulant, rubefacient, and *caustic solutions* of iodine, are employed by Lugol of the following strengths: —

	Stimulating Washes.			Rubefacient Solution.	Caustic Solution.
	No. 1.	2.	3.		
Iodine	gr. ii.	gr. iii.	gr. iv.	℥iv.	℥i.
Iodide of Potassium	gr. iv.	gr. vi.	gr. viii.	℥i.	℥i.
Distilled Water	℔i.	℔i.	℔i.	℥vi.	℥ij.

Lugol uses the stimulating washes in scrofulous ulcers, ophthalmia, fistulous abscesses, &c. When the scrofulous surfaces require stronger excitement than usual, he employs the rubefacient solution. In tubercular tumours which have obstinately resisted all other means of treatment, the rubefacient solution may be applied in admixture with linseed meal (forming the *ioduretted cataplasm* of Lugol). To prepare the mixture, the poultice is first made in the ordinary manner; and, when moderately cool, a sufficient quantity of the rubefacient liquid poured on it with a wooden measure. The caustic solution is used for touching the eyelids and nasal fossæ, to repress granulations, &c.

The tincture of iodine has been used by Bayle as an external application in mammary and other tumours (*Rev. Med.*, 1828 and 1829). More recently, Mr. J. Davies (*Selections in Pathology and Surgery*, published in Dunglison's Medical Library, 1839), has di-

rected attention to the curative powers of the tincture of iodine and of the compound solution, topically applied, in a large number of diseases, chiefly local, viz., phlegmon, extensive sloughing of the cellular membrane, acute inflammation of the joints, inflammation of the breast, gout, enlargement of the joints, inflammation of the absorbents, carbuncle, lupus or *noli me tangere*, malignant ulcers of the tongue and tonsils scrofulous swelling of the glands, whitlow, chilblains, lacerated, contused and punctured wounds, burns and scalds, ulcers. This is certainly an all-sufficient list of diseases in which iodine is applied externally, and to the part affected; and yet in all of them Mr. Davies has used the remedy, and, as he assures, with advantage in some and signal success in others. The first malady which he specifies is *erysipelas*, the topical remedy for which was iodine; but of course not to the exclusion of general treatment. The following case will serve to illustrate Mr. Davies's practice and the good effects of the remedy. "An elderly gentleman, who, in former years, had been a very active man, began to decline in general health about 1828, or the beginning of 1829. His bowels became irregular: his complexion appeared 'bilious;' his mental faculties, which were naturally very strong, began to show a decline; and, in a word, the general functions of the system became all more or less disordered. He was repeatedly cupped and leeched on the nape of the neck and temples, and the parts generally showed a disposition to inflame, more especially when leeches had been applied. In the summer of 1830, after the application of several leeches to the forehead and temples, a severe attack of erysipelas came on, which rapidly spread over the head and face, accompanied with a good deal of constitutional disturbance, such as quick pulse, furred tongue, and general uneasiness. The head was bald, having only a thin curtain of hair behind. *The tincture of iodine, reduced to half its strength, was applied by a camel's hair brush all over the head, temples, and face;* which, as may be supposed, gave him an odd appearance, from the brown or bronze colour it imparted to the skin. Next day the disease had all but disappeared. The local inflammation had nearly ceased, and the symptoms of constitutional derangement had much abated. The tincture, however, was applied once more, but still reduced in strength. No further trouble was found with the case." After giving another case of similar tenor, Mr. Davies adds:—"The remedy has since been frequently employed in cases of the above description, that is, erysipelas of the head and face, both at the infirmary and in private practice, *with uniform good effect.*" But such results are also displayed in other locations of the disease; erysipelas of the extremities has been equally benefited by it.

Mr. Davies supposes that iodine subdues inflammation by exciting the contractility of the capillaries; and it causes the living vessels to cast off the slough from the surface of foul ulcers. The tincture sometimes causes an itching or slight blush of the skin,

especially on the lower extremities, and then it should be discontinued; otherwise the cuticle will rise into small watery pimples, and will tease the patient for a few days; "but this effect is produced by it on the *healthy* skin only—when applied, for instance, to the skin covering a diseased joint, or when any induration or swelling is situated under the skin—for we have never found it to blister the cuticle and to cause exudation of lymph from the surface of an *inflamed* skin."

Preparations and Mode of Application.—Mr. D. uses the iodine in two forms, but by far more frequently in that of tincture by alcohol. The tincture is made by dissolving forty grains of iodine in an ounce of rectified spirit, and its strength is afterwards reduced by the addition of more spirit. The other form is an iodureted solution, which is made by dissolving thirty-two grains of iodide of potassium (hydriodate of potassa) in an ounce of distilled water, and by adding to the solution eight grains of iodine. With this iodureted solution, a lotion is made by the addition of distilled or common water, varying in strength according to circumstances, from one-eighth to one-fourth of the former. When the skin is thin and delicate in texture, the tincture should be reduced to half its strength, otherwise the cuticle may be raised in blisters, which should always be avoided if possible. But in induration of the glands, in chronic affections of the joints, in inflamed breast; in fact, in all affections whose seat is *under* the substance of the skin, the tincture should be employed in its full strength, unless the skin covering the seat of the disease be very delicate or irritable—that is, naturally irritable; for the remedy would soon deprive it of any morbid irritability.

The mode of using the tincture is to *paint* the affected part, suppose severe inflammation of the leg, with the tincture of its full strength, extending the application beyond the inflamed surface. At the end of twenty-four hours the skin will be much corrugated, and then the application of the tincture, of the same strength as at first, is to be repeated. At the expiration of another twenty-four hours, "the reduction of the swelling will have gone on rapidly, and only a remnant of the disease will be found to exist. The strength of the tincture must now be reduced to one-half, and its application continued daily or less often, according to circumstances, until the limb is well. After the second or third application of the tincture, we sometimes brush the limb over with spirit of wine alone, so as merely to dissolve the iodine which remains on the surface."

Mr. Davies gave the tincture of iodine a preference over all the customary remedies employed in *acute inflammation of the joints.* "It is necessary, however, to state, that no disease for which the iodine has been employed requires so much discretion on the part of the surgeon as the one under consideration. If used too strong at first, or applied too frequently, it may give rise to inflammation of the integuments, and cause, or add to the puffiness of the soft parts external to the joint; but we have not known it in

any one instance to aggravate the internal inflammation. We speak more particularly of the knee-joint." When the hip is the joint affected, Mr. Davies recommends leeches to be applied to the groin and behind the great trochanter; and after the bleeding has ceased, the whole of the upper part of the thigh, the hip and the groin, should be well painted over with the tincture of its full strength. The application, as in all other cases, should be repeated according to circumstances. When there has been chronic disease with enlargement, on the ankles or wrists, Mr. D. generally prefers the iodine lotion, even to the tincture.

By painting over a *carbuncle*, whether it has been laid open or not, with the tincture of iodine, there is greater readiness in casting off the dead cellular matter and in forming granulations. The remedy is equally applicable to common *boils*, and has been used with advantage in several cases of *bubo*. In *malignant ulcers of the tongue and tonsils*, a cure has been effected by painting over with a brush the palate, tonsils, and uvula, repeating the application daily in some cases. Where there exists a *combination* of *laceration and contusion* in certain wounds, the surface of the wound is brushed over with the tincture, and the same application is made to the contused skin, however extensive. "In several instances of the minor kinds of punctured wounds the tincture of iodine has been used with that kind of almost undeviating success which it exerts over local diseases and injuries attended by inflammation." In reference to *burns* and *scalds* Mr. Davies says:—"Fortunately, since the tincture of iodine has been tried in burns and scalds, we have not met with a *very severe* accident of that description, but in four or five cases where the injury was upon a moderate scale, the remedy proved so successful as to leave scarcely a comparison between it and those commonly employed. It seems to act on burns and scalds as it does on erysipelas."

In all cases of *sloughing*, or *irritable* or *spreading ulcers*, Mr. D. applies the tincture of full strength freely over their surface, and to the skin to the extent of two or three inches round them. Having been allowed to remain for some time, the ulcer is covered over with simple ointment of lint, or with a poultice, the former being generally preferred. The same application is repeated daily until the ulcer becomes clear and healthy. The tincture is then weakened, and the granulations are touched with it every two or three days. Under this plan the cavity of the ulcer fills up rapidly with healthy granulations.

The great difficulty in healing with success many of the diseases for which Mr. Davies so warmly recommends the tincture of iodine, would of itself constitute a claim to respectful consideration for his practice. Happily, it has something more than novelty and the ardour of its promulgator, we cannot say discoverer, in its favour. Other surgeons and physicians have used the remedy with decided success under circumstances similar to those pointed out by Mr.

Davies. Among reliable authorities on this head I may cite Dr. Dunbar, of Baltimore, in whose clinical practice in the Washington College Hospital of that city, and in that of his colleague, Dr. Monkhur, the iodine tincture externally applied by painting the affected parts — inflamed and scrofulous joints and anomalous ulcerations — has been productive of the best effects. Guided by Mr. Davies's practical remarks, Dr. Lanyon (*Lancet*, vol. ii., 1840, and *Eclec. Journ. of Med.*, vol. iv., 1840) has made use of the tincture of iodine externally in cases of phlegmonous and common erysipelas, swelled and painful testicle, phlegmon or boil, with entire success. Dr. L. concludes his paper by the observation: "When I read Mr. Davies's work, I concluded that he had overzealously claimed too much for his remedy; but on patiently investigating its merits, I find he is fully borne out in the assertion, that iodine is 'by far the most efficient topical application in our possession.' Dr. Lanyon details a case (*Lancet*, vol. i., 1839–40) of *phagedæna oris*, in which he applied the tincture of iodine to every part of the ulcerated surface, with the effect of arresting the progress of gangrene, exciting the parts to throw off sloughs and to put on healthy granulations.

In *hydrocele*, tincture of iodine has, within these few years past, been frequently used by M. Velpeau (*Archiv. Gen. de Med.*, Jan. 1837), in place of wine, as an injection into the vaginal sac: it is said to produce a complete adhesion of all points of the surfaces of the sac. The fluid of injection consisted of the proportion of one to two drachms of the tincture in iodine to an ounce of water. Twenty cases were reported (*ut supra*), eighteen of which were cured in less than twenty days (See also *Eclec. Jour. of Med.*, vol. ii., p. 348). Distention by the injected liquid is unnecessary. M. Velpeau seems to have been anticipated in this new practice by Mr. Martin of Calcutta, who, in a paper communicated to the Medical and Physical Society of Calcutta in Jan. 1835, and published in the *seventh* volume of their Transactions, states that he had, up to the time of presenting his paper, treated upwards of ninety cases with the iodine injection without danger or inconvenience. Twelve cases of double hydrocele, treated *on both sides at once*, recovered with quite as much ease and expedition as single cases. In the *Indian Journ. of Med.*, for May, 1836, Dr. Stewart relates the treatment, successfully, of two cases of hydrocele, by the iodine injection (*Am. Journ. of Med. Sciences*, vol. xxi., pp. 238–9, 1837–8). In a subsequent report, Mr. Martin gives an additional account of his treatment of hydrocele, from which it appears that he has treated no less than 777 cases for this disease since March, 1832; of these, 766 had the solution of tincture of iodine injected, and retained as formerly. Of all the cases treated in this way there were but four cases of failure (*Am. Journ. of Med. Sciences*, vol. xxiii., pp. 484–5). Dr. Post (*New York Journ. of Med. and Surg.*, vol. ii., p. 369, gives a case of double hydrocele in which he used the iodine as above on one side with success; and Dr. Norris (*Am. Journ. of Med. Sciences*,

vol. xxiii., p. 299) relates a case which, in his hands, was equally successful by the same means.

Iodureted Baths.—These are employed by Lugol in the treatment of scrofula. They are to be made in wooden vessels, of varying strength, according to the age of the patients, and exigency of the case. Thus, for a child from four to seven years old, he prescribes 30 to 36 grains (troy) of iodine and 60 to 72 of iodide of potassium, to be mixed and dissolved in 36 quarts of water; and, for one of 11 to 14 years, the iodine is 72 to 96 grains; of iodide 144 to 192 grains, and 125 quarts of water. For an adult the proportions are, to 2 to 2½ drachms of iodine, and 4 to 5 drs. of iodide to 200 quarts of water; and another formula gives 3 to 3½ drs. of the former article, and 6 to 7 drs. of the latter in 300 quarts of water.

Iodine has been used by inhalation, in chronic bronchitis and pulmonary consumption, by Drs. Murray and Berton, and Sir Charles Scudamore, by whom apparatus for its administration in this way have been described (*Bell on Baths and Mineral Waters*, pp. 325–40). More recently the *British and Foreign Medical Review*, April, 1838, speaks favourably of it as a palliative in consumption and a valuable remedy in bronchitis: and Dr. Corrigan (*Med. Gaz.* Vol. II. 1839, pp. 49–51.) regards inhalation of iodine, practised on proper conditions, as a means of diminishing most remarkably the profuse and purulent expectoration of phthisis. As respects the quantity of the medicine thus applied to the pulmonary mucous surface, Dr. C. says, that if we suppose the patient to inhale only one-twentieth of the iodine evaporated, he will inhale in each hour, and apply to the diseased surfaces, one grain and a half of iodine in a state of the most minute division or solution. If properly applied, and as a preliminary condition, intimately mixed and suspended in abundant watery vapour, Dr. Corrigan tells us that it will not be productive of any irritation of the larynx.

Iodine with other Elementary Bases.—I have anticipated the description of the therapeutical effects of iodide of potassium, which ought, pharmaceutically, to find its place under the head of Potassium and its various combinations; but as the medical virtues of the salt are due to the iodine which enters into its composition, I thought it better to place it under the head of this latter: as this reason does not apply with equal force to the iodide of iron, I introduce it in the same connexion with the preparations of that metal. That the series of iodinic combinations may be presented on this occasion entire, I shall now speak of the *Sesqui-Iodide* and the *Proto-iodide of Carbon*, the *Iodides of Sulphur* and *of Arsenic*, and the compound of *Arsenic*, *Mercury*, and *Iodine*, none of which are noticed by Mr. Brande. The Iodides of Lead, and Zinc, the latter not described by Mr. Brande, will be considered under the heads of those metals respectively—Plumbum and Zincum.

Carbonis Sesquiodidium (*Sesqui-Iodide of Carbon*).—On mixing concentrated alcohol solutions of iodine and potassa until the former loses its colour, we obtain a solution, from which the addition of water will throw down a yellow

precipitate — the sesqui-iodide of carbon. This substance is soluble in alcohol and ether, but insoluble in water. The ethereal solution yields large yellow crystals by slow exaporation.

Dr. Cogswell, who, in his Essay so often quoted, gives the above formula, adds, on the authority of Dr. Turner, that it has a sweet taste, and a strong saffron-like odour. Dr. C. shows by experiments on a dog, which he made to swallow fifty grains of the sesqui-iodide, that the blood, the brain, spinal cord, muscles of the extremities, liver, and kidneys, were strongly impregnated with combined iodine.

Of the medical virtues of this compound our knowledge is limited. Dr. Lichfield states (*Med. Gaz.*, August, 1836), that he has used it with advantage in five examples of enlarged glands, two of *lepra* and three of *porrigo*, in the form of ointment composed of ℥ss. of the powder to ℥vi. of the simple cerate.

Proto-Iodide of Carbon.—Mitscherlich, who first accurately determined the composition of the compound already described, but which had been discovered by Serullas, found that, on distilling it with an equal weight of corrosive sublimate, a fluid was procured heavier than water, and which turned out to be a proto-iodide. As thus obtained, the present substance has an orange-red colour said to arise from iodine, and is mixed with chloride of iodine, from both of which it is liberated by washing with aqua potassæ, and the fluid then remains clear and colourless.

A single and imperfect experiment by Dr. Cogswell is all the datum from which to draw any inference respecting the effects of this substance on the animal economy. He is disposed to place it on the same line with strychnia and brucia, in its chief influence being directed to the spinal marrow, causing convulsions and difficult breathing, but no cerebral disturbance.

Sulphuris Iodidum (*the Iodide of Sulphur*). — On mixing together Iodine and Sulphur, in single atomic proportions, they readily enter into combination by the aid of a gentle heat. The iodide of sulphur is a solid substance, of a dark gray colour, a radiated and sometimes lamellar appearance, and exhales an odour of iodine. According to Gay-Lussac, the iodine sublimes by distillation with water; the vapour, however, is constantly rising even below ordinary temperatures.

The mutual affinity of the constituents of iodide of sulphur, therefore, continues Dr. Cogswell, appears to be very feeble. A portion of it placed side by side with free iodine in a portion of intestine, imbibed it with fully as deep and penetrating a colour, so that it would have been hard to distinguish which was the effect of either of these substances.

The chief employment of the iodide of sulphur in medicines, has been in the external treatment of diseases of the skin. In these M. Biett is said to have found it of unrivalled efficacy, even to its surpassing the protonitrate and the iodides of mercury, as a resolvent of the tubercles in *lupus* and *acne* indurata. In old standing *lepra*, Rayer prefers it for external use to calomel and white precipitate, and he ranks it in the first class along with the iodides of

mercury, for the cure of *lupus non exedens.* Drs. Copland and J. Y. Simpson have been equally successful with the remedy in cutaneous complaints. Dr. Cogswell, however, does not believe that the present compound differs from iodine in its peculiar effects upon the animal economy.

Iodide of Arsenic. — The fullest account of the Preparation and Nature of the Iodide of Arsenic, is that given by Dr. A. T. Thomson at a meeting of the British Association in Newcastle, 1838. (See also *Lancet,* Vol. I., 1838–9.)

This iodide may be made by triturating together 75·4 parts of levigated pure metallic arsenic, and 631·5 of dry iodine, aiding the combination by a moderate degree of heat. But a better method, is that suggested by Mr. Plisson (*Ann. de Chimie et de Phys.* t. xxxix. 266), is to boil together in a glass flask, 150 parts of levigated pure arsenic, and 750 parts of dry iodine, in 7680 parts of water, and when the fluid acquires a lemon-yellow colour, to filter, and to evaporate the filtered fluid to dryness, stirring assiduously, and mixing the concreted portions with the fluid, until the whole becomes solid. This preparation may be, afterwards, sublimed in close vessels, without undergoing decomposition.

Both for toxicological and pharmaceutical purposes, it is desirable to know the physical and chemical properties and tests of this compound; and hence I shall repeat what Dr. Thomson says on the subject. The iodide of arsenic, unsublimed, is of a pale brick-red colour, and inodorous, and impresses a slight metallic taste on the palate; when sublimed it forms brilliant scales; when thrown into a quantity of water, inadequate to the solution of the whole of the iodide, decomposition ensues; an acidulous hydriodate, according to Plisson, remains in solution, whilst a sub-hydriodate is precipitated. In a large quantity of water the whole of the iodide dissolves, without decomposition, and forms a lemon-yellow solution, which has an acid reaction, and which is gradually decomposed, when long exposed to the air, assuming a deep-brown colour and exhaling the odour of free iodine. When the solution is made with boiling water, beautiful scales are deposited as it cools, which Plisson regards as a sub-hydriodate, and the fluid retains in solution the acidulous hydriodate. Dr. Thomson is disposed to regard this supposed hydriodate as a mixture of iodide and arsenious acid.

Incompatibles. — The solution of the neutral hydriodate is decomposed by nitric, sulphuric, and nitro-hydrochloric acid, consequently by chlorine, hydrosulphuric acid, solutions of ammonia, sulphate of copper, ammonio-nitrate of silver, bichloride of mercury, the nitrates of mercury, the acetate and diacetate of lead, chloride of lead, nitrate of lead, chloride of gold, of copper, and iodide of potassium. Ammonia changes the colour to a pale-violet hue, but no precipitate falls.

Allowable Combinations. — The solution may be administered medicinally in combination with the infusions or the decoctions of cascarilla, cinchona, cusparia, and solutions of catechu, guaiacum, and opium; no decomposition taking place.

Although this iodide readily sublimes, forming, as before mentioned, beautiful crystalline brilliant scales; yet, if the temperature be ranged to 280° F., decomposition takes place, and iodine and arsenic are separately sublimed.

The *physiological* action of the iodide of arsenic on the animal economy closely resembles that of the arsenious acid, but it is modified by the iodine. In minute doses it is rapidly carried into the circulation, and is, probably, decomposed; and the iodine converted into hydriodic acid; the iodine can be detected in the urine and the other secretions, soon after the iodide has been taken; but Dr. Thomson, who makes the preceding observation, adds, that he has never been able to detect the arsenic in any of the secretions. Its effects, in the first instance, are those of a tonic; the appetite is increased; but after its use has continued for ten or twelve days, a degree of pain is experienced at the epigastrium, accompanied with thirst, a dry state of the throat, slight fever, and sometimes with diarrhœa and tenesmus; the skin, also, becomes dry, and the urinary secretion is augmented in quantity. If the use of the iodide be still farther prolonged, the nervous system is rendered extremely irritable, and wakefulness supervenes. Dr. Thomson has never seen it to produce salivation, which occasionally results from the long-continued use of the arsenious acid.

Medical Uses.—M. Biett had employed the iodide of arsenic, externally, in the form of ointment, in some inveterate cutaneous affections; but Dr. Thomson was, we believe, the first to administer it internally (June, 1835): he gave it in minute doses in a long-standing case of *lepra vulgaris*. The beneficial influence which it exerted in this case, and the rapidity with which the disease was cured by it, induced Dr. Thomson to prescribe it in many other diseases, in hardly any of which has it disappointed his expectations. He considers it nearly a specific in chronic impetigo, a disease which has resisted nearly every other remedy. The author adds: when the action of the medicine has been closely watched, and its administration discontinued as soon as the throat becomes sore, or pain in the epigastrium is experienced, he has never seen its employment followed by emaciation, nor the softening or the wasting of glands, nor by irritative fever, such as sometimes occur when iodine is administered: on the contrary, the health has improved, the strength has become augmented, and the body has obviously increased in bulk. The *dose* is an *eighth* to a *sixth* of *a grain* combined with extract of conium, in the form of a pill, two or three times a day. In one of the two cases detailed by Dr. Thomson, the extract of conium was at first given in doses of three grains, but these were gradually augmented until a drachm was taken in the course of the day. Three grains of the iodide of iron were also given in the period between the pills, and the patient was strictly confined to a milk diet, and all kind of stimulants was prohibited. The disease was carcinomatous tumours of both breasts. This plan of treatment was pursued for eleven months, during

which the iodide of arsenic was carried to the third of a grain. The cure was complete. Much as we may be disposed to attribute, in the above case, to the conium and the mild diet of the patient, it must be remembered that the same beneficial result did not follow the treatment of other cases in which the iodide of arsenic was not used. Dr. Thomson's theory of the *modus operandi* of this remedy is, that it acts upon the capillary system, so as greatly to improve the general glandular and secreting functions, and not only to check the deposition of the carcinomatous matter, but to enable the system to throw off that which is already deposited.

Dr. Thomson, partial as he may seem to be to the iodide of arsenic, admits that, as it is much more energetic than the arsenious acid, and as the system does not seem so ready to accommodate itself to its influence as to this latter, the dose *must be augmented with great caution ;* and its employment should be altogether suspended on the first indication of its topical acrimony.

The same circumstances which contraindicate the internal employment of arsenious acid, ought to influence the administration of the iodide of arsenic ; namely, an irritable or very plethoric condition of the system, the presence of inflammatory fever, and the hemorrhagic diathesis. When phthisis or hectic fever is present, iodide of arsenic should not be prescribed. Dr. Thomson did not find any disadvantage to attend its employment in children; on the contrary, he gave it to a girl of twelve years of age, labouring under impetigo, in larger doses than he had ventured to prescribe it to adults, without the smallest deleterious effect.

M. Biett's employment of iodide in the form of ointment for external use has been already adverted to : the proportions were, iodide of arsenic, gr. iii. ; lard, ʒi. M. As an application to corroding tubercular skin diseases.

Dr. Thomson, however, thinks that, owing to its effects when applied to a wound, in one of the experiments on animals which he performed with the iodide, great caution is required in applying it to a denuded surface.

From the observations and experiments made by Dr. Thomson, he draws the conclusions :—That when iodide of arsenic is administered in non-poisonous doses it is carried into the circulation, enters all the secretions, and consequently may be administered to infants at the breast through the milk of the mother : in moderate doses, not too long continued, it improves both the digestive and the assimilating functions, invigorates the muscular power, and augments the bulk of the body : the same salutary effects are obtained from its employment, as a therapeutical agent, whether it be administered in the solid form or in solution. When its internal use is long continued, it accumulates in the system, and displays symptoms of poisoning, namely, pain at the epigastrium and in the lower bowels, tremors, and general febrile excitement. In large doses it is a most virulent poison, inflaming the tissues to which it is applied,

and softening and gelatinising the mucous membrane of the stomach, and occasionally causing ulceration. When administered in large doses, or applied to mucous or serous surfaces, or to an ulcer or a wound, it is absorbed, and exerts a deleterious influence on the nervous centres and the heart. From its effects when its solution is injected into the veins, and from both sides of the heart being found turgid with coagulated blood, the same as when death ensues from large doses introduced into the stomach, we may venture to conclude that, independently of its topical action, it kills chiefly by its powers of destroying the irritability of the heart.

To all this I would add the advice, to regard the iodide of arsenic, as well as the compound of iodine, arsenic, and mercury, to be afterwards spoken of, as a remedy in reserve, and to be employed only in extreme or intractable cases, after due trials have been made of the other and less potent and dangerous articles of the Materia Medica, which experience has indicated to be useful under the required circumstances. In cutaneous diseases preference ought to be given to the *iodide of ammonium*, for example, which was originally introduced into practice by M. Biett, and the success of which has been tested in a number of cases of *lepra* and *psoriasis* (*Am. Jour. of Med. Scien.*, vol. xv. p. 378-9). It is formed by adding caustic ammonia to hydriodic acid, to the point of saturation, and evaporating the solution. This iodide is used in the form of ointment, which consists of from a scruple to a drachm of the iodide and an ounce of lard.

Chemical Combination of Arsenic, Mercury, and Iodine. — Mr. Donovan (*Dublin Journal*, Nov. 1839, and *Lancet*, Vol. I., 1839–40, p. 900), gives the following formula for this new combination: Triturate 6·08 grains of finely levigated metallic arsenic, 15·38 grains of mercury, and 50 grains of iodine, with one drachm-measure of alcohol, until the mass has become dry, and from deep-brown has become pale-red. Pour on eight ounces of distilled water, and after trituration for a few moments, transfer the whole to a flask; add half a drachm of hydriodic acid, prepared by the acidification of ten grains of iodine, and boil for a few moments. When the solution is cold, if there be any deficiency of the original eight ounces, make it up exactly to that measure with distilled water. Filter.

Of this *liquor hydriodatis arsenici et hydrargyri*, or solution of the *iodide of arsenic and mercury*, each drachm consists of *water*, one drachm; *protoxide of arsenic*, one-eighth of a grain; *protoxide of mercury*, one-fourth of a grain; *iodine*, (converted into hydriodic acid), four-fifths of a grain. The colour of the solution is yellow with a pale tinge of green: its taste is slightly styptic. It cannot be properly conjoined with tincture of opium, or with sulphate, muriate, or acetate of morphia; for all these produce immediate and copious precipitates in it. Hence, if opiates are to be used during the exhibition of this arsenico-mercurial liquor, they must be taken at different periods of the day. Tincture of ginger produces no bad effect. The following formula is proper: — Solution of hydriodate of arsenic and mercury, 2 drachms; distilled

water, 3½ ounces; syrup of ginger, ½ an ounce. Divide into four draughts; one night and morning. This would give one-sixteenth of a grain of protoxide of arsenic, which is no doubt the proper dose to begin the exhibition of this active medicine with, although it may afterwards be increased with advantage.

The division into draughts is necessary, Mr. Donovan thinks, first to insure accuracy of the dose, so essential in the case of this active medicine, and next, to prevent injury to the ingredients by the use of a metallic spoon as a measure—the general way in which, unfortunately, the dose of a medicine is determined.

The formula is recommended by Mr. D. in cases in which its ingredients have been found serviceable—a large circle of diseases this, by the way. Mr. Carmichael testifies to its value.

Hydriodic Acid.—Frequent mention having been made of this acid, as well as reference to its effects, it may be well to conclude this extended article on Iodine and its compounds by a notice of this, which is a combination of iodine with hydrogen. Dr. Buchanan's formula is, to dissolve 264 grs. of tartaric acid in 1½ ounces of distilled water, and to this add a solution of 330 grs. of iodide of potassium, also dissolved in 1½ ounces of distilled water. When the bitartrate of potassa has subsided, strain, and to the strained liquor add sufficient water to make fifty drachms (℥vi. ʒij.) of solution.

Should cases of medico-legal inquiry occur, in which iodine or its compounds are implicated, it deserves to be remembered that it may always be traced in the urine, and that in some cases its presence may even be detected in that secretion, four, five, or even six days subsequent to its administration. The blue colour which it produces with starch is a delicate test of its presence; but to be thus indicated, it must be in a free state. To detect it, therefore, when combined with hydrogen or with potassium, as in the hydriodic acid, and in the iodide of potassium, those compounds must be decomposed by sulphuric or nitric acid, and the starch test will be effective. An elegant and accurate test of the presence of iodine is obtained by mixing the solution suspected to contain it with a solution of starch; a few drops of each, in a watch-glass, for instance; and then applying the platinum electrodes of a small voltaic power; the iodine is elicited at the anode, or electro-positive surface, and there the blueing immediately ensues.

In complex mixtures, organic and inorganic, Dr. Christison recommends the following system of analysis for the detection of iodinic compounds:—"Add water, if necessary, and filter, and if the fluid which passes through is tolerably free from colour, test a little of it with sulphuric acid and solution of starch. If the colour is too deep to admit of this trial, or the test on trial does not act, unite the fluid and solid parts and transmit sulphuretted hydrogen to convert any free iodine into hydriodic acid. Drive off the excess of gas, supersaturate with a considerable excess of potassa, filter,

and evaporate to dryness. Char the residue at a low red heat in a covered crucible; pulverise the charcoaly mass, and exhaust with water. The solution will probably act characteristically with starch and sulphuric acid; but on the whole, it is better in the first instance to remove some of the salts by evaporating to dryness and exhausting the residuum with alcohol. The alcoholic solution contains the iodide of potassium with some other salts, and on being evaporated to dryness, a residuum is left, on which, when dissolved in water, the starch and sulphuric acid will act characteristically. No other test is necessary, and frequently no other test will act, in consequence of co-existing salts." By this process, one grain of iodide of potassium may easily be detected in six ounces of urine. It must be recollected in all cases where starch is used as a test of the presence of iodine, that the blue iodide is soluble in hot water with the loss of its colour, but that as the solution cools the blue colour returns.

IPECACUANHA. *Radix.* The *root* of the *Cephaëlis Ipecacuanha. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Cinchonaceæ.

This plant is found in the woods of Brazil and the mountains of New Granada. The root is perennial, simple, or divided into a few diverging branches seldom more than four or six inches long, about as thick as a goosequill, ringed; when fresh, pale-brown; when dry, umber-coloured, blackish, or grayish-brown; the cortical integument with a reddish, resinous, glittering fracture, and readily separating from a central woody axis.

This is the species of ipecacuanha which is most esteemed; it is usually called *Annulated Ipecacuanha:* it is also known under the name of *Brazilian*, and *Lisbon Ipecacuanha.* It is imported in bales from Rio Janeiro; it is in short wrinkled or knotted pieces, covered with a gray-brown epidermis, and having a central woody fibre, surrounded by a pale-gray cortical part, which breaks short and resinous, and in which its virtues reside; the larger, therefore, its relative proportion the better.

The colour and some of the characters of this species vary, according to the soil in which it has grown; the varieties called brown, black, and red ipecacuanha, are probably produced by such causes.

The roots of some other South American plants are also imported into Europe under the name of *Ipecacuanha.* The variety, for instance, called *undulated* or *amylaceous Ipecacuanha*, is the root of the *Richardia* or *Richardsonia scabra, pilosa*, or *Braziliensis;* it is of a grayish-white colour, and rather indented than annulated; its fracture is not resinous, but mealy, and it generally has a nauseous musty odour. Another root is the *black, striated*, or *Peruvian Ipecacuanha;* it is of a blackish or brownish-gray colour, resinous fracture, and affords a dark-gray powder. Other roots are also occasionally met with in commerce under the name of

Ipecacuanha, which do not belong to the family of the *Cinchonaceæ;* those of the *Ionidium Ipecacuanha*, for instance, which belongs to the *Violaceæ*, is sometimes substituted for the genuine root, in the province of the Mines of Brazil: they contain *emetina*, but in smaller quantities than the roots of the cephaëlis.

The varieties of ipecacuanha contain a peculiar principle to which their powers are owing, and which has been termed *Emetina;* it was discovered by Pelletier and Magendie, in 1817. It may be obtained by digesting powdered ipecacuanha, first in ether, by which the fatty matter is abstracted, and then in alcohol; from the alcoholic solution magnesia throws down impure emetina; the deposit is well washed with cold water, dried, and boiled in alcohol; from this solution the emetina is obtained by evaporation. Emetina may also be obtained by digesting powdered ipecacuanha in dilute sulphuric acid, precipitating by magnesia, washing and drying the precipitate, and digesting it in alcohol.

Emetina is yellowish, uncrystallisable, bitter, fusible at about 125°, soluble in pure alcohol, but nearly insoluble in water and in ether. It has an alkaline reaction upon reddened litmus paper, but its salts have not been satisfactorily examined. It forms an insoluble precipitate with infusion of galls, which is said to be inert.

The *fatty matter* of ipecacuanha has a nauseous odour, especially when heated, and an acrid taste; it appears to be nearly inert, or, at all events, not emetic.

Emetina produces vomiting in doses of less than one grain, but that which is usually obtained is impure, and therefore of variable power. According to Magendie, two grains of pure emetina will kill a dog, the symptoms being frequent vomiting, followed by drowsiness, coma, and death in from fifteen to twenty-four hours. The same effects follow its injection into a vein, and its application to a wound. In the dead body, the stomach and the lungs are found inflamed. Emetina is rarely employed; its only advantage seems to be that of activity in much smaller doses than ipecacuanha; its high price and uncertain purity ought, therefore, to exclude it from use.

Properties and Uses of Ipecacuanha Root.—Ipecacuanha was introduced into notice in Europe by Helvetius in the reign of Louis XIV. It is generally used in the form of powder, and in pulversing it, the central woody fibre, or meditullium, which constitutes about a fifth part of the weight of good ipecacuanha, should be rejected. It is not easily pulverisable unless it has been well dried, and the dust which it throws off during the process is apt to excite great irritation of the respiratory organs. In some persons, the mere odour of the root produces a distressing sense of tightness across the chest, and violent sneezing. Dr. Prieger has published a case of a druggist's servant who, in consequence of inhaling the dust of ipecacuanha, was attacked with vomiting and an alarming sense of suffocation; the dyspnœa remained several days, but the

uneasiness in the throat was soon removed by the use of decoction of rhatany and uva-ursi. The following case of Mr. Roberts, a surgeon at Dudley, is recorded by Mr. Pereira (*Med. Gaz.*, xviii. 778). "If I remain in a room where the preparation of ipecacuanha is going on, for instance, making the *Pulvis Ipecacuanhæ, Compositus*, I am sure to have a regular attack of asthma. In a few seconds, dyspnœa comes on in a violent degree, attended with wheezing, and great weight and anxiety about the præcordia. The attack generally remains about an hour, but I obtain no relief until a copious expectoration takes place, which is invariably the case. After the attack is over I suffer no further inconvenience. I have always considered that the attack proceeds from the minute particles of ipecacuanha floating in the atmosphere, acting as an irritant on the mucous membrane lining the trachea and bronchial tubes." A young gentleman attending lectures in the University of Pennsylvania at the same time with myself, used to be similarly affected with the volatile powder of ipecacuanha.

The medical effects of ipecacuanha vary considerably with the dose, the mode of preparation, and the adjuncts. In very small doses, it is expectorant and tonic; in larger doses it nauseates, and has a sudorific and aperient tendency; its decoction, after long boiling, loses its emetic powers, but remains laxative; when conjoined with opium it is a certain and powerful diaphoretic; and in larger doses it vomits: it is, therefore, calculated to fulfil a variety of indications.

In the dose of a quarter of a grain to a grain every three or four hours, ipecacuanha is diaphoretic and expectorant; and in the latter sense is a valuable remedy in inflammatory catarrhal affections, more especially of children, to whom the wine of ipecacuanha may be given in doses of from five to twenty drops. In these smaller doses, also, that is, barely to nauseate, it is found to lessen the impetus of the circulation, and hence is said to be of service in active hemorrhage.

In doses of from one to three grains, ipecacuanha may be so managed as merely to nauseate, and in this way it has been found useful in certain obstinate diarrhœal and dysenteric affections; and in dyspepsia. It, also, under the same circumstances, adds to the activity of purgative medicines, and is occasionally conjoined with them where determination to the surface is required.

℞ Pulveris Ipecacuanhæ gr. j.; Pulveris Jalapæ gr. x.; Calomelanos gr. ij. Fiat pulvis vehiculo idoneo sumendus.

Ipecacuanha furnishes us with the only vegetable emetic to be relied upon; evacuating the stomach certainly and completely, without any material consequent debility, or purging, and being milder and safer in its operation than the generality of such medicines. The emetic dose of ipecacuanha is from *fifteen to twenty grains* of the powdered root, in about an ounce of any aromatic

water. In ten or fifteen minutes it nauseates, and when retching comes on, and not before, moderate draughts of warm water, or chamomile tea, should be taken to promote its operation, and thoroughly to wash out the contents of the stomach. If the powder be taken in a large quantity of liquid, or if warm water be too copiously swallowed immediately after the emetic, vomiting is apt to come on too rapidly, and the contents of the cardiac portion of the stomach only are thrown off, while the pyloric end escapes the evacuation.

Where an emetic is administered at the commencement of fevers, with a view of blunting their violence, or cutting short their progress, and especially if given upon the accession of the cold stage of an intermittent, a grain of tartarised antimony may be added to fifteen of ipecacuanha; this extends the duration of the nausea and of the vomiting, and tends more decidedly to promote perspiration:—

℞ Antimonii Potassio-tartratis gr. j.; Pulveris Ipecacuanhæ gr. xv.; Aquæ Menthæ Viridis f℥xj.; Syrupi Croci f℥j. Fiat haustus emeticus.

Such an emetic is highly proper in the early stage of many diseases, especially at the commencement of inflammatory sore throat, of quinsey, and of laryngeal and tracheal inflammation. It ought to be followed up by a diaphoretic regimen. Some practitioners prefer ipecacuanha to antimony in croup; and not unadvisedly where the attack is mild: but in the more severe cases we must not look to vomiting in itself as a means of relief so much as an evidence of the reduction of vascular action and morbid excitement, which is much more effectually obtained by means of the antimony than of ipecacuanha. Besides, there is reason to believe that the former exerts, at once, a peculiar and depressing action on the par vagum and its branches which supply the larynx and trachea; while that of ipecacuanha on the same nerve is, at first, irritating.

Where there is decided fulness of the cerebral vessels, and in cases of hernia, of passive hemorrhage, and in advanced pregnancy, emetics are obviously contraindicated.

The operation of an emetic is sometimes followed by suppression of urine. Dr. Heberden mentions the case of a young woman (*Commentaries*), and Mr. Brande has seen another, in which scarcely any urine appeared to be secreted for nearly twenty-four hours after the vomiting. I have known this to occur in sea-sickness.

The following are the formulæ of ipecacuanha in the present *London Pharmacopœia*:—

Wine of Ipecacuanha. — Take of Ipecacuanha, bruised, two ounces and a half; Sherry Wine, two pints. Macerate for fifteen days, and filter.

In the dose of *twenty to forty minims*, this is an effectual adjunct to expectorants and diaphoretics; as an emetic, it is frequently given to children in the dose of a tea-spoonful every ten minutes till it operates. Dr. A. T. Thomson states that a pint of sherry wine takes up 100 grains (of the soluble matter) of ipeca-

cuanha, "and as the active part of the root, or emetina, is more soluble in acetic acid than any other menstruum, the acescency of the wine is no objection." The acescency of sherry, however, is, or ought to be, dependent upon bitartrate of potassa, and as we are not sufficiently acquainted with the properties of the salts of emetina, an alcoholic tincture of ipecacuanha would, perhaps, have been preferable to the wine.

Compound Pills of Ipecacuanha. — Take of Compound Powder of Ipecacuanha three drachms; Squills, fresh dried, Ammoniacum, each a drachm; Mixture of Acacia, as much as may be sufficient. Beat them together until incorporated.

This is a good diaphoretic and sedative expectorant; ten grains, divided into two or three pills, may be taken at bed-time to allay cough.

Compound Powder of Ipecacuanha. — Take of Ipecacuanha in powder, Hard Opium in powder, of each one drachm; Sulphate of Potassa, powdered, an ounce. Mix.

A grain of opium is contained in ten grains of this powder. It is an excellent sudorific: it should be given at bed-time in a small quantity of liquid, for it is apt to nauseate if copious drinking be resorted to immediately after its administration. A ten-grain dose of this powder frequently vomits. In febrile and rheumatic affections, and in all cases where a sedative diaphoretic is required, its certainty of effect especially recommends it; but when prescribed with this view, it ought to be in repeated doses at regular intervals, during a period of twenty-four to forty-eight hours.

The combination of ipecacuanha and opium in the above powder constitutes its activity; the sulphate of potassa is a convenient vehicle. In the original "Dover's Powder," for which this is intended as a substitute, the saline ingredient was obtained by deflagrating nitre with sulphate of potassa; but this formed a deliquescent mixture, and, therefore, less appropriate than the above; nitre is, however, often a proper adjunct, except in cases in which it irritates the stomach, and especially the cardia.

In the dose of five grains, this powder often proves effective, especially if conjoined with an equal quantity of mercurial pill, where that remedy is not contraindicated, or with half a grain of calomel. This combination is highly serviceable in subacute and chronic bronchitis and dysentery. From ten to twenty grains of the powder itself, in a common saline draught, is the usual mode of prescribing it where its full powers are wanted; it is, however, less apt to nauseate when given in pills, or in currant-jelly, or thick gruel.

IRON, *see* FERRUM.

JALAPA. *Radix.* Jalap; the *root* of the *Ipomœa Jalapa. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Convolvulaceæ.

This plant is a native of the eastern declivity of the Mexican Andes, near Chiconquiaco and near San Salvador, at an elevation

of 6000 feet above the level of the sea; also on the mountains near Orizaba.

The root is tuberous and fleshy, with many rounded tubercles. Stem smooth and brownish.

Jalap was first brought to Europe about the year 1610. The most select comes from Vera Cruz. The root, when fresh, abounds in milky juice. It is imported in irregular globular pieces, and their sections and slices; it should be dense and of a resinous fracture, exhibiting a brownish-gray interior, and a concentric arrangement of its layers. Its odour, especially when in powder, is very characteristic; its taste exceedingly nauseous, accompanied by a sweetish bitterness. Those pieces which are light, spongy, pale-coloured, worm-eaten, and inodorous, and which do not readily burn in the flame of a candle, should be rejected, as either injured or spurious.

The following are the officinal formulæ of jalap in the *London Pharmacopœia*: —

Extract of Jalap. — This extract should be kept *soft*, fit to form pills, and *hard*, so that it may be rubbed to powder.

Compound Powder of Jalap. — Take of Jalap, three ounces; Bitartrate of Potassa, six ounces; Ginger, two drachms. Rub them separately into powder, then mix.

The common antibilious powder in the southern states, at least in Virginia, where, when a student, I have so often compounded it, is made by adding sulphate of potassa to the above, in the same quantity as the cream of tartar.

Jalap is one of the most valuable of the drastic purgatives; the best form for administering it is in powder; the extract is less certain in its effects. In the dose of from five to twenty grains of the powder, it usually produces watery motions, with some gripings, and an increased flow of urine. Where the intestines are to be thoroughly evacuated, it may be united with other remedies of the same class, as with calomel, scammony, senna, &c.

℞ Pulveris Jalapæ gr. xv.; Hydrargyr. Chloridi gr. iij. ad gr. x. M. fiat pulvis e vehiculo idoneo sumendus.

℞ Pulver. Jalapæ ℈j.; Infusi Sennæ c. f℥j.; Aquæ Cinnam. f℥ss. M. fiat haustus purgans.

These are effectual purges; the latter especially, says Mr. Brande, for evacuating the bowels of boys who have over-eaten themselves; they sometimes nauseate and vomit, but enough usually remains behind to purge also.

As a diuretic, the qualities of jalap are much increased by combining it with bitartrate (sup. tart.) of potassa; hence, in such cases, the use of the *Pulvis Jalapæ Compositus*, given in the dose of from fifteen to forty grains; and an electuary composed as follows, it is also a good diuretic purge: —

℞ Confectionis Sennæ ℥ij.; Pulver. Jalapæ ℥j.; Potass. Supertart. Pulv. ℥ss.; Syrup. Zingiber. ℥j. M. Sumat cochl. j. min. bis vel ter die.

Or the following draught may be taken two or three times a day: —

℞ Pulv. Jalapæ gr. v.; Aceti Scillæ f℥j.; Aquæ Menthæ Viridis f℥x. Misce. Fiat haustus.

Tincture of jalap is often used for the purpose of increasing the operation of other purgatives, but it sometimes nauseates. The extract is an active purgative, but when given in the form of pills, it is apt to gripe: triturated with almonds and sugar, or with mucilage, this effect is generally prevented, and it then operates freely and without pain. The dose for an adult is from five to fifteen grains.

Search has been made at different times for the active principle of jalap, but nothing of an alkaline character has been detected in it; it appears, however, from the experiments of Buchner and Herberger, (*Rep. für die Pharm.*, xxxvi.) that its purgative power resides in the *resin*, which is separable by the action of ether into two distinct forms of resinous matter, which are to each other in the relation of acid and base. The basic resin they have termed *Jalapine*, and to it they ascribe the activity of the root.

The action of jalap as a poison has been partially examined by Cadet de Gassicourt; according to whom it produces no effect on dogs, when injected into the jugular vein, in the quantity of twenty-four grains, or when applied to the cellular tissue. When duly rubbed, however, for a few days upon the skin of the belly and thighs, it excited severe dysentery; introduced into the pleura and peritonæum, it produced fatal pleurisy, and peritonitis accompanied by dysentery; and when introduced into the stomach or anus, the animals died under profuse purging, in the course of four or five days, and the stomach and intestines were found inflamed, and in some cases, ulcerated.

JUJUBES. The fruit of the *Zizyphus Jujuba.* (*Nat. Ord.* Rhamnaceæ). This is a small prickly tree, common in China and various parts of the East Indies. Its fruit is pleasantly acid and mucilaginous, and furnishes the pectoral lozenges known under the name of *pâte de jujube;* the article, however, commonly sold as such, is little else than gum arabic with a little isinglass and sugar coloured red.

JUNIPERI CACUMINA ET FRUCTUS. The *tops* and *fruit* (berries) of the *Juniperus communis.* *Cl.* 22. *Ord.* 13. Diœcia Monadelphia. *Nat. Ord.* Coniferæ or Pinaceæ.

The juniper is an indigenous shrub in Europe, the North of Asia, and North America.

The juniper tops might have been omitted in the list of the Materia Medica; they furnish an infusion which is diuretic and sudorific, but they are not always to be had fresh, and are altogether unimportant.

The fruit, or juniper berries, are principally imported from Italy, Germany, and Holland. The Italian berries are large and plump, but not in general so abundant in oil as the others. Their taste is sweet and mucilaginous, and, when chewed, warm and aromatic.

The medical virtues of juniper berries reside exclusively in their

volatile oil, which has a place among the *Olea Destillata* of the Pharmacopœia.

Oil of Juniper has a fragrant and terebinthinate odour. It is largely imported from Italy, but the foreign oil is never so fragrant as that which is drawn in England. It is of a greenish yellow colour, and soluble in alcohol. Its specific gravity varies from, ·868 to ·883, the English oil being generally the less dense.

In the dose of two or three drops, added to pills, or triturated with sugar, oil of juniper is diuretic, and often powerfully so, especially in conjunction with other remedies of that class. In the treatment of anasarca, therefore, and of ascites, infusions of juniper berries, with the occasional addition of the compound spirit and of the oil, are frequently prescribed as adjuncts to squills and digitalis. A decoction of the berries has also been recommended as an alterative diet-drink in some cutaneous affections, and as a lotion for the hands in scabies.

The compound spirit of juniper is sometimes used as a substitute for Hollands, and merits no place in a Materia Medica any more than the latter itself.

The following are diuretic formulæ for dropsical affections, of which juniper forms a part: —

℞ Scillæ Rad. Pulv. gr. ij.; Pulv. Foliorum Digitalis gr. j.; Pilulæ Hydrargyr. gr. vj.; Olibani Pulver. ℈ss.; Olei Juniperi ♏iv. Fiat massa in pilulas quatuor dividenda, è quibus capiat ij. hora somni, superbibendo haustulum misturæ sequentis.

℞ Baccarum Juniperi contus. ℥ij.; Carui Semin. contus. ℥ij.; Aquæ ferventis oct. j. Macera per horas tres et cola.

℞ Colaturæ f℥xij.; Spirit. Æther. nitric. ℥ss.; Potassæ Nitras ℈ij.; Syrupi Scillæ f℥ss. Fiant mistura, de qua sumantur cyathus cum pilulis et subinde.

KINO. *Extractum.* The *extract* of the *Pterocarpus erinaceus. Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Leguminosæ.

The extract of the bark of the *Eucalyptus resinifera* of New Holland, and of the *Coccoloba uvifera*, or Sea-side grape, of the West Indian Islands and adjoining coast of America, appear to have borne the name of kino, and probably occur in commerce as such; but the genuine kino is stated to be the indurated exudation of the broken or wounded branches of the above species of Pterocarpus, which is a tree from forty to fifty feet in height.

Kino usually occurs in small fragments, having a brilliant fracture, and a reddish-brown colour. It is slightly sweet, and very astringent when chewed. Water at 60° dissolves about half of it, and alcohol nearly two-thirds; the latter solution having a rich brown colour; there is, however, an article termed kino, which is tasteless and nearly insoluble, and with which the genuine drug is frequently mixed: this is supposed to be African kino. The leading components of kino appear to be tan, and a difficultly extractive matter, probably united with a portion of gum and resin.

The following is an officinal formula of kino — omitting the tincture : —

Compound Powder of Kino. — Take of Kino, fifteen drachms; Cinnamon, half an ounce; Hard Opium, a drachm. Rub them separately into a very fine powder ; then mix them.

Twenty grains of this powder contain one grain of opium. It is useful in allaying diarrhœa, and is a form of opium which sometimes agrees better than others with the stomach. The dose is from five to twenty grains in chalk mixture, or other convenient vehicle.

The use of kino in pharmacy is exclusively as an astringent, and it is given in any proper vehicle, in doses of from ten to thirty grains, two or three times a day ; it is however, not more effective than catechu, and liable to vary in its composition; so that it is sparingly employed.

Speaking of the uses of opium, with astringents, in the treatment of pyrosis, Dr. Pemberton observes, that kino is generally to be preferred, because, unless there is diarrhœa present, it appears to have no tendency to confine the bowels. " In this drug," therefore, he adds, " you have a medicine, which exerts its powers to restrain the discharge of the glands when they are secreting too much, without exerting any such powers over the glands when they are acting naturally." And again he remarks, " that it is not difficult to conceive that an astringent shall be able to contract a vessel, already too much relaxed, to its natural standard; but that the same astringent shall be unable to contract it further. If this be the allowed, we have the advantage of possessing an agent which shall restrain the unnatural secretion of a gland, but which shall cease to act when this purpose is obtained. Whether such be the true method of accounting for this peculiarity, or whether it may arise from the insolubility of kino, except in a quantity of fluid, I do not pretend to determine; but I can with confidence assert, that the effect of kino will be found such as I have above stated."—(*On the Diseases of the Abdominal Viscera.*)

The greater number of the purer vegetable astringents, however, possess this character; and under the ordinary circumstances of a healthy state of stomach and bowels, their tendency is not to constipate: indeed, in their capacity of tonics, they often relieve habitual costiveness, apparently by increasing the muscular power of the alimentary canal.

Kino has been applied externally as a styptic, and to diminish the discharge of ill-conditioned ulcers.

KRAMERIA. *Radix.* Rhatany Root. The *root* of the *Krameria triandra. Cl.* 4. *Ord.* 1. Tetrandria Monogynia. *Nat. Ord.* Polygalaceæ (Krameriaceæ ?).

This suffruticose plant inhabits the dry sandy and gravelly soils of Peru, and flowers all the year round. Its root is horizontal, long, and branched, with a thick reddish-brown bark, stem procumbent, much branched, taper.

Krameria, or, as it is commonly called, *rhatany root*, abounds in astringent matter. Peschier found in it a peculiar crystallisable acid, which he calls *krameric acid.* According to Vogel, its constituents are, 40·00 of a peculiar red astringent principle; 1·50 mucilage; 0·50 starch; 48·00 woody fibre; 10·00 water (and loss).

In Peru it is used as a tooth-powder, and internally as a tonic. In England it is stated to have been long employed by the manufacturers of port wine, and that large quantities of its extract are prepared solely for that purpose in South America. As a medicine, it is not much used, though no doubt a very effective astringent tonic. According to Dr. A. T. Thomson, it has been found serviceable "in chronic rheumatism, in gastrodynia attended by dyspepsia, headache, and vertigo, and in all diseases of the digestive organs in which the powers of the stomach are impaired. When there is great debility of the nervous system it operates as powerfully and more immediately than the cinchona bark, whilst in cases of general asthenia its invigorating effects are very evident." In profuse mucous discharges and in passive hemorrhages it is also useful. An *infusion* is the only formula of the root in the *London Pharmacopœia*: —

Infusion of Rhatany Root. — Take of Rhatany Root, (finely bruised,) an ounce; Boiling distilled Water, a pint. Macerate for four hours in a lightly-covered vessel, and strain. Dose, one to two ounces. The powder may be given in a dose of from gr. x. to ʒss.

LACMUS. *Thallus preparatus.* The *prepared thallus* of the *Rocella tinctoria. Nat. Ord.* Lichenes.

This lichen, after having been cleaned, dried, and powdered, is mixed with pearlash and moistened with urine, when a species of fermentation ensues, which is kept up till the material becomes a blue pulp; it is then mixed with a certain quantity of chalk and potash, and dried. In this state it constitutes the *litmus*, or *archil* of commerce. It is chiefly used by silk dyers. It furnishes, with water and alcohol, a beautiful violet-coloured tincture, which is reddened by acids, and the blue colour is again restored by alkalis. It probably has a place in the Materia Medica merely from its use as a test, for neither the original lichen, nor the litmus prepared from it, are employed in medicine.

LACTUCARIUM. *Succus spissatus.* The *inspissated juice* of the *Lactuca sativa. Cl.* 19. *Ord.* 1. Syngenesia Æqualis. *Nat. Ord.* Cichoraceæ.

This species of lettuce is abundantly cultivated for culinary use. It has a fibrous root, and a corymbose stem from two to three feet in height. Its general characters are well known. When in flower its juice becomes milky on exposure to air, and when dried in the sun acquires a brown colour. In this state it has been used as an anodyne and narcotic, under the name of *Thrydace* and *Lactucarium.* Its taste and smell are slightly those of opium, but it has not been shown to contain morphia. The drowsiness occasioned

by eating lettuce has been frequently noticed; it is one of the least indigestible of raw vegetables, and is often taken with impunity by persons with irritable and dyspeptic stomachs. In such cases small doses of opium are frequently effectual in promoting digestion, and it is possible, as Dr. W. Philip has suggested, that this peculiarity of raw lettuce may be referable to its anodyne powers. Lactucarium may be tried as a sedative where opium cannot, from various causes, be exhibited. Dr. Duncan, following up the suggestions of Dr. J. R. Coxe, who was the first to experiment medicinally on the lactucarium, considers it well adapted for allaying cough in phthisis. It is generally given in pills, the dose being from one to six or eight grains. It has little effect, as an anodyne, unless taken in a full dose, of eight to ten grains. According to Trousseau, and Pidoux (*Traité de Therapeutique*, I. 260), four drachms have been taken during the day. A tincture is sometimes prepared by digesting one ounce of lactucarium in a pint of proof spirit; from ten minims to one drachm is the dose.

LAUDANUM (from *Laudo*, in consequence of the *praises* bestowed upon it). A tincture of opium: the name is also given, in Germany, to a compound tincture of opium, stronger generally than that of the Pharmacopœia, and containing spices and saffron. (*See* Opium.)

LAVANDULA. *Flores.* Lavender Flowers. The flowers of *Lavandula spica. Cl.* 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. Ord.* Labiatæ, or Lamiaceæ.

The *Lavundula spica* is the shrub called *French lavender.* It yields a fragrant essential oil, largely employed as a vehicle for colours in porcelain painting, and in the preparation of varnishes, and generally known in trade under the name of *oil of spike.* The officinal species is the *Lavandula vera*, or *common lavender;* it is a shrub two or three feet high, perennial, and a native of the South of Europe; it is largely cultivated on account of its flowers, which it bears in June and July.

Lavender flowers are rather to be regarded as a perfume than a medicine. The essential oil, which ought also to have had a place in the list of the Materia Medica, is obtained by distilling these flowers with water, in the proportion of about one pound from fifty to seventy pounds of the flowers; it is extremely fragrant; and, dissolved in alcohol, constitutes one of our most agreeable perfumes. In point of fragrance, none of the foreign oil of lavender comes into competition with that distilled in England; and the plant is abundantly cultivated in the vicinity of London for that purpose. The oil which passes first over has the highest and most perfect scent, and is frequently kept separate, and sold at a proportionate price. When the stalks and leaves are distilled with the flowers, the odour of the oil is considerably deteriorated, and this appears generally to be the case with the continental oil.

Spirit of Lavender. — Take of fresh Lavender Flowers, two pounds and a half, Rectified Spirit, a gallon; Water, two pints. Mix; then, by a gentle fire, let a gallon distil.

Spirit of Lavender forms a part of the formula for making Lavender water and of the *Linimentum Camphoræ compositum* (page 112), in both of which oil of lavender might have been substituted; nor is it necessary to use recent flowers, as directed, for those which are dried yield an equally fragrant product. This preparation may be substituted for rectified spirit in lotions and other cases, where we wish to avail ourselves of the perfume.

Lavender water, as generally prepared, is not a distilled spirit, but an alcoholic solution of oil of lavender, to which other scents are occasionally added.

The compound tincture or spirits of lavender is, or used to be, a sadly abused cordial. We should lose nothing by its omission from the books.

LEAD, *see* Plumbum.

LEECH, *see* Hirudo.

LICHEN, *see* Cetraria.

LIME, *see* Calcium.

LIMONES. *Fructus.* The *fruit* of the *Citrus Limonum*. *Cl.* 18. *Ord.* 3. Polyadelphia Icosandria. *Nat. Ord.* Aurantiaccæ.

The lemon, like the orange-tree, is found in a wild state in the northern parts of India, and in China. It is cultivated in Spain, Portugal, and France, and in Florida and Louisiana in our own country, and is common in our conservatories: it is evergreen.

Citric acid is the source of the acidity of this fruit. Its aroma depends upon the peculiar essential oil (*citrene*) contained in the cells of the rind, and which has a place in the Materia Medica under the name of *Oleum Limonum*. According to Mr. Phillips, fresh lemon-juice, of the specific gravity of 1044, is almost precisely equal in strength to distilled vinegar of the specific gravity 1009, since two parts of the former are saturated by 14·8 grains of carbonate of soda, and the same quantity of the latter by 14·5 grains. He also states that a pint of lemon-juice weighing fifteen ounces and six drachms and a half, decomposes a few grains more than six drachms of chalk: these proportions apply to lemon-juice of average strength; but its saturating power varies considerably with the state of the fruit; and when it has fermented, its saturating power remaining the same, its proportion of *citric* acid is often diminished. Lemon-juice consists, according to Proust, of citric acid 1·77; malic acid, gum, and bitter extractive 0·72; water, 97·51.

The *essential oil* of the external rind of the lemon is largely prepared in Italy and other parts of the South of Europe. Its chief use is as a perfume; it is a good addition to sulphurous and other disagreeably smelling ointments. Its flavour is much less agreeable than that of lemon-peel, for which, therefore, it cannot be substituted. It often tastes and smells so strongly of turpentine, as to lead to a suspicion of adulteration with that oil.

Lemon-juice is employed in medicine, chiefly in the preparation of lemonade, and with barley water and similar cooling drinks; and,

saturated with potassa, in saline draughts. Sometimes ammonia is used, citrate of ammonia being probably somewhat more diaphoretic than citrate of potassa; but these compounds are nearly inert in themselves, though elegant vehicles for diaphoretics and expectorants. The following are the usual prescriptions for saline draughts:

1. ℞ Potassæ Carbonatis ℈j.; Succi Limonum recentis f℥ss. vel q. s.; Aquæ f℥j.; Spirit. Myristicæ, Syrupi, āā f℥j. M.
2. ℞ Ammoniæ Sesquicarbonatis ℈j.; Succi Limonum recent. f℥vj. vel q. s.; Misturæ Camphoræ f℥vj.; Syrup. Tolutani f℥ss. M.

Vomiting is sometimes relieved by a saline draught in the act of effervescence, or, in other words, by the effect of the evolved carbonic acid gas upon the stomach; in this case the following formula is used, in which bicarbonate of potassa is substituted for the carbonate.

℞ Potassæ Bicarbonatis gr. xxiv.; Aquæ f℥j.; Syrupi Aurant. Tinctur. Cardam. compos., āā f℥j. M. fiat haustus in actu effervescentiæ sumendus cum succi limonum recentis f℥ss.

In these formulæ fresh lemon-juice is more agreeable than solution of citric acid, but the latter may often be substituted, especially in the effervescing draught.

The following table of the equivalent proportions of concrete citric acid, and of lemon-juice, necessary to neutralise the carbonates of potassa and of ammonia, is from Dr. Paris's *Pharmacologia*:—

Citric Acid.	Lemon Juice.	A Scruple of the Alkalis.
grs. x.	f℥iij.	Bicarbonate of Potassa.
grs. xv.	f℥iv.	Carbonate of Potass.
grs. xxv.	f℥vij.	Sesquicarbonate of Ammonia.

The following are good proportions of the ingredients of lemonade:—

Fresh Lemon Juice, four ounces; Fresh and very thin Peel of Lemon, half an ounce; White Sugar four ounces; Water, three pints.

The water should be poured boiling upon the other ingredients, in a covered vessel, and strained off when cold: it may then be iced if necessary. A drachm of nitre is sometimes a good addition to the above, when it is used as common drink in fevers. In these and in gastro-enteritic diseases, the peel should be omitted. In hemorrhages, iced lemonade is beneficial.

The beverage known under the name of *King's Cup*, is also a good diluent, and often used at the table and in the sick room. It is made by pouring a quart of cold spring water upon the rind of one or two lemons, *peeled very thin*, and leaving it to infuse for six or eight hours; it is then poured off, and should be bright and pale-yellow.

"On account of its antiseptic powers, lemon-juice is successfully used in sea-scurvy, and for this purpose, large quantities of it, in a concentrated state, are distributed in the navy; but the continued use of it is said to be hurtful to the general health of the men, and

to hasten the progress of phthisis, where it makes its appearance." (*Lond. Disp.*) Sir Gilbert Blane states that solution of crystallised citric acid is not an effective substitute for lemon-juice in cases of scurvy.

The alkalies and their carbonates in poisonous doses are best neutralised by vinegar or lemon-juice. In cases, also, of narcotic poisoning, after the poison is expelled, lemon-juice seems to counteract their effects.

LINIMENTS. (Lino, *I besmear.*) External applications, to be smeared or rubbed upon the part affected. They are generally of a stimulating character, and intended to promote absorption, or excite counter-irritation.

LINI SEMINA. The *seeds* of the *Linum usitatissimum. Cl.* 5. *Ord.* 5. Pentandria Pentagynia. *Nat. Ord.* Linaceæ.

The common flax plant has an extensive geographical range in Europe and America.

The mucilage of linseed is extracted by hot water, and forms the basis of *linseed tea*, and of the following infusion, which furnishes a cheap and useful demulcent: —

Compound Infusion of Linseed. — Take of Linseed, bruised, six drachms; Liquorice, sliced, two drachms; Boiling distilled Water, a pint. Macerate for four hours, near the fire, in a lightly-covered vessel, and strain.

For the purposes of pharmacy, *linseed oil* is generally employed as met with in commerce, the seeds having been heated previous to expression. When *cold drawn*, it has little taste, and a pale yellow-green colour, but soon becomes rancid, and more disagreeable than that expressed at a higher temperature: from eighteen to twenty pounds of oil are obtained by cold expression from one hundred weight of the bruised seed. Linseed oil is gently aperient, but rarely used on account of its unpleasant flavour. As an external application, it is employed in burns and scalds, sometimes mixed with lime water, or with oil of turpentine. The following is the *Linimentum Oleosum* of the London hospitals, applicable in such cases:

℞ Olei Lini f℥iss.; Liquoris Calcis f℥iij. M.

But the following, which is Mr. Kentish's liniment, is preferable:

℞ Olei Lini f℥iv.; Olei Terebinthinæ f℥ij. Misce. Fiant linimentum partibus affectis applicandum.

It is important, in extensive burns or scalds, to apply a remedy of this kind immediately upon the occurrence of the accident; much pain is thus prevented, and the extent of the subsequent vesication is generally much diminished, and the cure proportionately accelerated. If, on such occasions, oil of turpentine cannot be procured, diluted alcohol should be substituted.

Linseed oil is a good addition to poultices, and upon the same principle *linseed meal* is employed; but the latter is usually the powdered cake from which the oil has been expressed, and is an inferior article to powdered linseed, the greasiness of which contributes to the permanent softness required in a mollifying poultice.

Cataplasm of Linseed.— Take of boiling Water, a pint; Powdered Linseed, as much as may be sufficient to produce a proper consistency. Mix them.

LIRIODENDRON TULIPFERA. Tulip Tree. *Cortex.* The bark. *Cl.* 13. *Ord.* 12. Polyandria Polygynia. *Nat. Ord.* Magnoliaceæ.

The Tulip tree, or Poplar, as it is often erroneously called, has a wide geographical range in the United States, extending from New England to the lower region of the Mississippi; and adding, especially on the banks of the Ohio, where its growth is so luxuriant and the size of the tree so great, much to the beauty of the landscape. In common with other families of the magnoliaceæ, the bark, which is the officinal portion of the liriodendron, is a bitter, with some aromatic pungency; the latter of which, Dr. Bigelow thinks, resides in a volatile oil. Water extracts its bitterness, but diluted alcohol is the most universal solvent of its properties. The bark of all parts of the tree is used, but that of the roots is preferable.

Medicinally considered, the bark of the tulip tree is a stimulating tonic and diaphoretic, adapted to the treatment of intermittent fevers, chronic rheumatism, catarrh with dyspepsia, hysteria, and cholera infantum. Dr. I. T. Young (*American Museum*, Vol. xii.), who has thus extended the list of diseases beyond intermittent fever, to which this remedy is in his opinion applicable, remarks also that, for two years prior to the date of his communication, he had used no other medicine in cholera infantum but the poplar bark. Nor has he known it to fail in a single case of worms; especially ascarides. After all, however, the most obvious utility of this bark is in intermittent fever; and above all, when it is combined with the bark of the root of the Dogwood (*Cornus Florida*).

The *dose* of the powder is from a *scruple to two drachms*, to be repeated at intervals. A decoction may be also used, in the proportion of an ounce of the bark to a pint of water, and administered in a dose of one or two fluid ounces.

LITHONTRIPTICS (λιθος, *a stone*, and τριβειν, *to rub down*). Medicines supposed to dissolve stone in the bladder. When a stone has once become lodged in the bladder, we have no evidence of any successful means of dissolving it, or even of lessening its bulk by the action of solvents; but there are certain remedies which, when properly administered, may not only alleviate the symptoms, but prevent, by their influence over the secretion of urine, the tendency to the formation of urinary deposits, and, consequently, the increase in bulk of the nucleus in the bladder. These remedies, however, when carelessly or injudiciously exhibited, are often productive of much mischief: their individual applications are stated under other heads. Lithontriptics are of three kinds:—1. *Acids*, which are calculated for cases of white sand, in which phosphate of lime, and the ammonio-magnesian phosphate, predominate, constituting what has been termed the *phosphatic diathesis*. 2. *Alkalis*, which are indicated in cases of *uric diathesis*, or where the urine contains excess of uric acid. 3. *Diluents*, and *diuretics*, which are often

applicable to both the preceding, and to other morbid conditions of the urine.

LOBELIA. Indian Tobacco. *Lobelia inflata. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Lobeliaceæ.

This is an annual, found in fields and on the road sides in the United States of America. In flowers from July to October.

This plant, when dry, has little odour. When chewed it produces a pungent sensation, which remains long in the fauces, causing salivation and nausea. It yields its properties to water and to alcohol. It is emetic and purgative; but its chief value is in smaller doses, when it is antispasmodic, expectorant, diuretic and diaphoretic. It was first brought into notice by the Rev. Dr. Cutler, of Massachusetts, who used it for the relief of asthma; for ten years he had tried most of the usual remedies with little benefit: he took a saturated tincture of lobelia, in doses of a tablespoonful, which soon produced an abatement of the paroxysm. It has been recommended also by Mr. Gordon, in that form of the disease which has been termed *Hay asthma;* it has also been employed in some cases of croup, and in hooping-cough, but not with any remarkable success. In the form of enema, it produces the same effects as tobacco.

Lobelia is administered in powder, in infusion, and in tincture; the dose of the powder is from four to twenty grains. In the latter dose it acts as a powerful nauseating emetic; hence it has been called the *emetic weed.* The infusion may be made of one ounce of the plant to one pint of boiling water; of this, an ounce may be taken every half hour till it nauseates. The tincture is made with four ounces of the dried herb to one quart of proof spirit; from fifteen minims to about thirty is the common dose, but in urgent cases it has been given in larger quantity; two drachms namely, to half an ounce. Care should be taken not to push the dose beyond slight nausea.

LUPULUS. *Strobili exsiccati.* Hops. The *dried strobiles* of the *Humulus Lupulus. Cl.* 22. *Ord.* 5. Diœcia Pentandria. *Nat. Ord.* Urticaceæ.

The hop is an indigenous perennial, largely cultivated in England, and also in parts of the United States, for the use of the brewer. The strobiles are usually picked in September, and carefully dried in peculiarly constructed kiln, or oast-house, during which process they lose about three-fourths in weight, and are slightly bleached by the action of the fumes of burning sulphur.

The fragrancy and bitterness of the hops appear to reside chiefly in a pulverulent substance, which may be separated from them by a sieve, and which has been called *lupulin.* It consists of 36 resin, 12 wax, 11 bitter extract, 5 tannin, 10 extractive matter insoluble in alcohol, 26 insoluble residue. Their effect in covering the nauseous sweetness of wort, and preserving beer, is well known. By many writers on the Materia Medica they are represented as powerfully sedative: it has even been asserted, that laying the head

upon a pillow stuffed with hops, quiets the delirium of fever, and assuages the violent agitation of maniacal persons. Upon the whole, the medical virtues of hops have been extolled beyond their merits; if we allow them to be a slightly narcotic bitter, we grant them, perhaps, more than they deserve. As a direct or powerful sedative, they are entitled to no confidence.

The *Extractum Lupuli* of the Pharmacopœia is directed to be prepared in the same way as the *extract of gentian* (page 217). It is a good bitter, but not anodyne. One hundred weight of hops yield about forty pounds of this extract.

MACERATION (Macerare, *to soften by steeping*). The steeping a body in a cold liquid.

MAGNESIA. This, like the other alkaline earths, is the oxide of a metal which has been termed *Magnesium*, and which may be obtained by heating potassium with chloride of magnesium; chloride of potassium is formed, and the magnesium set free in its metallic state. It was discovered by Bussey in 1830, though its existence had been anticipated by Davy. Magnesium is a hard, white metal, malleable, and not acted on by water. Heated in the air or in oxygen, it burns vividly into *magnesia*. It appears to be fusible at about the same temperature as that at which silver fuses. It is oxydized by the dilute acids. Its equivalent upon the hydrogen scale may be considered as = 12. Magnesia is its only oxide; it consists, therefore, of—

	Atoms.	Equivalents.	Per Cent.
Magnesium	1 . . .	12 . . .	60
Oxygen	1 . . .	8 . . .	40
Magnesia	1 . . .	20 . . .	100

Pure or calcined magnesia, or *Magnesia*, as it is simply called, is procured by driving off the carbonic acid from the carbonate by means of heat, or by adding a solution of caustic soda or potassa to any of the salts of magnesia in solution.

Magnesia may be called insoluble in water; when moistened upon turmeric paper it slightly reddens it; but water filtered through magnesia has no effect upon the most delicate vegetable colours: it has neither taste nor smell, and does not effervesce with acids. When long exposed to the atmosphere, it slowly reabsorbs moisture and carbonic acid.

Carbonate of Magnesia. — Take of Sulphate of Magnesia, four pounds; Carbonate of Soda, four pounds and eight ounces; Distilled Water, four gallons. Dissolve the carbonate of soda and the sulphate of magnesia, each separately, in two gallons of water, and filter; then mix the solutions, and boil, assiduously stirring them with a spatula for a quarter of an hour; lastly, the liquor being poured off, wash the precipitated powder with boiling distilled water, and dry it.

According to Berzelius, the precipitate obtained by adding carbonate of soda to sulphate of magnesia, and thoroughly edulcorating and drying it at 212°, consists of—

Magnesia	41·60	43·2
Carbonic Acid	36·58	36·4
Water	21·82	20·4
	100·00	100·0

The *carbonate of magnesia*, therefore, or *Magnesia alba*, as it was formerly called, of the Pharmacopœia, is probably a compound of hydrate and carbonate of magnesia, in the proportion of 1 atom of quadrihydrate and 1 atom of carbonate. It differs considerably in texture and appearance, according to the methods adopted in precipitating and drying it, the principal object of the manufacturer being to procure it as smooth and free from grittiness or harshness as possible; it should also be colourless and tasteless: the latter desideratum is seldom procured.

Medical Uses of Magnesia and Carbonate of Magnesia.— Pure magnesia is not calculated to fulfil any indications which may not be more conveniently attained by the use of the carbonate; it is, therefore, seldom prescribed except in those cases where it is presumed that the carbonic acid evolved from the carbonate by the action of the acids of the stomach might prove inconvenient. It may be given in doses of about ten, fifteen, or twenty grains, or, generally speaking, in a dose about one-third less than that of the carbonate. In persons whose digestive canal is irritable, and where there is febrile excitement, calcined magnesia is often injurious, particularly to the rectum.

Carbonate of magnesia, in doses of from one scruple to one drachm, has long been used as a neutraliser of acid in the stomach, and as operating gently upon the bowels; its activity as an aperient depends much upon the acid and other matters with which it meets in the *primæ viæ*. In the febrile affections which attend dentition, and in the aphthous fever of children, magnesia and saline remedies are employed to allay the symptoms. Small doses of carbonated magnesia are also effectual in some cutaneous eruptions; especially in the pimples about the chin, nose, and forehead, which are symptomatic of acidity in the stomach.

There is no application of magnesia more important than in cases of *uric*, or *red sand*, in which alkalies are generally used, but in which they frequently disagree or fail. It may here be administered in doses of twenty or thirty grains twice or three times a day, and except the disease has gone to a great height, or has continued so long as to become, as it were, habitual, it will usually check the increased secretion of uric acid; the red deposit in the urine becomes much diminished, or altogether disappears, and the irritation of the kidneys is proportionately relieved. It must not be forgotten, that in cases of *phosphoric*, or *white sand*, magnesia and other alkaline or antacid medicines are mischievous. Whenever magnesia is continuously administered, its tendency to lodge in the bowels must be prevented by the occasional use of aperients; for cases have occurred in which serious mischief has resulted from such accumulation.

Magnesia may be given in water, milk, or any aromatic water, or conjoined with bitters. The latter are proper in dyspeptic cases, and a little compound spirit of ammonia is frequently a useful adjunct. It is more soluble in cold than in warm water.

℞ Magnes. Carbonatis ℥ss.; Infus. Gentianæ compos. ℥x.; Spirit Ammoniæ compos. ℥ss. M. fiat haustus, ante prandium et vesperi sumendus.

In the above-named calculous affections, magnesia may be given in the vehicles just mentioned, or we may use its solution in carbonated water, which is manufactured by several soda-water makers, and sold under the name of *aërated magnesia water*, a pint of which, containing a drachm of magnesia, or more if required, may be taken daily.

I have long been in the habit of prescribing from half a drachm to a drachm of the carbonate of magnesia with opium, when desirous of procuring the anodyne effects of the latter without constipation, and the frequent headache afterwards. If the state of the stomach either requires or does not forbid it, a little powdered ginger or cinnamon may be added to the opium and magnesia.

Citrate of magnesia is not, as in the following extemporaneous prescription, a disagreeable aperient, especially when a little excess of lemon-juice is used:—

℞ Magnesiæ Carbonatis ℥j.; Succi Limonum recentis f℥iij.; Syrupi Tolutani f℥i.; Aquæ Cinnam. f℥ss.; Aquæ destillatæ f℥ss. Fiat haustus.

MAGNESIÆ SULPHAS. *Sulphate of Magnesia. Epsom Salt.*

This salt is manufactured upon a large scale, and the sources from which it is obtained are either sea-water or magnesian limestone. The residue which remains after the separation of chloride of sodium from sea-water, is known under the name of *bittern;* it contains sulphate and chloride of magnesium; to this, sulphuric acid is added in sufficient quantity to decompose the latter, and the sulphate of magnesia is ultimately purified by repeated crystallisation. Magnesian limestone, which is a mixed carbonate of lime and magnesia, is also decomposed by sulphuric acid. Sulphate of lime and sulphate of magnesia are formed, and the latter salt is separated and purified by crystallisation. Sulphate of magnesia was formerly chiefly obtained from mineral or saline springs, and, among others, from those in the neighbourhood of Epsom. It is also produced abundantly in some alum works, but scarcely pays for its separation and purification.

Properties. — The primary form of crystals of sulphate of magnesia is a right prism with a rhombic base. When exposed to dry air, the pure salt has a slight tendency to effloresce, but, under common circumstances, it is unalterable. At a red heat it loses the whole of its water of crystallisation, and if moistened in this dry state, it reabsorbs water with considerable elevation of temperature. It is soluble in about its own weight of water at 60°,

and in three-fourths its weight of boiling-water. Its taste is saline and bitter. It consists of —

	Atoms.	Equivalents.	Per Cent.
Magnesia	1	20	16·3
Sulphuric Acid	1	40	32·5
Water	7	63	51·2
Crystallised Sulphate of Magnesia	1	123	100·0

Sulphate of magnesia should be colourless: it often contains a minute quantity of iron, which gives its solution a reddish tint on exposure to air, and which may be detected by the discoloration of tincture of galls. It is sometimes mixed with sulphate of soda, an adulteration most easily detected by the inferior weight of the precipitate obtained by adding carbonate to potassa; 100 grains of pure crystallised sulphate of magnesia furnishing a precipitate which weighs when dried at 212°, about 40 grains. If sulphate of magnesia contain common salt, or any other chloride, it is detected by pouring upon it a little sulphuric acid, which has no action on the pure salt, but evolves hydrochloric acid if any chloride be present. The following is the *Note* in the *Pharmacopœia* referring to this salt: —

Sulphate of Magnesia (*crystals*). — Very readily soluble in water. Sulphuric acid dropped into the solution does not expel any hydrochloric acid. 100 grains dissolved in water, and mixed with boiling solution of carbonate of soda, yield 34 grains of dried carbonate of magnesia.

Medical Uses of Sulphate of Magnesia. — This is one of the most useful and effective saline purges. In doses of from half an ounce to an ounce, it proves actively aperient, especially if taken in a sufficient quantity of liquid; in smaller doses, it may be conveniently given with tonics, to keep up a gentle action upon the bowels. Even a drachm in half a pint of water, taken in the morning, fasting, will often, in the case of a delicate female, produce the desired effect. It admits of mixture with magnesia or its carbonate; acids may also be given with it; indeed, one of the best vehicles for it is the compound infusion of roses. Infusion of cascarilla, and of gentian, with or without the addition of dilute sulphuric acid, may also be used; and these bitters cover, in a considerable degree, the more nauseous and unpleasant bitterness of the salt. Neither ammonia nor carbonate of ammonia precipitate magnesia from this salt under common circumstances; they may, therefore, be blended with it, especially where spasmodic pains and nausea follow its use.

If it be desired merely to evacuate the *primæ viæ* of their grosser contents, half an ounce of sulphate of magnesia, taken in half a pint of warm water, early in the morning, generally proves effectual. But where the bowels are loaded with viscid mucus, such a purgative, although operating freely, is far from cleansing them; in such cases, a preliminary dose of calomel and cathartic extract, or some purge of a more searching description, must be taken overnight, and the saline purge must be aided by others, as in the common *black dose*: —

℞ Magnesiæ Sulphatis ℥ss.; Infusi Sennæ compos. f℥iss.; Tincturæ Sennæ, Syrupi Zingiberis, ää f℥j.; Spiritûs Ammoniæ compos. f℥ss. Fiat haustus purgans.

The senna tincture may be omitted without inconvenience.

It by no means follows that the bowels have been completely *emptied* or cleansed, because a dose of salts has performed its full duty; it may leave much offending matter behind, and the symptoms may not subside, as far as they are connected with such a residuum. Thus it is, that the bowels are often drenched with mineral saline waters, which, though very active, are quite ineffectual in the relief of disorders that are soon cured by other purgatives.

Saline purgatives sometimes excite pain, and flatulency of the stomach and bowels, an effect generally remedied by combination with aromatics, spirituous stimulants, and ammonia.

It deserves notice, that although repeated and full doses of salts are apt to induce costiveness, small doses of sulphate of magnesia, especially when combined with bitters, are effectively aperient in some cases of habitual costiveness; it is generally necessary to precede its use in this way by a more active purgative, and then the following may be given daily, either at noon, or two hours before dinner: —

℞ Magnesiæ Sulphatis ℥ss.; Infus. Rosæ compos., Infus. Gentianæ compos. ää f℥vj.; Acid Sulphurici diluti ♏x.; Syrup. Zingiberis f℥j. M. fiat haustus.

MAGNOLIA. *Cortex.* The bark.

This tree, of which there are so many varieties in the United States, belongs to the same class and order in the Linnæan arrangement and to the same natural order with the *Liriodendron tulipfera* already described. Its sensible properties and medical effects are also so analogous as not to require a separate notice. Like the bark of the tulip tree, that of the magnolia is used in powder and decoction, and in the same doses.

MALVA. *Mallow.* *See* Althæa, or *Marsh Mallow.*

MANNA. *Succus Concretus.* The concrete juice of the *Ornus Europæa.* *Cl.* 23. *Ord.* 2. Polygamia Diœcia. *Nat. Ord.* Oleaceæ.

This species of ash is a native of the South of Europe, especially of Calabria and Apulia. It is a small tree, twenty or thirty feet high, with a close round head.

In dry and warm weather, manna exudes spontaneously from this tree, and concretes upon the bark; but the finest manna is procured by longitudinal incisions. Several varieties of this drug occur in commerce; the purest is called *flake manna;* the others are in smaller fragments, mixed with various impurities, and sometimes is said to be adulterated with sugar, honey, scammony, and other analogous articles. Fine flake manna, called also, *Sicilian* or *Calabrian manna,* is in long pieces of a pale-buff colour, moderately dry, friable, light, and bearing the impressions of the branches on which it had concreted; its texture generally appears granular,

but it also presents fasciculi of acicular crystals: its odour is slightly disagreeable; its taste sweet and nauseous. It is perfectly soluble in water and in alcohol. When boiled in alcohol, the solution crystallises as it cools, depositing a peculiar modification of sugar which has been termed *mannite*, and which differs from common sugar in being unsusceptible of fermentation. Mannite constitutes about four-fifths of the best manna; the remainder is common sugar, and a peculiar yellowish extractive matter, in which the purgative quality resides.

Manna is chiefly employed in doses of a drachm or two, as a mild aperient for children. In large doses it is apt to gripe and inflate, without purging, and scarcely proves active with adults in a quantity less than two ounces. The following aperient mixture, however, is a useful one: —

℞ Magnesiæ Sulphatis ℥i.; Fol. Sennæ, Mannæ, āā ℥ss.; Aquæ Fervent f℥xii.; of which, after an hour's infusion, a cupful, strained, may be taken, and repeated in two or three hours. This dose is better than a smaller one, such as a wineglassful every two hours. Its operation is more prompt and free, and is less apt to gripe than the latter. To obviate this effect, ℥ij. of the root of the Serpent. Virg. is a useful addition to the other ingredients.

In some inflammatory diseases, especially those of the kidneys and bladder, where the bowels have been evacuated by a full dose of castor oil, the following is sometimes used to keep up a gentle aperient action: —

℞ Olei Amygdalæ, Olei Ricini, Mannæ optimæ, āā ℥j. tere simul, et adde gradatim, Aquæ Rosæ f℥x. M. fiat haustus, sextâ quâque horâ sumendus.

MARANTA. *Rhizomatus fæcula.* The starch of the *Maranta arundinacea.* *Cl.* 1. *Ord.* 1. Monandria Monogynia. *Nat. Ord.* Marantaceæ.

This plant is a native of the West Indies, South America, and the southern states of North America.

The tubers yield the *Arrow-Root* of commerce, the uses of which have been adverted to under the article Amylum (page 47). The best arrow-root is perfectly white and inodorous, and in coarse powder or small lumps which easily crush when pressed. It sometimes acquires the odour of the boxes in which it is packed, but that goes off on exposure to air. The inferior arrow-root is mealy or pulverulent, not brittle, but soft, of a bad colour, and often musty. Its quality is best judged of by dissolving it in hot water, and examining the consistence and taste of the jelly when cold. In preparing it, the rhizomes or tubers are dug up when a year old, washed, pulped, and then agitated with water; the milky fluid so obtained is strained through coarse linen to separate the fibrous impurities, and then left at rest till the fecula subsides; the supernatant fluid is then poured off, and the deposit well washed and dried in the sun. The import duty upon arrow-root from the colonies into England is one shilling *per cwt.*; from foreign parts, two-

pence *per lb.* In 1835, 987966 lbs. were imported, of which only 6267 were exported.

The *Maranta arundinacea* was formerly regarded as a powerful alexipharmic; its English name has been ascribed to its reputed property of counteracting the effects of poisoned arrows.

MASTICHE. *Resina.* The resin of the *Pistacia Lentiscus.* *Cl.* 22. *Ord.* 5. Dicœcia Pentandria. *Nat. Ord.* Anacardiaceæ.

This evergreen bush is a native of the Levant.

The medical virtues of mastic are insignificant: it has, however, been prescribed as a diuretic in some cases of gleet and gonorrhœa. It is occasionally a good adjunct to pills, enveloping their active matter, and thus rendering them less soluble in the stomach, and consequently more progressive in their operation. Upon this principle, it may be conjoined with rhubarb, aloes, and some other purgatives, as in the following *Pilulæ ante Cibum*, or *Dinner Pills*, of the old *Paris Pharmacopœia*:—

℞ Aloes ʒvj.; Mastiches, Confect. Rosarum rubrarum, āā ʒij.; Syrupi de Absynthio q. s. ut fiat massa.

This mass is to be divided into pills of three grains each. "The operation of this pill," says Dr. Paris, "is to produce a copious and bulky evacuation, and in this respect experience has fully established its value. It is difficult to explain the *modus operandi* of the mastic, unless we suppose that it depends upon its dividing the particles of the aloes, and thereby modifying its solubility."

MEL. Honey. *Humor e floribus decerptus et ape mellificâ præparatus.* A juice collected from flowers, and prepared by the honey-bee.

Note. — *Honey.* It is not to be used unless despumated. Dissolved in water iodide of potassium and any acid being added, it does not become blue.

Starch or flour is said to be sometimes added, by way of adulteration, to honey, hence the application of the test of iodide of potassium and an acid, directed in the above *Note.*

No directions are given in the Pharmacopœia, as to the mode of despumating or clarifying honey: the process generally consists in keeping it for some time at a temperature of 212° in a water-bath; portions of wax and other impurities are thus partly deposited, and partly rise in the form of scum, and may be removed. The honey becomes transparent and less tenacious; it is directed to be used in this state, in the "Mellita," or Preparations of Honey, in the Pharmacopœia.

As an article of the Materia Medica, honey is chiefly useful as a *vehicle*, and as a means of mixing some resinous and similar substances with water. With most persons it proves mildly laxative, and with some diuretic: it has occasionally been administered in nephritic complaints. "In some parts of Asia and America a poisonous honey is met with, which probably owes its deleterious properties to the flowers on which the bees feed. It is supposed that the honey extracted from the *Azalea Pontica*, and from species of the genera *Kalmia*, *Andromeda*, and *Rhododendron*, are poisonous; and that the honey carried from the *Azalea Pontica*

was that which poisoned the Greek soldiers in the celebrated Retreat of the Ten Thousand through Pontus. In the Island of Bourbon, honey of a green colour, and very fragrant, is prepared, and bears a high price in India, to which it is chiefly exported. But bees do not sip the honey secreted in all flowers; thus they refuse the *Fritillaria imperialis*, and *Nerium Oleander*, which kills thousands of flies." (*Lond Disp.*)

When honey dissolved in water is fermented by the addition of yeast, it produces that modification of wine called *mead*.

MELALEUCA MINOR, *see* CAJUPUTI OLEUM.

MENTHA PIPERITA. *Peppermint. Cl.* 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. Ord.* Labiatæ or Lamiaceæ.

This is a perennial plant indigenous to England, growing in moist places: it is found over the whole of Europe, in Egypt, central Asia, India, and North and South America.

The odour of peppermint is strong and peculiar; its taste pungent, leaving a peculiar impression of coldness upon the tongue. When either the dry or fresh herb is distilled with water, a highly odorous and pungent oil is obtained, the relative proportion of which varies exceedingly; in a warm, dry, and favourable season, the produce of oil from a given quantity of the fresh herb is double that which it yields in a wet and cold season. The largest produce is three drachms and a half of oil from two pounds of fresh peppermint, and the smallest, about a drachm and a half from the same quantity. The quality of this oil is also variable as to taste and odour. There is a variety of peppermint, the foliage of which has a darker hue than the *green* herb commonly cultivated, and its essential oil always partakes of the flavour of pennyroyal, often to such an extent as leads to a suspicion of mixture or adulteration.

Oil of peppermint is a useful stimulant and cordial. In spasm and flatulence of the stomach and bowels, in cramp, faintness, and nausea, it is a favourite remedy, a drop or two being taken upon a piece of sugar, or triturated with powdered sugar, so as to form an *Elæosaccharum*. It is also occasionally added to purging pills and other remedies, to prevent griping. It has been recommended as a stimulant in cases of Asiatic cholera.

Peppermint drops are a common and convenient form of oil of peppermint; they are made as follows:—Four ounces of white sugar in fine powder are put into a bright copper ladle, made shallow, and with a lip to it, and constantly stirred over a clear charcoal fire, till so hot as not to be borne by the hand. Twenty-four minims of oil of peppermint and half a fluid ounce of peppermint water are then added, and the whole rapidly stirred together, till of such consistency as barely to admit of being dropped out, by the assistance of the spatula, upon a piece of polished marble, where the drops speedily harden, and are afterwards to be dried in a very gentle heat. *Peppermint lozenges* are a mixture of starch, sugar, and mucilage of tragacanth, flavoured with oil of peppermint.

Peppermint Water. — Take of dried Peppermint, two pounds, *or* Oil of Peppermint, two drachms; Proof Spirit, seven fluid ounces; Water, two gallons. Let a gallon distil. When the fresh herb is employed, double the above weight of it to be used.

Peppermint water, when well prepared and sufficiently strong, is an excellent cordial in common cases of flatulency and spasmodic pains of the stomach and bowels: it is one of the best vehicles for saline and several other purgatives, not only preventing or diminishing their griping tendency, but covering their nauseousness and rendering them altogether more agreeable to the stomach as well as the palate. Violent cramps of the stomach may sometimes be relieved by a wine-glassful of hot peppermint water.

Spirit of Peppermint. — Take of Oil of Peppermint, three drachms; Proof Spirit, a gallon; Water, a pint. Mix; then, with a gentle fire, let a gallon distil.

This is an adjunct useful in the same cases as peppermint water, or forming, when diluted, an extemporaneous substitute for it. A more useful, though analogous preparation is the *Essence of Peppermint*, which is a mixture of one part of oil of peppermint with three of rectified spirit, or alcohol: it is often coloured green by a little spinach juice, or by the green leaves of peppermint: it may be taken upon a lump of sugar, to the extent of eight or ten drops.

MENTHA PULEGIUM. *Pennyroyal.*

This plant, like the former, is found in wet ditches, and similar places, over the greater part of Europe.

The *Distilled Water* and the *Spirit of Pennyroyal* are directed to be prepared in the same way as the corresponding preparations of peppermint; and the *Oil of Pennyroyal* has a place among the "Olea Destillata" of the Pharmacopœia. Of this oil, the fresh herb yields from $\frac{1}{120}$th to $\frac{1}{100}$th of its weight.

The old physicians had a high opinion of the virtues of pennyroyal in hysteria and uterine obstructions, and accordingly, pennyroyal tea, and pennyroyal water, were resorted to in various nervous affections, and as emmenagogues. The water is not an improper adjunct in such cases, to chalybeates, valerian, and similar remedies, and may be substituted for the rose-water in the *Mistura Ferri composita*. Pennyroyal water was also regarded as antispasmodic and expectorant, and therefore used in hooping-cough and asthma; it is now, however, rarely prescribed.

MENTHA VIRIDIS. *Green or Spear-Mint.*

This species of mint is found in marshy places in the milder parts of Europe, the Canaries, the Cape of Good Hope, and North and South America.

This species of mint is selected for medical use just when the flowers appear. Its peculiar aromatic flavour is well known. It is useful in the same cases as peppermint; its officinal preparations are a distilled water, spirit, and essential oil: the average produce of the latter is not more than about $\frac{1}{500}$th of the weight of the fresh herb, so that it generally bears a much higher price than the distilled oil of peppermint, and is neither more agreeable nor efficacious.

MENYANTHES. Buckbean. Water Trefoil. *Menyanthes trifoliata. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Gentianaceæ.

The buckbean is common in boggy and marshy soils in Europe and North America.

The whole of this plant is bitter, and, in sufficient doses, nauseant and purgative; it is also placed by some writers amongst diuretic and diaphoretic remedies. It is occasionally prescribed in intermittents, as a tonic; and in chronic rheumatism, and some cutaneous affections, as a diaphoretic alterative. Boerhaave regarded it as useful in an attack of gout, occurring to himself: he took the juice mixed with whey. It is, however, rarely used, and there are no officinal formulæ of it in the Pharmacopœia. It is best administered in infusion as follows: —

℞ Folior. Menyanthes sicc. ℥ss.; Aquæ ferventis, octarium. Macera per horas quatuor, et cola.

℞ Colaturæ f℥x.; Tinct. Cardam. compos. f℥j. Misce.

To this, ten grains of the powdered leaves may be occasionally added. Menyanthes is said to have been used as a substitute for hops; and, according to Paris, when given in the dose of one drachm of the powdered leaves, it is a cure for the rot in sheep.

MEZEREUM. *Radicis Cortex.* The bark of the root of the *Daphne Mezereum. Cl.* 8. *Ord.* 1. Octandria Monogynia. *Nat. Ord.* Thymelaceæ.

The mezereum is a shrub four or five feet high, a native of the woods of Europe, especially in the central countries, and commonly cultivated in the English gardens.

The bark of mezereon, and especially of the root, contains an acrid sap, which irritates and produces a serous discharge when applied to the skin. The fruit is also acrid and poisonous, and its tempting appearance such, as sometimes to induce children to swallow it; in such cases, an emetic should be given as soon as possible, followed by demulcent drinks. Linnæus says that he once saw a girl die of excessive vomiting and hæmoptysis, from having taken twelve of the berries to cure an ague; he also states that six of the berries will kill a wolf.

Infusions and decoctions of mezereon have been recommended in chronic rheumatism, in some cutaneous disorders, and in certain venereal affections; but it is a remedy too uncertain to merit the eulogies that have been bestowed upon it, and is very rarely employed even as a local stimulant. It enters into the composition of the compound decoction of sarsaparilla.

A crystallisable principle, termed *daphnin*, was obtained from this plant by Vauquelin, and has been subsequently examined by Gmelin and Bär.

The root and bark of the *Daphne Gnidium*, a small bush found upon the hills and plains of the southern parts of Europe, are used in France, under the name of *garou;* the *Daphne Laureola*, or common *spurge laurel*, is frequently, and, indeed, generally, sub-

stituted for mezereum; it is found in the woods over the whole of Europe, as far south as Sicily.

MOMORDICA ELATERIUM, *see* ELATERIUM.

MONŒSIA. *Corticis Extractum.* Extract of the bark.

This new vegetable substance has been introduced to the notice of American physicians within the past year. In 1839, M. Derosne, the druggist, who first introduced it in Paris, states that some travellers call the monesia bark *goharem*, and others, *buranhem*. Naturalists, who have examined it, think that the tree which furnishes it is a chrysophyllum. The extract is exported from South America in the form of thick, hard cakes, or loaves, weighing about a pound and three-quarters. They are flattened, and have paper of a yellow colour adhering to them.

The extract is of a deep-brown, and very friable; when broken it looks like a well-roasted cocoa-nut. It is entirely soluble in water; and its taste, which is at first sugary, like liquorice, soon becomes astringent, and leaves behind a well-marked and lasting acrid taste, which is particularly felt in the tonsils.

The bark of the monesia is smooth and grayish, like that of the plane tree, but it is much thicker than the latter; and its imbricated fracture and sweet taste form a strong contrast with the bitterness of the thin laminæ which are detached from the plane.

The chemical analysis of the bark of the monesia, and of the imported extract, according to MM. Bernard Derosne and O'Henry, has demonstrated the presence of the following soluble principles:— 1. Chlorophylla; 2, a vegetable wax; 3, a fatty and crystallisable matter; 4, glycyrrhizine; 5, an acrid and somewhat bitter substance; 6, a little tannin; 7, an unexamined organic acid; 8, a red colouring matter resembling that of cinchona; 9, phosphates of lime with organic acids.

The pharmaceutical preparations which have been made with this substance are — 1, an aqueous extract; 2, a syrup, containing $5\frac{1}{2}$ grains in the ounce; 3, a hydro-alcoholic tincture, containing 37 grains to the ounce; 4, chocolate, containing $5\frac{1}{2}$ grains in each cake, weighing within a few grains of an ounce; 5, an ointment containing an eighth part of its weight of extract; 6, monesine, being the acrid substance mentioned in the analysis. The extract contains about eight *per cent.* of glycyrrhizine, and twenty *per cent.* of acrid matter.

The preceding, and most of the subsequent information, in this article, on the new medicine, will be found in a memoir by Dr. G. J. Martin St. Ange, which originally appeared in the *Gazette Medicale*, and was translated for and published in the *London Medical Gazette*, Vol. I., 1839–40, p. 491–6; whence the memoir was transferred to the *Eclec. Journ. of Med.*, Vol. IV., 1840, p. 291–7, and into other American journals.

Dr. Sigmond, in some remarks on the monesia, at a meeting of the Royal Medico-Botanical Society, says, it would appear, from a monograph now placed before the Society, that a French mer-

chant, having witnessed the good effects of a substance employed by the natives in cases of dysentery and diarrhœa, sent a quantity of the drug to Paris, and it was placed in the hands of M. Derosne.

In France the preparations of monesia have been tried by many practitioners, amongst whom are Baron, Lisfranc, Manec, Laurand Payen, and Alquie, and they were led to form a high opinion of its effects, more especially in various affections of the digestive organs; it was serviceable in bronchitis, phthisis, hemoptysis, and as an astringent generally. Its external application in various affections of the skin, and ugly ulcers, has been attended with success. It would appear, also, and the remark is an important one, that although exerting considerable influence upon the system, it had never produced any bad symptom.

The doses were, of the extract, given in the form of a pill, from *ten to twenty grains;* as much as forty-five grains had been given in a day; of the tincture, from *a drachm to a drachm and a half*, in six ounces of water. Experiments have been made in Dublin from which it appeared that much benefit had been derived from it as an astringent. (*Lancet*, Vol. II., 1840, p. 612–13, and *Eclec. Journ. of Med.* Vol. IV., p. 456–7.) Monesia ointment may be employed externally upon sores, ulcers, &c.

In a patient to whom M. Payen prescribed the monesia, leucorrhœa was considerably increased in consequence: it was then used as an injection, and the discharge, which had hitherto resisted every remedy, disappeared and did not return. In two cases of menorrhagia, he gave it with the effect of bringing back the discharge to its healthy standard. Scrofulous ulcers have also been cured by this remedy, internally and externally used for a period of six or seven weeks. Dr. J. G. Nancrede (*Medical Examiner.* Vol. III., p. 215,) states his having exhibited the extract internally, in the form of pills, in three cases, of which the first was diarrhœa of long standing; also in dysmenorrhœa, and with advantage. Dr. Burns (*Med. Exam.*, Vol. III., p. 517–18) reports his having used the extract in two cases of menorrhagia, one of hemoptysis, and two of chronic diarrhœa, with marked advantage; the latter supervened on cholera infantum. Dr. Chaloner (*op. cit.* p. 517) gives his experience in favour of the new medicine, in a case of obstinate menorrhagia; not unaided, however, by perfect rest and cold drinks.

MORUS. Mulberries. The fruit of the *Morus nigra. Cl.* 21. *Ord.* 4. Monœcia Tetrandria. *Nat. Ord.* Urticaceæ.

The mulberry tree is a native of Persia: it is cultivated over the greater part of Europe, and largely in the United States of late years; flowering in June, and ripening its fruit in September.

The fruit of the mulberry owes its acidity to tartaric acid; it is very grateful, and forms the basis of an elegant syrup, but very liable to ferment. The bark is said to be a purgative vermifuge. The root of the *Morus alba* is also used for the same purpose.

Syrup of Mulberry. — Take of Mulberry Juice, strained, a pint; Sugar, two pounds and a half. Dissolve the sugar in the juice of the mulberries, by a gentle heat; then set aside twenty-four hours, afterwards remove the scum, and pour off the clear liquor from the sediment, if there be any.

MORPHIA, *see* Opium.

MOSCHUS. Musk. This substance is defined in the Pharmacopœia as "*Humor in folliculo præputii secretus*—a juice secreted in the follicle of the prepuce" of the musk deer. (*Moschus Moschiferus*, Linn.)

This animal inhabits the mountains of Eastern Asia, especially the Himalayan Chain; it is also found in China, in Cochin China, Tartary, and Siberia. It is extremely shy and solitary; its length rarely exceeds three feet; it has no horns, but in other respects somewhat resembles a deer. The musk sac is oval, flat and smooth above, and convex below; its breadth from an inch and a quarter to an inch and three-quarters; its length from two inches to two inches and a half. It has an outer hairy coat or skin; a fibrous or muscular coat, and an inner smooth membrane; the musk is secreted by appropriate glands. In the young animal the bag is empty, but in the adult, it contains two or three drachms of musk, which, in the fresh state, has the consistence of an electuary, and a reddish-brown colour.

Musk is chiefly obtained from China and Russia. Chinese, Thibet, or Tonquin musk, comes into the market in small boxes holding about twenty five pods each, and lined internally with sheet-lead and paper, and externally with silk; the pods are generally flattened spheres, or somewhat oval; they are covered by short yellowish hair, arranged concentrically round the orifice of the sac.

Good musk is somewhat unctuous to the touch, of a rich dark-brown colour, a bitterish aromatic taste, and of an intense and peculiar odour.

According to Geiger and Reimann, the odorous principle of musk requires the presence of the vapour of water for its development; it becomes inodorous when dried in vacuo over sulphuric acid, and regains its odour when moisture is present.

The adulterations of musk are not easily detected, and among them the admixture of dried blood, which is said to be most frequent, is that which is most difficultly recognised. If, when burnt, it exhale a strong smell of burnt horn, we may suspect that blood has been added; for the odour thus exhaled by genuine musk, differs from that of burnt blood. If it fuse when heated, some bituminous or resinous substance has probably been mixed with it. Earthy matters, shot, and clippings of lead, are sometimes found in it.

Musk is placed among the stimulant antispasmodics of the Materia Medica; but much difference of opinion exists as to its efficacy; and its high price and liability to adulteration are against its employment. It has been recommended in many spasmodic dis-

cases, but seldom had recourse to except in obstinate and peculiar cases. Dr. A. T. Thomson speaks highly of a combination of musk and calomel in epilepsy, and attributes the disappointment which has generally attended its use to the remedy having been adulterated, or the smallness of the dose. He gave half a drachm four times daily. It is best given in pills, or electuary, or in a very small quantity of liquid, united with other antispasmodics or stimulants.

1. ℞ Moschi ℈j.; Camphoræ (ope Spt. Vin. pulverisat.) gr. v.; Confect. Rosæ Gall. q. s. ut fiat bolus.

2. ℞ Moschi ℈j. ad ʒss.; Mucil. Arabic. ʒj. tere simul, et adde Mistur. Camphor. fʒj.; Spirit. Ammon. compos. fʒj. M. fiat haustus pro re nata sumendus.

The *musk mixture* of the Pharmacopœia, is another somewhat more diluted form of musk; from one to two ounces has been given every three or four hours in the delirious and sinking stage of typhous fevers. It has been recommended by Dr. White, in combination with ammonia, to check the progress of gangrene, and in ill-conditioned phagædenic ulcers. Great expectations were at one time entertained regarding the use of musk in hydrophobia, but, like all other remedies, it has there unfortunately proved ineffective. In violent cases of common cholera, it has been resorted to, to allay the pain, spasm, and vomiting. In Asiatic cholera it has been tried as a stimulant without success. On the whole, the evidence which has been adduced appears favourable to the antispasmodic and cordial powers of this article of the Materia Medica, but its scarcity must always stand in the way of its general employment. The late Dr. Rush, in his lectures, attributed the good effects of musk in the advanced stage of fevers to the weakness by which, as a mild stimulus, it was adapted to the excitability of the system at the time. Whether the blood and the secretions of persons taking musk, do or do not become impregnated with its odour, is a question hitherto not satisfactorily determined. According to Tiedemann and Gmelin, its odour is perceptible in the blood, but not in the contents of the lacteals.

Some persons, from idiosyncrasy, cannot endure even the remote odour of musk; it produces headache, giddiness, nausea, and fainting; drowsiness and stupor have occasionally been induced by it when given in small medicinal doses.

Mixture of Musk. — Take of Musk, Gum Acacia, powdered, Sugar, of each, three drachms; Rose Water, a pint. Rub the musk with the sugar, then with the gum, gradually adding the rose-water.

MUCUNA. *Leguminum pubes.* The bristles of the pods of the *Mecuna pruriens.* *Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Leguminosæ.

This plant, the *Dolichos pruriens* of former Pharmacopœiæ, is common in the West Indies and in woods, along river-courses, and in waste and neglected places.

Under the name of *Cowitch*, the spiculæ, or hairs of the pods,

have long been used as anthelmintics, especially in cases of *lumbricus teres;* it acts as a mechanical irritant, and is best administered in syrup or despumated honey, into which the pods may be first dipped and then scraped, so as to form an electuary; it requires to be followed by a brisk purge. Much irritation about the anus is apt to follow the use of this very inconvenient vermifuge.

MURIATIC ACID, *see* Hydrochloric Acid.

MYRISTICA. Nutmeg. *Nuclei.* The *nuts* of the *Myristica moschata. Cl.* 22. *Ord.* 13. Diœcia Monadelphia. *Nat. Ord.* Myristicaceæ.

The nutmeg tree is a native of the Moluccas, especially of the island of Banda.

The seed is the nutmeg of the shops. The aril is the mace.

When the fruit is gathered, the mace is separated and dried in the sun; the nutmegs are then gently baked, taken out of their shells, and washed in lime-water.

Nutmegs should be dense, mottled, and greasy in the interior: those which are light, brittle, or pulverulent, are to be rejected. Mace should be light-brown, or nearly orange-coloured, aromatic, and high flavoured.

Mace and nutmegs afford an essential and an expressed oil. According to Spielman, nutmegs yield one-sixteenth their weight of essential oil, and about one-third of their weight of expressed oil.

The expressed oil, generally called *oil of mace*, is usually imported wrapped in flag leaves, of the consistence of marrow, an orange colour, and fragrant. The only use made of it is in the *Emplastrum Picis compositum*, where it might be omitted. It is probably generally adulterated, and it is said to be commonly composed of suet, palm oil, and a little of the genuine oil to give it odour.

The volatile, or distilled oil, has the odour and flavour of the nutmeg in a high degree; it is very pale-yellow, limped, and lighter than water; it gives flavour to the *Spirit of Nutmeg*, which is the only officinal preparation of the nutmeg:—

Spirit of Nutmeg. — Take of Nutmegs, bruised, two ounces; Proof Spirit, a gallon and a half; Water, a pint. Mix; then, by a slow fire, let a gallon distil.

The general qualities of the nutmeg are well known; in large doses it is said to be somewhat narcotic. With other spices, it forms a principal ingredient in the following "aromatic confection" of the Pharmacopœia, which is an elegant and useful stimulant and cordial, and an excellent adjunct to a variety of other remedies:—

Aromatic Confection. — Take of Cinnamon, Nutmeg, of each, two ounces; Cloves, an ounce; Cardamoms, half an ounce; Saffron, two ounces; Prepared Chalk, sixteen ounces; Sugar, two pounds. Rub the dry ingredients together into a very fine powder, and keep them in a stopped vessel. But as often as the confection is to be used, gradually add water, and mix till incorporated.

MYRRHA. Myrrh. *Gummi-resina.* The *gum-resin* of the *Balsamodendron Myrrha.* (*Protium Kataf*, Lindley). *Cl.* 8. *Ord.* 1. Octandria Monogynia. *Nat. Ord.* Burseraceæ.

According to Ehrenberg, this celebrated gum-resin is the produce of the above tree; it grows on the borders of Arabia Felix, in the province of Gison.

Myrrh is chiefly imported from Turkey, in the form of irregular tears and their fragments, of a reddish-brown colour, more or less translucent, a fragrant aromatic odour, and a warm pungent taste. It crumbles between the teeth, and should not be sticky or insipid. It does not readily fuse, nor is it very inflammable. Its specific gravity is about 1·36.

The Abyssinian myrrh, which comes to us through the East Indies, is sometimes largely mixed with other gummy resinous substances; with bdellium, which is dark-coloured, opaque, and nauseously bitter; and with a pale and nearly transparent gum, which has not the characters of myrrh.

Myrrh is a valuable stimulating tonic. It may be given in doses of from five to twenty grains, either in pills, or triturated with any aromatic water, in the form of a draught: it is an excellent adjunct to carbonate of iron, as in the *Compound Mixture of Iron—Mistura Ferri composita* (page 205); it may be united with aloes and chalybeates as an emmenagogue; and with cinchona and other bitters as a general tonic. Such combinations are well adapted to leucophlegmatic and torpid habits; it improves the appetite, and generally agrees well with the stomachs of delicate persons, especially where the bowels have a relaxed tendency. Combined with expectorants, it is used in asthmatic affections, and in phthisis pulmonalis, when the debility from expectoration is considerable, and where it is not otherwise contraindicated. The following are good expectorant formulæ, applicable in cases of chronic catarrh; they are taken from Dr. Paris's *Pharmacologia:*—

℞ Myrrhæ Gum. Resin. ʒiss.; Scillæ exsiccatæ ʒss.; Extract. Hyoscyam. ℈ij.; Aquæ q. s. ut fiant pilul. xxx., è quibus sumantur binæ nocte maneque.

℞ Pulver. Myrrhæ. gran. xij.; Pulver Ipecacuanhæ gran. vj.; Potassæ Nitratis ʒss. Misce, et divide in doses æquales quatuor, quarum sumat unam quartis horis.

Where a combination of tonics and aloetics is required, the following pills may be used:—

℞ Pilul. Aloes cum Myrrhâ ʒj. · Ferri Sulphatis, Potassæ Carbonatis, āā ℈j.; Misce et divide in pilulas xxiv. sumantur duæ omni nocte.

The *Compound Pills of Iron—Pilulæ Ferri compositæ* (page 206, are a similar combination. When prescribed in the liquid form, a small lump of select myrrh rubbed up with the gradual addition of water, forms a more uniform milky mixture than when the myrrh is previously powdered; as in the following formula:—

℞ Myrrhæ ʒij. tere et solve in Misturæ Camphoræ f ʒvij. et adde Syrupi Croci f ʒss.; Tincturæ Myrrhæ, Spirit. Ammon. compos., āā f ʒij. Misce fiat mistura. Cochlearia iij. pro dosi.

The *Tincture of Myrrh* of the Pharmacopœia is an alcoholic solution of the resin of myrrh; it is useful when diluted with water, as a mouth-wash, and as an ingredient in stimulant gargles, and is sometimes applied to foul ulcers. In the dose of half a drachm or a drachm it is occasionally added to draughts and mixtures.

Tincture of Myrrh. — Take of Myrrh, in powder, three ounces; Rectified Spirit, two pints. Macerate for fourteen days, and strain.

MYRTUS PIMENTA, *see* PIMENTA.

NARCOTICS (ναρκη, *stupor*). Medicines which induce sleep, or, in larger doses, stupor. *Hypnotics*, *anodynes*, and *sedatives*, are other terms commonly, if not with entire accuracy, applied to the same class of remedies.

NARCOTINE, *see* OPIUM.

NICOTINA, AND NICOTIANA TABACUM, *see* TABACUM.

NITRIC ACID. This important acid is generally obtained by the distillation of nitrate of potassa (*see* POTASSÆ NITRAS) with sulphuric acid, according to the following formula of the Pharmacopœia, which, with some modifications as to proportions and apparatus, is the process generally adopted by the wholesale manufacturer, from whom the acid is usually procured for pharmaceutical and medical use.

The ultimate components of nitric acid in its anhydrous state, and as it therefore exists in nitre, are: —

	Atoms.	Equivalents.	Per Cent.
Nitrogen	1	14	26
Oxygen	5	40	74
Anhydrous Nitric Acid	1	54	100

In this state, however, the nitric acid cannot be insulated; in the liquid nitric acid, the water which is present takes the place of a base, and its composition, when of the greatest strength, is: —

	Atoms.	Equivalents.	Per Cent.
Anhydrous Nitric Acid	1	54	80
Water	$1\frac{1}{2}$	13·5	20
Liquid Nitric Acid, sp. gr. 1·5	1	67·5	100

Nitric acid, when pure, is colourless, and extremely corrosive; it exhales fumes when exposed to air, and absorbs moisture, consequently diminishes in specific gravity, and increases in bulk. It tinges the cuticle of an indelible yellow, and causes it soon to peel off. It is decomposed by nearly all the metals and combustible substances, and is one of the most active oxydizing agents known. When passed through a red-hot tube, it is resolved into nitric oxide, oxygen, and water. It frequently has an orange colour, in consequence of the presence of nitrous acid.

Nitric acid is scarcely employed in its concentrated state; it is, however, a very effective caustic, and would probably be an efficacious application to the bites of rabid and poisonous animals, its

liquid form enabling it to penetrate into the wound, the surfaces of which would be thus killed and corroded, while its peculiar activity in the decomposition of animal matter renders it probable that it would act speedily upon the poison. Mr. Welbank recommends it as an escharotic in sloughing phagedænic ulcers, but it requires care in its application, and the protection of the surrounding parts by a coat of lard.—(*Med.-Chirur. Trans.* IX. 69.)

Nitric vapour is sometimes employed for the destruction of contagious and infectious matter; it is easily produced by the action of sulphuric acid upon nitre, aided by a gentle heat; it is, however, much less certain in its operation than chlorine.

Diluted Nitric Acid. — Take of Nitric Acid, a fluid ounce; Distilled Water, nine fluid ounces. Mix.

Dilute nitric acid may be given in doses of from ten to forty minims, in any proper vehicle, such as capillaire and water, or infusion of roses, or the common bitter infusions; for although the concentrated acid is decomposed by vegetable substances, the diluted acid produces no such effect. It is considered as an antiseptic tonic; and is useful in those cases of dyspepsia, in which the acid plan of treatment is indicated. It has been recommended in chronic hepatitis attended by dropsy. It was once considered as efficient in the cure of syphilis; but although in such cases it may be occasionally useful as a tonic, it certainly possesses no influence over the disease, corresponding with that of mercury. In some cases of eruptions, and in ulcerations of the legs, an alterative course, consisting of nitric acid and small doses of mercury, is said to have been of service: the acid may be given in the morning and at noon, and five grains of mercurial pill may be taken at bed-time; the bowels will generally be opened, and sometimes violently affected by this treatment, but these effects may be checked by opiates. It is doubtful whether nitric acid is preferable to the other mineral acids as an antiseptic and refrigerant.

As nitric acid dissolves uric acid as well as the phosphates, chemical physicians have sometimes preferred it as a lithontriptic, and have considered it applicable in cases in which mixtures of those substances are voided; but practice does not sanction the theory; and where the urine deposits a sediment consisting of the phosphates and of uric acid, it is usually symptomatic of disordered digestion or of some hepatic affection, and yields to acids with bitters and mild aperients. If, however, the sediment assumes the more decided symptoms of *gravel*, and is attended with uneasiness in the loins, and a constant pink deposit in the urine, great constitutional derangement is generally to be apprehended, and, in most instances, organic changes.

Nitric acid is applied externally to ill-conditioned sores or ulcers, in various states of dilution, depending upon the effects it produces, which are sometimes very beneficial; two or three drachms of the diluted acid to a pint of water may be used in the first instance, and the strength increased according to circumstances.—(For the toxi-

cological history of this and other acids, see Christison *on Poisons*, chap. III.)

NITROHYDROCHLORIC ACID. *Nitro-muriatic Acid. Aqua Regia.*

Diluted nitrohydrochloric acid, externally applied, has been recommended as an alterative and stimulant, more especially in hepatic affections, and in deficient secretion of bile. The acid should be diluted in the proportion of two ounces to each gallon of water, or so as to produce a mixture as sour to the taste as strong vinegar; this should be applied daily with a sponge to the surface of the body, or used as a bath for the feet and legs. It generally produces a slight cutaneous excitement, thirst, and a peculiar taste in the mouth; the bowels become affected, the pulse quickened, and the pain in the region of the liver, the headache, and the symptoms of morbid irritability under which such patients frequently suffer, gradually give way. We owe this introduction of chlorine or nitrohydrochloric baths to Dr. Scott, who long resided in India, and used them with great success. Upon the whole, however, the encomiums bestowed upon them are not justified by experience. A pediluvium of this acid and warm water sometimes relieves very troublesome headaches.

NUX VOMICA. *Semina.* The *seeds* of the *Strychnos Nux Vomica. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Apocynaceæ.

This species of strychnos is found on the coast of Coromandel, in Ceylon, and elsewhere in the East Indies. It is a low tree, with irregular branches, covered by a smooth ash-coloured bark. The wood is white, hard, and very bitter, especially that of the root.

The proximate principles of these seeds are, according to Pelletier and Caventou, strychnia and brucia, in combination with strychnic acid, wax, oil, gum, starch, and woody fibre. Their poisonous quality and medicinal powers are due to the presence of the alkaloid *Strychnia.*

Strychnia forms octoëdral and prismatic crystals, colourless when pure, and requiring between 6000 and 7000 parts of cold, and 2500 parts of boiling water for solution; the intensity of its bitterness is such as to render it perceptible in 600,000 times its weight of water. It is stated by Dumas to be almost insoluble in anhydrous alcohol and in pure ether. Spirit of wine of the specific gravity ·835 dissolves it, and deposits it in a granular form when rapidly evaporated, but in crystals by spontaneous evaporation. The statement of its ready solubility in *alcohol*, is not, therefore, quite correct. It has an alkaline reaction on vegetable colours, and neutralises and forms salts, chiefly crystallisable, with the acids. The equivalent of strychnia (on the hydrogen scale) appears, upon the author of Liebig, to be 234.

There are no very satisfactory tests of the presence of strychnia: as it usually occurs, it is reddened by nitric acid, but that change of colour depends either upon the presence of brucia, or of extractive matter, and does not occur with the pure strychnia obtained from the *Upas Tiente* of Java.

Medical Properties and Uses of Strychnia.—The physiological effects of strychnia are of a very peculiar and dangerous character, and render extreme caution necessary whenever it is medicinally exhibited. It is placed by Dr. Christison among the *Narcotico-acrid* poisons. When strychnia is administered in *very* small doses (in a state of solution in a small quantity of a diluted acid), it acts as a tonic and diuretic; in the dose, for instance, of about one-thirtieth of a grain; but if the dose be somewhat increased, to the amount, for instance, of from one-sixteenth to one-tenth of a grain, it soon produces a disordered state of the muscular system. Mr. Pereira, in his *Lectures on Materia Medica* published in the *Medical Gazette* (xix. 442), describes "a feeling of weight and weakness in the limbs, and increased sensibility to external impressions (of light, sound, touch, and variation of temperature), with depression of spirits and anxiety," as the usual precursory symptoms. "The limbs tremble, and a slight rigidity or stiffness is experienced when an attempt is made to put the muscles into action. The patient experiences a difficulty in keeping the erect posture, and, in walking, frequently staggers. If, when this effect is beginning to be observed, you tap him suddenly on the ham when standing, you may frequently bring on a slight convulsive paroxysm, so that he will have some difficulty to prevent himself from falling. I have often, in this way, been able to recognise the effects of nux vomica on the muscular system, before the patient had experienced any particular symptoms. If the medicine be still persevered in, these effects increase, and the voluntary muscles are convulsed by very slight causes. Thus, when the patient inspires deeply, or attempts to walk, or turn in bed, a convulsive paroxysm is brought on. The sudden contact of external bodies also acts like an electric shock on him. The further employment of nux vomica increases the severity of the symptoms: the paroxysms now occur without the agency of any evident exciting cause, and affect him even when lying perfectly quiet in bed."

From these and other effects of strychnia, it has been inferred that its chief operation is upon the motor tract of the spinal cord; and it has been ascertained, in proof of this opinion, that its poisonous effects are not prevented by division of the spinal cord, or even by decapitation; whereas, on the other hand, the destruction of the spinal cord immediately causes the tetanic symptoms to cease, and, if part only of that cord be removed or destroyed, the convulsions cease in that part only of the body which receives its supply of nerves from the injured portion of the medulla spinalis. So far, therefore, neither the cerebrum nor cerebellum appear immediately concerned in its effects.

The extraordinary power of strychnia over the muscular system, and apparently independent of cerebral influence, led M. Fouquier to suggest it as a remedy in certain cases of paralysis, especially those unattended by evident organic lesion, such, for instance, as arise from the influence of lead and other poisons. It is most

efficacious when administered in acid solution. Dr. A. T. Thomson recommends an acetate, formed by dissolving one grain of strychnia in one drachm of distilled vinegar, "so that six minims contain one-tenth of a grain of strychnia, the proper dose to commence with. In some habits, I have seen one-sixteenth of a grain produce tetanic twitchings, whilst, in others, I have given a grain and a half, without the smallest obvious effect. As soon as the tetanic twitchings become so severe as to affect the breathing, the medicine should be discontinued, and after some days again recommenced in smaller doses, if it be necessary to persist in its use." Strychnia has also been used in epilepsy, chorea, hysteria, and hypochondriasis. "I have seen it," says Mr. Pereira, "very serviceable in that shaking or trembling action of the muscles produced by habitual intoxication."

In all cases where strychnia is used, whether in paraplegia, and partial paralysis, or in those obscure and painful affections, constituting varieties of *Tic douloureux*, it requires to be employed with great circumspection; there is, however, no reason to regard it as a cumulative poison. It seldom produces any remarkable effect upon the pulse, and when administered in paralysis, its effects are first and chiefly observed in the paralysed parts. Warmth, creeping sensation, perspiration, and convulsive movements there first manifest themselves, and M. Magendie says that he has seen the affected side covered with an anomalous eruption, while the opposite side was free from it.

In some cases of amaurosis, independent of any apparent organic lesion, strychnia has been tried, but, hitherto, with uncertain results. In these cases it has been recommended to sprinkle it upon small blisters applied to the temples and eyebrows. The remedy is said to cause specks to be perceived in the eyes, especially in the affected one, and that the more of these, the better the prognosis.

All that has been said of strychnia, applies, of course, to the *nux vomica*, and to certain preparations of it: the dose of the powder of the nux vomica is two or three grains gradually increased. The *alcoholic extract*, in the dose of half a grain to a grain, at first night and morning, and then three or four times a day, has also been recommended. It is one of the best remedies for involuntary discharge of urine in young persons, in doses of from half a grain to four in the course of the day. Tannin and astringents, and chlorine, iodine, and bromine, are said to be incompatible with strychnia, and to modify or impair its activity. Opium or hemlock may be resorted to, to allay its too-powerful effects.

The *Tinctura Nucis Vomicæ* of the *Dublin Pharmacopœia* is made by digesting two ounces of finely-rasped nux vomica in eight fluid ounces of rectified spirit, for seven days. The dose is from five to ten drops twice or thrice a day. Though recommended by some in preference to the strychnia, the tincture is open to the objection brought against the nux vomica in substance, viz., uncertainty of effect. It is also sometimes used externally as a lini-

ment or embrocation, mixed with the *Linimentum Saponis*, or *Linimentum Ammoniæ compositum.*

Poisoning with Strychnia.—Nux vomica is occasionally resorted to as a poison, though the intensity of its bitterness is against its employment as an instrument of murder. Magendie found that half a drachm of the powder of *nux vomica* killed a dog in forty-five minutes; a grain and a half of the alcoholic extract killed another dog in seven minutes. Dr. Christison killed a dog in two minutes, by injecting a sixth part of a grain of *strychnia* dissolved in alcohol, into the chest; he adds, "I have seen a wild boar killed in the same manner, with a third of a grain, in ten minutes; and there is little doubt that half a grain thrust into a wound, might kill a man in less than a quarter of an hour."

The experiments which have been made on animals to ascertain the cause of death in these cases, tend to refer it to spasm of the thoracic muscles of respiration. When strychnia is administered in fatal doses, "the effects are very uniform and striking. The animal becomes agitated and trembles, and is then seized with stiffness and starting of the limbs. These symptoms increase till at length it is attacked with a fit of violent general spasm, in which the head is bent back, the spine stiffened, the limbs extended and rigid, and the respiration checked by the fixing of the chest. The fit is then succeeded by an interval of calm, during which the senses are quite entire, and unnaturally acute; but another paroxysm soon sets in, and then another and another, till at length a fit takes place more violent than any before it, and the animal perishes suffocated. The first symptoms appear in sixty or ninety seconds, when the poison is applied to a wound. When it is injected into the pleura, I have known them to begin in forty-five seconds."

There seems to be no antidote to the effects of strychnia. The stomach should be evacuated as rapidly as possible, either by the pump, or by emetics of the sulphate of zinc or of copper; and in cases where the powdered nux vomica has been swallowed, the means of evacuating the stomach should be continued for some time, in consequence of the obstinacy with which it adheres to the inside of the stomach. Opium and hemlock may be used afterwards with a view of allaying the tetanic action.

The only disease which produces effects likely to be confounded with those resulting from this poison, is *Tetanus*, and when nux vomica has been given in small doses often repeated and gradually increased, it may induce symptoms exactly resembling tetanus from natural causes. In other cases, however, the diagnosis is obvious, for tetanus is unaccompanied by the symptoms of irritation which nux vomica often produces, the fits are slow in being formed, and it never proves so quickly fatal as large doses of the poison.

On the whole, in the intensity of its action and the smallness of the dose in which it may prove fatal, strychnia is perhaps only equalled by aconitina, and hydrocyanic acid: while, from the

resemblance of the symptoms which follow its protracted use to those of a natural disease, it presents itself in a most formidable aspect, as a secret poison.

OLEA DESTILLATA. *Distilled Oils.*

The fruit of anise, caraway, and juniper, the flowers of lavender and elder, the berries of pimenta, the tops of rosemary, and the entire and fresh herbs of the rest, should be employed. Put any one of these into an alembic, and as much water as is sufficient to cover it, then let the oil distil into a large cold vessel.

The uses of these, and of the other essential or distilled oils included in the Materia Medica, will be found under the respective plants from which they are obtained.

The quantity of essential oil from herbs is, in most cases, not materially affected by drying them: sometimes the odour of the oil is ameliorated, in others deteriorated, by previous desiccation; they are, however, commonly used in their fresh state by the distillers in the neighbourhood of London.

These oils are called *volatile oils* in consequence of the readiness with which they rise in distillation along with the vapour of water; but when they are distilled *alone*, a process sometimes resorted to under the idea of purifying them, it is found that they require a much higher temperature than 212° for their evaporation, and that they suffer more or less change; they deposit resinous matter, and become less odorous and volatile: if, therefore, distilled with a view to their purification, they should always be mixed with water. Many of these oils, when kept, deposit benzoic acid and camphor. Exposed for a long time to light, they generally become pale or colourless, and in the contact of air they acquire viscidity, and some of them assume resinous characters. They are mostly soluble in alcohol, and in ether: the alcoholic solutions are often known under the name of *essences*. They are sometimes adulterated with alcohol, which may be separated by agitation with water, and its quantity appreciated by their diminution of bulk: this adulteration is also indicated by a slight increase of temperature when they are mixed with water, and which is not observed when they are pure. Their adulteration with fixed oil is detected by the greasy stain which they leave when dropped upon paper and held to the fire; after the evaporation of the pure oil, under such circumstances, there only remains a slight discoloration, which may be written over with a pen and ink.

Some of these oils are obtained by *pressure*, as those of lemon, orange, and bergamotte, which exist in vesicles in the rind of the ripe fruit; others are of so delicate a nature as to be impaired by the most careful distillation, such as those of jasmine and tuberose. These are only used as perfumes, and are procured for that purpose by steeping the flowers in a perfectly inodorous fixed oil, which abstracts the odorous principle from the flower, and from which it may be transferred to alcohol, so as to form a spirituous essence. The same perfume cannot be obtained either by steeping

the flowers in alcohol, or by distilling them either with it or with water.

In the Materia Medica, the essential oils rank among the most powerful stimulants, and as such they are both externally and internally employed. Some Pharmacopœiæ direct them in powders blended with sugar; but these should be left to extemporaneous prescription, in consequence of the loss of flavour which they sustain when kept: they have been called *elæosacchara*, and are prepared by triturating together half a drachm of the essential oil, with an ounce and a half of powdered sugar.

OLIVÆ OLEUM. Olive Oil. *Oleum è drupis expressum.* The expressed oil of the fruit of the *Olea Europæa.* *Cl.* 2. *Ord.* 1. Diandria Monogynia. *Nat. Ord.* Oleaceæ.

The olive-tree is a native of the South of Europe, and flowers from June to August.

The oil from Lucca, Florence, or Provence, is extremely bland and insipid; sometimes it has a slight acrimony and bitterness, said to arise from the unripe fruit. Its specific gravity is ·916. It congeals at about 38°, and begins to be decomposed when its temperature is elevated to between 500° and 600°. It becomes rancid on keeping, especially when originally of an inferior quality, or adulterated with poppy oil.

Olive oil is not much used as an internal remedy. In the dose of half an ounce to an ounce, it is gently aperient, and is sometimes administered as an antidote to certain poisons; but in such cases it is rarely useful. The superficial application of the bland fixed oils to the body, is said to prevent the reception of plague, and to mitigate the symptoms of those suffering from the disease. Such inunction has also been recommended in ascites, but there is no good evidence of its utility. Some years ago its external use in this way was alleged to be a cure for the itch. As a vehicle for various active remedies, in the form of *liniment*, this oil is very useful; it impedes the evaporation of volatile substances, and retains other bodies in contact with the cuticle, so as to enable them to be absorbed. Upon this principle, oily liniments of ammonia, of opium, and of cantharides, are frequently prescribed.

The bark of the olive-tree is bitter and astringent, and has been used as a substitute for cinchona; the gum of the olive-tree has also been employed medicinally.

OPIUM (ὀπος, *juice*). *Capsulæ immaturæ succus concretus.* The concrete juice of the immature capsule of the *Papaver somniferum.* *Cl.* 13. *Ord.* 1. Polyandria Monogynia. *Nat. Ord.* Papaveraceæ.

The somniferous poppy is an annual, flowering in June in Europe, and in February in India.

The poppy is probably an original native of Asia, though not an uncommon indigenous plant in the warmer parts of Europe. It was known to Homer, and was used in medicine by Hippocrates. Opium is chiefly prepared in Turkey, Persia, and India; but the

plant is also abundantly cultivated in France and the South of Europe, on account of its seeds, from which a useful bland oil is procured by expression.

The method of obtaining opium is sufficiently simple; the young plants are set out in rows about six inches distant from each other, and are at first plentifully watered. When six or eight inches high, a rich manure is applied, and when about to flower they are again profusely watered. The collection of opium commences when the seed-capsules are about half-grown. At sunset two or three longitudinal incisions are made in each capsule, care being taken to avoid reaching the internal cavity; the exuding juice is removed as fast as it concretes, put into earthen pots, and ultimately dried in the sun; it is then formed into spherical masses, covered with poppy or tobacco leaves, and more completely dried.

Several varieties of opium are met with in commerce. That which is most prized is the *Turkey*, *Smyrna*, or *Levant opium*. It is found in the European market in flattish cakes, sprinkled with pieces of dried leaves, and with the seed capsules of some species of *Rumex*. It should be of a rich brown colour when recently cut, and of a tough consistency, and a tolerably smooth and uniform texture. After exposure to air, it becomes blackish, and harder. Its peculiar narcotic smell should be strong and fresh, and unaccompanied by any burnt odour. Its taste is bitter, and slightly warm and acrid. Those pieces which are very soft, full of herbaceous impurities, containing patches of a very dark-brown or black extract, of an empyreumatic odour, or not smelling duly narcotic, are in general adulterated; and it is not uncommon to find stones, sand, bullets, and other impurities in masses even of the best opium. When this opium is carefully dried it becomes brittle, and affords a yellow-brown powder. It burns with flame, and exhales an odour in which may be traced some resemblance to that of animal matter. Its specific gravity is about 1·3.

A large quantity of opium is made in India: that which is found in our market under the name of *East India opium* is generally darker coloured and less pure than the Turkey opium; it has less of the narcotic odour, and smells, and tastes, and looks as if it had been injured by fire. But of the genuine Indian opium, little or none is exported to western markets; about one-third is sent to the Eastern Islands, and two-thirds to Canton; it is rigidly prohibited in China, so that the whole of it is smuggled into that country. In the year 1829–30, between 16,000 and 17,000 chests of Indian opium are said to have been imported into China, each chest containing about 133 pounds. The Chinese use it chiefly for smoking, and prefer it to Turkey opium; they, however, also import a considerable quantity of the latter. The principal varieties of Indian opium are *Malwa* and *Bengal* opium: the former is in small cakes of a dark brown colour and resinous fracture; the latter in balls of about three and a half pounds' weight, of a softish consistence, and having a strong and pure taste and odour of opium.

Egyptian opium is in small flat cakes of a peculiar reddish colour, and having less of the opium odour than the other varieties.

Constantinople opium is in large and small cakes; the former of good quality; the latter covered with poppy leaf; less odorous, and more mucilaginous.

Persian opium is in small cylindrical sticks about six inches long and half an inch in diameter. "Each one is enveloped in a smooth, shining paper, and tied with cotton; its colour is similar to that of Soccotrine aloes. It has the opiate odour stronger than that of the Egyptian kind, but less than Smyrna opium, and mixed somewhat with a musty odour; its taste is intensely bitter. It is commonly termed Persian opium, but the specimens I received came from Trebizond. It is considered an inferior kind."—(*Pereira.*)

Chemical and Pharmaceutical History of Opium. — The analyses by which the proximate principles of opium have been separated and identified are well calculated to show the recent improvements in this department of organic chemistry, and to illustrate the importance and practical utility of such researches. There are certain substances in opium common to it and some other vegetable products; and there are others peculiar to it, and upon which its medical virtues depend; so that by separating these, its active principles may be obtained in a distinct form, and the relative value of different samples accurately determined. Minute quantities of volatile and of fixed oil, gum, resin, extractive, caoutchouc, and small portions of inorganic salts, are combined in opium with a peculiar crystallisable principle, which has been termed *narcotine*, and with several alkaloids, of which the most important is *morphia;* the others have been termed codeia, narceia, meconia, thebaia or paramorphia, and they are saturated, or supersaturated, in the crude opium, by *meconic acid.*

We shall now describe the modes of separating the several substances, and mention such of their properties as are most important.

1. Narcotina is a leading ingredient in several varieties of opium; its medical powers have not been accurately ascertained; by some it is regarded as nearly inert; by others it is considered as the stimulant and exciting principle of opium. It may be obtained by digesting powdered opium in ether, which takes up the narcotine with some of the less important principles, from which it may be freed by crystallisation. When purified, it forms prismatic crystals insoluble in cold water, and very sparingly soluble in boiling water, and soluble in hot alcohol, ether, and fat oils. It is tasteless and inodorous, soluble in dilute acids, and yields bitter compounds, which are difficultly obtained in crystals, for when evaporated, they are mostly decomposed into acid and narcotina, and crystals of the latter only separate. Its most definite salt is the hydrochlorate. Its alkaline characters, however, have not been satisfactorily established. Its equivalent may be assumed as = 370, and its ultimate components are, according to the analysis of Liebig,—

	Atoms.	Equivalents.	Per Cent.
Carbon	40	240	65·0
Hydrogen	20	20	5·4
Oxygen	12	96	25·9
Nitrogen	1	14	3·7
Narcotina	1	370	100·0

2. Morphia. There are several processes by which this alkaloid may be obtained, and among them that of the Pharmacopœia. The simplest and the best is the following proposed by Drs. Robertson and Gregory. Chloride of calcium is added to a strong aqueous solution of opium to precipitate the acids by which the alkaloids are held in solution; it is then filtered and evaporated to the consistency of syrup, and set aside to crystallise; the crystals are strongly pressed to squeeze out the mother liquor, which contains narcotine and other impurities. The pressed crystals are then purified by solution, crystallisation, and the action of animal charcoal, till they are obtained colourless; they consist of the hydrochlorates of morphia and codeia: they are dissolved in hot water, and ammonia is added, which throws down morphia, and which, being separated upon a filter, may be redissolved in boiling alcohol and obtained in crystals.

The liquor from which the morphia has been precipitated contains codeia, together with hydrochlorate of ammonia and some morphia; it is to be evaporated till it crystallises, and the crystallised mass dissolved in a small quantity of water and decomposed by excess of a solution of caustic potassa; codeia is thrown down, and when redissolved in ether, may be obtained in crystals.

Morphia, as crystallised from its alcoholic solution, is in small prismatic crystals of a bitter taste, the primary form of which is a right rhombic prism. It is nearly insoluble in cold water; soluble in about 100 parts of boiling water, and in 40 of cold, and 30 of boiling anhydrous alcohol: it is nearly insoluble in ether, hence the use of that menstruum in separating it from narcotina. Morphia is soluble in potassa and soda, but only to a very small extent in ammonia; hence the advantage of using the latter alkali in its precipitation. When heated it fuses, then takes fire and burns with a reddish flame, leaving a bulky coal which may be consumed without residue. The saturating equivalent of morphia is 284, and it consists of —

	Atoms.	Equivalents.	Per Cent.
Carbon	34	204	71·83
Hydrogen	18	18	6·33
Oxygen	6	48	16·90
Nitrogen	1	14	4·94
Anhydrous Morphia	1	284	100·00

In its usual crystallised state it includes 2 atoms of water, and consists, therefore, of —

	Atoms.	Equivalents.	Per Cent.
Anhydrous Morphia	1	284	94·04
Water	2	18	5·96
Crystals of Morphia	1	302	100·0

The *salts of morphia* are mostly crystallisable, bitter, narcotic, and obtained by dissolving morphia in diluted acids. They afford precipitates of morphia, on the addition of ammonia and of the carbonates of potassa and soda. They afford precipitates with tannic acid and infusion of galls, which are redissolved by acetic acid. When dropped into a solution of iodic acid, they render it reddish-brown, and iodine is evolved: they are reddened by nitric acid; and form a blue compound when added to a strong solution of perchloride of iron

The other alkaloids have not as yet been used in medicine; they are contained in opium in variable quantities, and do not appear essentially to contribute to its medical virtues, *codeia*, perhaps, excepted.

The relative quantity of morphia contained in the different varieties of opium is extremely variable. The average in fine Turkey opium is about 8 *per cent.*; and of narcotina about 4 *per cent.* One ounce of hydrochlorate of morphia is considered as equivalent in value to a pound of the best opium. The other kinds of opium generally contain less morphia, and many of them more narcotina, than the Turkey opium.

3. Meconic Acid. This is the acid, or one of the acids, with which the alkaloids of opium are united, for they appear to be partly also in the state of sulphates. It is inert as a medicine. One of its characteristic properties, as also of its salts, is, that when added to solutions of the persalts of iron a deep blood-red colour is produced, and by this test opium may sometimes be recognised when in quantities so small as to render the morphia of very difficult detection. But an analogous change of colour is produced by several other substances upon these salts of iron, so that the test cannot be relied on unless verified by others.

Among the pharmaceutical formulæ of opium is *Hydrochlorate (muriate) of Morphia:* it is generally represented as an anhydrous salt. It forms soft plumose crystals, very bitter, and soluble in about 20 parts of cold water. When its hot saturated solution cools, it concretes into a crystalline mass. This salt consists of—

	Atoms.	Equivalents.	Per Cent.
Morphia	1	284	88·48
Hydrochloric Acid	1	37	11·52
Hydrochlorate of Morphia	1	321	100·00

Acetate of Morphia. — Take of Morphia, six drachms; Acetic Acid, three fluid drachms; Distilled Water, four fluid ounces. Mix the acid with the water, and pour them upon the morphia to saturation. Let the liquor evaporate by a gentle heat that crystals may be formed.

Note. — *Acetate of Morphia (crystals).* It is very readily soluble in water. Its other properties are such as have been stated of morphia.

Acetate of morphia requires to be cautiously crystallised in consequence of the ease with which part of the acid may be expelled;

it forms acicular crystals, readily soluble in water, and less so in alcohol. The composition of this salt has not been determined experimentally, nor has it been ascertained whether its crystals contain water. A syrup of acetate of morphia, consisting of four grains of this salt to a pound of syrup, is recommended by Magendie as a substitute for the syrup of poppies. The sulphate of morphia is made up in the same proportion with the like quantity of syrup.

Purified Extract of Opium. — Take of Opium, sliced, twenty ounces; Distilled Water, a gallon. Add a little water to the opium, and macerate for twelve hours, that it may soften; then, the remaining water being gradually poured in, rub them till they are very well mixed, and set by, that the dregs may subside; afterwards strain the liquor, and evaporate to a proper consistence.

Purified Extract of Opium, when properly prepared, is nearly inodorous, of a deep brown colour, and bitter taste. The odorous principle of opium is volatile, and apparently inert, for the distilled water of opium possesses no poisonous or narcotic properties, although it has the peculiar odour of the drug. Where it is required to administer it in a solid form, common opium is generally preferable to this extract. 112 pounds of opium yield between 70 and 80 pounds of the extract, but a considerable residue of morphia may be obtained from the *dregs*.

Tincture of Opium (*Laudanum*). — Take of hard Opium, powdered, three ounces; Proof Spirits, two pints. Macerate for fourteen days, and filter.

This tincture varies in depth of colour according to the quality of the opium with which it has been prepared: it is generally deep brown, and should smell strongly of opium. Its specific gravity, when prepared as above, Mr. Phillips states to be 0·952, and that about 19 minims or 38 drops contain 1 grain of solid matter. There are 60 minims or 120 drops to the drachm of laudanum. Proof spirit is a much better solvent of opium than cold water, for the latter dissolves less than three-sevenths of the opium, whereas proof spirit, as is found in preparing the tincture, dissolves more than two-thirds of it. The dose of laudanum for an adult will vary from twenty to thirty or thirty-five drops.

This tincture is generally sold under the name of *laudanum*, but abroad, and especially in Germany, a stronger spirituous solution of opium than the preceding, and flavored with aromatics, is used under that name. The above is a convenient preparation of opium, either where a large dose is required, in its most active state, or where it is necessary to administer it in very small and divided portions. It may be given in almost any vehicle, but it is as well to avoid combining it with alkalies and metallic salts, by which morphia is either precipitated or enters into new combinations. The acids, as usually employed in medicine, are perfectly compatible with it; and acid tinctures of opium have sometimes been preferred to other formulæ. Among these, the *acetic tincture of opium* has been supposed to act as a more direct sedative than opium itself; the celebrated *black drop* is probably a compound of this kind; it was originally made, about a century ago, by Edward Runstall, of Bishop Auckland, in Durham. It is said to be prepared

by slicing half a pound of opium, and boiling it with an ounce and a half of nutmeg, and half an ounce of saffron, in four pounds of verjuice; then adding a quarter of a pound of honey, and two tablespoonsful of yeast; this compound is allowed to ferment for six weeks in a warm place, after which it is decanted, filtered, and bottled, adding a little sugar to each bottle. Were this recipe correct, the black drop would contain an acid salt of morphia, which is the case, as, when diluted with water, and tested by litmus, it displays acid properties. This is an *acetated tincture of opium*, and is more conveniently prepared agreeably to the formula of the U. S. Pharmacopœia, as follows:—Take of opium two ounces; vinegar, twelve fluid ounces; alcohol half a pint. Rub the opium with the vinegar, then add the alcohol, and, after maceration for fourteen days, strain. The dose is about two-thirds the dose of laudanum, or in the proportion of two drops of the acetate to three drops of the spirituous tincture of laudanum. The discovery, however, of morphia, and the introduction of its salts, have rendered this and similar preparations of opium much less important than formerly.

Wine of Opium. — Take of purified Extract of Opium, two ounces and a half; Cinnamon, bruised; Cloves, bruised, of each two drachms and a half; Sherry Wine, two pints. Macerate for fourteen days, and filter.

This is one of the forms of *laudanum*, and closely resembles the *Laudanum Liquidum Sydenhami* of the old Pharmacopœia, which, however, was stronger, and contained saffron. "This preparation differs from the *Tinctura Opii*, not only in containing aromatics, but also in the use of purified opium. Various circumstances render it difficult to form an estimate of the comparative powers of these preparations; they probably differ but little, for respectable authorities agree in representing their doses as similar. The *Vinum Opii* must be less disagreeable to most persons than the tincture, not only on account of the aromatics which it contains, but because the opium, during purification, loses its peculiar disagreeable smell and taste."—(*Phillips.*)

Confection of Opium. — Take of hard Opium, powdered, six drachms; Long Pepper, an ounce; Ginger, two ounces; Caraway, three ounces; Tragacanth, powdered, two drachms; Syrup, sixteen fluid ounces. Rub the dry ingredients together to a very fine powder, and keep it in a close vessel. And whenever the confection is to be used, add sixteeen fluid ounces of hot syrup, and mix.

This confection is a convenient form where small doses of opium are required, conjoined with aromatics, as in the treatment of diarrhœa, in atonic gout, and some forms of chronic rheumatism. From ten to thirty or forty grains are given for a dose, rubbed up with chalk mixture, camphor mixture, or any of the aromatic waters. It is sometimes employed as a collyrium, in chronic conjunctivitis, by dropping two or three drops into the eye night and morning.

Plaster of Opium. — Take of hard Opium, powdered, half an ounce; Resin of Spruce Fir, powdered, three ounces; Lead Plaster, a pound; Water, eight

fluid ounces. Add the resin of the spruce fir, the opium, and the water to the melted plaster, and with a slow fire boil down until all unite into a proper consistence.

Besides the above, there are several other formulæ in the Pharmacopœia, into which opium enters, and which are noticed elsewhere, such as the *Enema Opii*, the *Linimentum Opii*, the *Pilulæ Ipecacuanhæ compositæ*, the *Pilulæ Saponis compositæ*, the *Pilulæ Styracis compositæ*, the *Pulvis Cretæ compositus cum Opio*, the *Pulvis Ipecacuanhæ compositus*, the *Pulvis Kino compositus*, and the *Tinctura Camphoræ composita.*

Medical Properties and Uses of Opium, &c.—Opium stands at the head of the narcotics, sedatives, and anodynes, and is a remedy of extreme importance; it is one, however, which, from various causes, requires considerable care and management in its administration; there are many diseases in which it is decidedly improper, or, as it is said, contra-indicated; there are others in which the symptoms favourable to its employment are conjoined with some which render it objectionable, if not inadmissible; and, lastly, it is a medicine more liable than almost any other to be modified in its effects by idiosyncrasy.

With respect to the *modus operandi* of opium, little is certainly known; by some it has been regarded as acting solely through the medium of the nerves, by others through the blood, and there are experiments in favour of both hypotheses. In proof of the actual absorption of opium, it has been said that the blood and the secretions are often imbued with its odour, and that if the odorous principle of opium be absorbed, its narcotic principles are probably absorbed also; indeed, Baruel states that he detected morphia in the blood and urine of a person poisoned by laudanum; but others have searched for it under the most favourable circumstances without success. Of the influence of opium upon the sensorium there needs no further proof than common experience; how it affects the nervous system, will be more obvious in the sequel.

The apparent effect of small doses of opium, from an eighth to a sixth of a grain, is often that of a stimulant, rather than a sedative. It quickens the pulse, exhilarates the mind, produces headache, thirst, and heat of the body. But these effects are followed by a peculiar quiescent state of the system, which is more apparent after a full dose, when the stimulating power of opium is frequently unobserved. The pulse is then rendered full and slow, the skin warm and moist, the mind tranquil, and pain is allayed. Sometimes a quiet sleep follows, and, on awaking, the person feels animated and refreshed. But it frequently happens that the sleep is broken and disturbed by disagreeable dreams; and, instead of refreshment, languor, giddiness, nausea, and drowsiness succeed. In other cases a medium dose of opium, about a grain, produces a tranquil state of body and of mind, without the smallest tendency to sleep, and without subsequent debility or exhaustion. The cutaneous secretion is generally increased by opium, and sometimes considerably; but the other secretions are more or less

diminished; the bowels, especially, become constipated, and the urine smaller in quantity than usual. Bearing in mind these effects of opium, its value in disease must be obvious, in allaying pain, inducing sleep, and checking inordinate secretions.

In febrile diseases, opium is a useful palliative where there are no high inflammatory symptoms. In typhoid fevers it allays irritability and watchfulness, quiets many of the nervous symptoms, prevents inordinate relaxation of the bowels, and tends, in combination with vinous and ammoniacal stimulants and bitters, to support the general powers of the system. It is contra-indicated when the skin is hot and dry, or when sopor or coma have supervened. In intermittent fevers, and especially in those which long resist the curative power of cinchona, it has been found that putting the system under the influence of opium, at the accession of the fit, has much accelerated its cure by the ordinary methods.

In many inflammatory diseases opium may occasionally be resorted to for the purpose of alleviating particular symptoms, especially violent pain, spasmodic affections, or excessive discharges. It has also been employed, in conjunction with copious bleeding, as an occasional means of allaying inflammatory action; in such cases, a full dose of opium is admininistered, and, if successfully, it determines to the skin, allays irritability, and induces quiet and refreshing sleep, provided proper adjuncts be at the same time resorted to.

In obstinate, irritating, and spasmodic coughs, where inflammatory action is not predominant, an opiate at night is almost always palliative, and often curative: sometimes inflammatory action is kept up by the mere exertion of coughing; and, in such cases, that which checks the cough will diminish the tendency to inflammation.

In eruptive diseases attended by typhoid fever, and in those cases of small-pox especially in which convulsions precede the eruption, in putrid sore throat, in scarlet fever, and in all diseases attended by nervous debility, opiates are occasionally beneficial; but they must be most cautiously given, particularly in reference to the state of the brain. In nearly all spasmodic or convulsive diseases, the use of opium may be said to be indicated; but it often requires the aid of aperients, and occasions mischief, if the free action of the bowels is interfered with.

In rheumatism, both acute and chronic, opium is an important remedy, by relieving the excruciating and wearing pains of those disorders. In these cases, and especially in the acute form of the disease, it is combined with diaphoretics; and in chronic rheumatism similar combinations may be used, such as opium with small doses of ipecacuanha, emetic tartar, and calomel. The following formula is effectual in allaying rheumatic pains, especially when they come on with increased severity, as is often the case, upon getting warm in bed, or after the first sleep:—

℞ Opii, Hydrargyr. Chloridi, āā gr. iv.; Antimonii Potassio-tartratis gr. j.; Extract. Conii ℈ss. M. divide in pilulas viiij. Sumantur duæ hora decubitûs et repetentur quartis vel sextis horis.

Where rheumatic and spasmodic pains are conjoined, as is not unfrequently the case, and where the attacks are periodical, opium, calomel, or blue pill, quinia, and other tonics, and an occasional warm aperient, are remedies that rarely fail of success. But in obstinate chronic rheumatism, confined to some one joint or muscle, the treatment by a brisk emetic, a purge, and local stimulants is most to be depended upon.

In certain dyspeptic states of the stomach attended by heartburn, and in the ordinary forms of pyrosis, and, generally, in irritable stomach, opium and tonics may often be administered with advantage, and improve the appetite, when given an hour or two before dinner, as in the following formula :—

℞ Quiniæ disulphatis gr. ij.; Acid Sulphur. dilut. ♏v.; Tinct. Opii ♏x.; Infus. Cascarillæ f℥x. M. fiat haustus horâ ante prandium sumendus.

In common colic, and, above all, in *colica pictonum*, opium is successfully used; and in visceral diseases, attended by pain, it is often resorted to as a palliative. In the irritation of calculi in the kidneys, ureters, or bladder, it is often the only means of securing a little rest; but here it requires cautious attention to the state of the bowels, and especially of the urine, for the latter is sometimes so much diminished in quantity by the influence of opium, as to precipitate an additional proportion of sabulous matter. In cases of diseased prostate, irritable bladder, and painful affections of the rectum, a suppository of two or three grains of opium is sometimes the best mode of applying the remedy. Large doses of opium have also been found effectual in the treatment of diabetes, and in that of uterine hemorrhage.

It would be irrelevant to the object of this work further to pursue this extensive, and, indeed, almost endless subject; we must, therefore, content ourselves with referring to writers on the Practice of Physic and Surgery generally for details respecting the employment of opium, and the precautions under which it requires to be administered. In prescribing opium, much will often depend upon the selection of its proper forms, vehicles, and combinations. It acts more slowly and continuously when given in substance than in solution; much will also depend upon the extent to which it is diluted, and the adjuncts with which it is blended. Where a powerful and immediate effect is required, as in cases of great pain or exhaustion, of violent spasm, or excessive irritability, the *tincture* is, generally speaking, the most effective preparation. It has already been stated that twenty (19) minims of the tincture are usually considered as equivalent to one grain of solid opium; but from the state in which it is exhibited, the effect of the former is not identical with that of the latter. To a person not habituated to opium, or for whom it is prescribed for the first time, ten minims in an ounce

and a half of some inert vehicle, or in a common saline draught, will generally produce quiet; but in cases of any emergency a larger dose, namely, twenty or thirty minims, is usually required; and time is not only often lost, but actual mischief incurred, by the use of an inadequate dose; here, however, as in all instances where powerful remedies are requisite, much must be left to the judgment of the prescriber, and to his acquaintance with the peculiarities of his patient. The varying strength of the tincture, and, indeed, of opium itself, must also not be lost sight of, for they are considerable obstacles to certainty. Some, therefore, have proposed to substitute, in all cases, one of the salts of morphia for crude opium; and of these the *hydrochlorate*, as being most uniform and definite, is the best, perhaps even the only requisite combination or form; yet, that there is something peculiar in opium itself, is perhaps proved by the circumstance that the dose of hydrochlorate of morphia frequently requires to be carried to the same extent as that of opium, in order to produce a corresponding effect; and in all cases, half a grain of hydrochlorate of morphia must be resorted to as the equivalent of a grain of opium, although, calculating upon the produce of morphia, and of the hydrochlorate, from the best opium, it might be presumed that one grain of the salt would be equivalent to about ten of opium. A solution of hydrochlorate of morphia, in the proportion of eight grains of the salt to one ounce of proof spirit, is, however, a good substitute for tincture of opium; each drachm containing one grain of the hydrochlorate. Dr. Thomson says (*Lond. Disp.*), that "the dose of hydrochlorate of morphia is from a quarter of a grain to half a grain, in any bland fluid." The usual dose of the tincture of opium of the Pharmacopœia is, he says, "from ten to sixty minims, but, in some morbid states of the habit, very large doses can be borne, and are even necessary. In colica pictonum, one fluidrachm, given before using purges, facilitates their action, and renders the relief more speedy."

In *tetanus*, it is stated upon the authority of Dr. Currie (*Report on Cold Water*, i. 138), that five fluid ounces and a half of tincture of opium have been given in divided doses, with advantage, in twenty-six hours.

Where the continuous use of opium is required, the necessity of increasing the dose soon becomes apparent; that quantity which at first quiets the system and procures rest, gradually loses its powers, and acts as an excitant rather than a sedative; and persons who have thus become habituated to it, are often obliged to have recourse to appalling doses. As far as possible, therefore, the medical practitioner should endeavour so to manage the administration of the remedy as to prevent its *habitual* use; for it is then with opium as with dram-drinking, and extreme restlessness of body and mental misery are felt when it is suddenly discontinued. "Some years ago I was consulted," says Dr. Thomson, "by a lady, who took a wine pint and a half of laudanum every week, and who, as she began to experience its bad effects on her constitu-

tion, was anxious to discontinue it, but was uncertain how to proceed. I recommended her to get a three-pint bottle of the drug, and to continue her usual dose, but, after taking each portion out of the bottle, always to replace it with water, so that, in progress of time, the bottle would contain water only, and her propensity would be cured." The result of this experiment is not related, but I have known a similar plan successfully adopted, where, however, the quantity of laudanum taken did not exceed two drachms a day, and where brandy was used to fill up the bottle; so that the patient, instead of taking two drachms of laudanum, ultimately arrived at taking two drachms of brandy every evening, and, as the change was very gradual, no inconvenience ensued. Independently of the mental disquiet and nervous irritability which persons habituated to laudanum suffer from its abrupt discontinuance, other, and even more serious inconveniences ensue, and among them none more frequent than diarrhœa. This is not, however, always the case; and instances may be found of persons who, from some accidental cause, have been obliged suddenly to leave off the daily use of opium, and have suffered but little from its omission. Sometimes other narcotics may be substituted for it, more especially henbane; lactucarium, and the extract of white poppies, are also useful remedies on such occasions; and when the necessity of opium is once broken through, these admit of easier reduction and discontinuance.

The extent to which opium is occasionally indulged in by *opium-eaters*, is almost incredible. Some years ago a work was published under the title of *Confessions of an English Opium-Eater*, by a gentleman who wrote from personal experience, and which contains much curious and authentic information upon this part of our subject; it appears that at one time he took about nine ounces of laudanum (8500 drops) daily. According to Dr. Russell (*History of Aleppo*), the effects of opium as frequently witnessed in Turkey, when thus habitually indulged in, are invariably deleterious, producing, in the first instance, obstinate costiveness, succeeded by diarrhœa and flatulence, with loss of appetite, and a sottish appearance; the memory soon fails; the individuals become prematurely old, and then sink into the grave, objects of scorn and pity.

In the *Phil. Trans.* (xix. 289), an account is given by Dr. Edward Smith, of Mustapha Shatoor, a Smyrna opium-eater, who took three drachms of solid opium daily; the visible effects at the time were sparkling of his eyes, and great exhilaration of spirits; he found the desire of increasing his dose growing upon him; he seemed twenty years older than he really was; his complexion was very sallow, his legs small, his gums eaten away, and the teeth laid bare to the sockets. From these and similar statements, it has been a prevalent opinion that the habitual use of opium is always dangerous and deleterious, and frequently, if not always, of fatal termination. But these conclusions must not be too hastily

admitted, for many cases might be cited of an opposite character, and, more lately, some important remarks in reference to them have been published by Dr. Christison, whose attention was directed to the subject by the refusal of an Assurance Company to pay a sum of money, on the ground that the insurer (the late Earl of Mar) had been addicted to the vice of opium-eating, which was not made known to the company; he died of jaundice and dropsy; but it was assumed that his life had been shortened by the use of opium. Dr. Christison states, that in consequence of inquiries made on this occasion, he became for the first time aware of the frequency of opium-eating, both among the lower orders and the better ranks of society, and satisfied that the habit is often concealed, that the effects are not those which either professional or unprofessional persons would expect, and that practitioners and toxicologists possess little or no precise information on the matter. His inquiries apparently lead to the conclusion that the practice of eating opium is not so injurious, and an opium-eater's life not so uninsurable, as is commonly thought; and that an insured person who did not make known this habit, could scarcely be considered guilty of concealment to the effect of voiding his insurance; he, however, cautions us against the too hasty deduction of such inferences, which, being drawn from a comparatively small number of cases, are liable to the fallacy often remarked in medical experience arising from the accidental grouping of similar facts. "Meanwhile, however," he observes, "insurance companies and insurance physicians ought to be aware that many persons in the better ranks of life are confirmed opium-eaters, without even their intimate friends knowing it. And the reason is, that at the time the opium-eater is visible to his friends, namely, during the period of excitement, there is frequently nothing in his behaviour or appearance to excite particular attention. From the information I have received, it appears that the British opium-eater is by no means generally subject to the extraordinary excitement of mind and body described by travellers as the effect of opium-eating in Turkey and Persia; but that the common effect is merely to remove torpor and sluggishness, and make him, in the eyes of his friends, an active and conversable man. The prevailing notions of the nature of the excitement from eating opium are, therefore, very much exaggerated. Another singular circumstance I have ascertained is, that constipation is by no means a general effect of the continued use of opium. In some of the cases mentioned above, no laxatives have been required, and in others a gentle laxative once a week is sufficient."

The cases which Dr. Christison alludes to as throwing a doubt over the generally-received opinion as to the eminently injurious effects of the habitual use of opium, are the following:—1. A lady about thirty, in good health, has taken it largely for twenty years, having been gradually habituated to it from childhood by the villany of her maid, who gave it frequently to keep her quiet.

2. A female who died of consumption at the age of forty-two, had taken about a drachm of solid opium for ten years, but had given up the practice for three years before her death; she had led in other respects a licentious life. 3. A well-known literary character, about fifty years of age, has taken laudanum for twenty-five years with occasional short intermissions, and sometimes an enormous quantity, but enjoys tolerable bodily health. 4. A lady, after being in the practice of drinking laudanum for at least twenty years, died at the age of fifty; of what disease, I have been unable to learn. 5. A lady about fifty-five, who enjoys good health, has taken opium many years, and at present uses three ounces of laudanum daily. 6. A lady about sixty gave it up after using it constantly for twenty years, during which she enjoyed good health; and subsequently she resumed it. 7. Lord Mar, after using laudanum for thirty years, at times to the amount of two or three ounces daily, died at the age of fifty-seven, of jaundice and dropsy, but he was a martyr to rheumatism, and, besides, lived rather freely. 8. A woman, who had been in the practice of taking about two ounces of laudanum daily, for very many years, died at the age of sixty or upwards. 9. An eminent literary character, who died lately, about the age of sixty-three, was in the practice of drinking laudanum to excess, from the age of fifteen; his daily allowance was sometimes a quart of a mixture consisting of three parts of laudanum and one of alcohol. 10. A lady, now alive, at the age of seventy-four, has taken laudanum in the quantity of half an ounce daily, between thirty and forty years. 11. An old woman died not long ago, at Leith, at the age of eighty, who had taken about half an ounce of laudanum, daily, for nearly forty years, and enjoyed tolerable health all the time. 12. Visragee, a celebrated Cutchee chief, had taken opium largely all his life, and was alive when Dr. Burnes drew up his narrative, at the age of eighty, paralysed by years, but his mind unimpaired. (*See* Christison, *On Poisons*, chap. xxxii.)*

We might, from the records of medical practitioners, cite several analogous cases of persons who have gradually inured themselves to large doses of opium, and upon whom it does certainly not appear to have produced those decidedly deleterious effects which are sometimes represented as its inevitable consequences; but we believe that such cases are far from common. Not so, however, with persons who habitually take laudanum to a much smaller extent, and with whom it serves as a substitute for wine, tea, or coffee; relieving lassitude and disposition to drowsiness and mental inactivity. In these instances, it becomes a question whether it is more prejudicial than the above-named ordinary stimulants;

* [After all, these cases must be regarded as analogous to those of aged drunkards from alcoholic liquors. The exemption or escape of the few is no argument against the nature of the destructive habits by which thousands are degraded and destroyed.]

whether it may not be sometimes judiciously substituted for them; and whether, on the other hand, those who have habituated themselves to these small exciting doses of opium, may not frequently resort with advantage to strong tea and coffee as substitutes. That small doses of opium are, in the end, less prejudicial than large ones of wine, will, I think, appear evident to those who will take the trouble of tracing their parallel effects.

The considerations suggested in the preceding paragraphs have important bearing upon the medicinal applications of opium; for where it has been habitually used, its effects upon the system are of course proportionately modified; and when it has been so used, and then discontinued, it must, if again resumed, be circumspectly employed, and in much smaller doses than those in which it was taken with impunity at the time of its discontinuance; this, though self-evident to the medical practitioner, is not always so to the patient.

The *formulæ* for the administration of opium admit of many modifications, and, as elsewhere observed, its effects as a therapeutic agent are often much influenced by its vehicles and adjuncts. Camphor mixture, or the common saline draught, or occasionally some aromatic water, in the bulk of ten drachms, or an ounce and a half, may in most cases be used as vehicles for the tincture; and when the taste of crude opium is objected to, the *Vinum Opii*, which is made with purified opium, may be employed. Acids are generally supposed to be more perfect solvents of the active parts of opium than proof spirit, and there is certainly no inconsiderable proportion of morphia left in the residue of the officinal tincture. The addition of alkalis and of magnesia to tincture of opium, precipitate the morphia, and consequently mitigate its activity; and tannin and gallic acid, from the difficult solubility of their compounds with morphia, probably produce the same effect. Tinctures of opium, originally made with alkaline menstrua, and afterwards filtered, are obviously eminently unchemical; the *Tinctura Opii Ammoniata* of the *Edinburgh Pharmacopœia*, is open to this objection. An acid tincture of opium might perhaps with propriety have been introduced into the Pharmacopœia. Dr. Paris states that a citric solution of opium is often a valuable substitute for, and acts with less disturbance than the usual tincture, and recommends Dr. Porter's *Liquor Morphii Citratis*, which is prepared by triturating four ounces of powdered opium and two ounces of crystallised citric acid with a pint of boiling distilled water; the mixture is then macerated for twenty-four hours, and filtered.

When circumstances render the internal exhibition of opium inconvenient, or when it is rejected by the stomach, benefit is sometimes derived by its external application; in this way, liniments of opium may be rubbed along the spine, or applied to the stomach and abdomen, or rubbed upon the jaw in symptomatic trismus. In the form of suppository, or as an enema, opium relieves painful affections of the rectum, bladder, and adjacent parts. "A weak

watery solution of opium is a useful adjunct to injections in gonorrhœa, and to collyria in ophthalmia, and the vinous tincture dropped into the eye removes ecchymosis and the suffusion which often remain in that disease, after the inflammation has been subdued, and restores the tone of the diseased organ. The aqueous solution also lessens the pain of open cancer, when cloths soaked in it are laid over the sore, and it is useful in lacerated wounds of tendinous and aponeurotic parts." (*Thomson.*) — *Brande.*

The application of the salts of morphia by the endermic method is often attended by the most soothing effect in rheumatism, neuralgia, and various spasmodic and irritative diseases. By the rectum, opium and its various preparations sometimes acts as an anodyne with less subsequent distress of stomach and nervousness than when taken by the mouth. The dose in the former is commonly double to that by the latter; although, if we were to credit more than one French writer, this rule ought to be modified, so as to make the dose *per anum* only one-half more than that by the mouth.

Toxicological History of Opium.—There is no poison of such frequent occurrence as opium; it is a common instrument in the hands of the suicide; it has been used to commit murder and to induce insensibility previous to the commission of robbery; and fatal accidents are often ensuing from its careless administration and extensive employment in medicine. The mode of action of opium, and the symptoms which it induces, have already been referred to. Whether it acts through the medium of the blood upon the brain; whether its influence is conveyed along the nerves; or whether it produces an impression on the inner coat of the blood-vessels which is conveyed more exclusively along their nerves, are questions not hitherto satisfactorily answered; those, however, who will take the pains of examining the conflicting evidence respecting its *modus operandi*, will probably deem transmission by the blood the most probable cause of its influence upon the sensorium.

The symptoms produced by an excessive dose of opium are principally marked by giddiness and stupor; the respiration is slow, the eyes closed, the pupils contracted, and an expression of deep repose rests upon the countenance. Afterwards the muscles become relaxed, the features ghastly, the pulse extremely feeble, and death soon supervenes. If the patient recovers, the sopor is followed by heavy sleep, which lasts from twenty-four to thirty-six hours, and is succeeded by sickness and giddiness. Here, as in other cases of poisoning, it is often of much importance to ascertain the period which elapses between the taking of the poison and the commencement of the symptoms. This will vary from various causes, but much will depend upon the form in which the opium has been administered.

In cases mentioned by Dr. Christison, large doses of *laudanum*

induce symptoms in ten or fifteen minutes; but if taken in the solid form, it does not begin to act in less than half an hour. "It is singular," he observes, "that an interval of an hour was remarked in a case where the largest quantity was taken which has yet been recorded. The patient swallowed eight ounces of crude opium, but in an hour her physician found her able to tell connectedly all she had done, and she recovered. In some rare cases the sopor is put off for a longer period."

The peculiar sopor produced by opium is very characteristic of the poison; it differs from coma in the patient continuing capable of being roused by shaking, tickling, or splashing with cold water. Dr. Christison observes, that the possibility of rousing the patient from the lethargy caused by opium is often a good criterion for distinguishing the effects of this poison from apoplexy and epilepsy. It is curious that, although opium always produces convulsions in other animals, it rarely does so in man; they are, however, not an uncommon consequence of the administration of opium to children. Delirium is also a rare symptom of poisoning by opium.

The quantity of opium requisite to produce fatal effects will depend upon a variety of causes. The smallest quantity which, upon good evidence, has occasioned death, is four grains and a half; it was taken with nine grains of camphor, and was followed by the usual symptoms of narcotism and death in nine hours. The man took the opium for a cough at seven in the morning; at nine his wife found him in a deep sleep, from which she could not rouse him; nothing was done for his relief till three in the afternoon, when he was labouring under all the usual symptoms of poisoning with opium; death ensued in an hour, notwithstanding the active employment of remedies.

Young children are so sensible to the poisonous influence of opium, that even the smallest dose cannot be given to them with impunity. Cases are recorded of infants several months old killed by three or four drops of laudanum; and Dr. Christison cites an instance of a healthy infant, four weeks old, killed by an anodyne draught, containing an eighth of a grain of opium, and as much henbane.

The action of poisonous doses of morphia resembles that of opium, but it is more powerful.

The common duration of fatal cases of poisoning from opium is stated by Christison as from seven to twelve hours; those who outlive twelve hours, generally recover. Fatal cases of longer duration, are, however, on record.

It has been stated, upon the authority of Orfila and others, that opium acts more powerfully when introduced into the rectum, than into the stomach; this, however, is certainly not the case, and it is frequently administered in clysters in doses which would have proved fatal if swallowed. Opium should be applied externally in lotions and liniments, with some caution, especially to children,

and in certain diseased states of the integuments. A case is also on record, in which death is said to have been produced by the introduction of solid opium into the external ear, for the cure of earache.

The principal morbid appearances which have been met with on dissection, in cases of opium poisoning, are turgescence of the vessels of the brain, and effusion of water upon its surface and into the ventricles. Extravasation of blood is rare, except, perhaps, where a predisposition to apoplexy has existed. The lungs, too, are sometimes found gorged with blood. Any extraordinary appearance in the stomach is of rare occurrence. The blood is generally fluid, and the body often tends to rapid decomposition. The detection of opium in the stomach depends upon several accidental circumstances; sometimes it appears to have been digested, and sometimes removed by absorption; sometimes it may be detected by its odour, by tests, and by the poisonous influence of the contents of the stomach upon dogs and other animals. Neither opium nor the salts of morphia appear to undergo destructive decomposition by long contact with putrefying animal matter, for it has been detected, under such circumstances, by tests, after the lapse of many months.

The following general process for the detection of opium in mixed fluids and solids, has been suggested by Dr. Christison:—1. If there is any solid matter, it is to be cut into small fragments; water is to be added if necessary, then a little acetic acid to render the mixture slightly acidulous, and when the whole mass has been well stirred, and has stood a few minutes, it is to be filtered and evaporated at a temperature somewhat below ebullition, to the consistence of a moderately thick syrup. To this extract, strong alcohol is to be gradually added, care being taken to break down any coagulum which may be formed; and, after ebullition and cooling, the alcoholic solution is to be filtered. The solution must then be evaporated to the consistence of thin syrup, and the residue dissolved in distilled water, and filtered anew.

2. Add now a solution of acetate of lead as long as it causes precipitation; filter, and wash. The filtered fluid contains the morphia, and the precipitate on the filter contains the meconic acid, combined with oxide of lead.

3. The fluid part is to be treated with sulphuretted hydrogen, to throw down any lead which may remain in solution. It is then to be filtered while cold, and evaporated sufficiently in a vapour-bath. The solution in this state will sometimes be sufficiently pure for the application of the tests for morphia; but in many cases it is necessary, and in all advisable, to purify it still further. For this purpose, the fluid is to be precipitated with ammonia, and the precipitate having been collected, washed, and drained on a filter, the precipitate and a portion of the filter to which it adheres, are to be boiled in a little pure alcohol. The alcoholic solution, filtered, if necessary will give, by evaporation, a crystalline residue,

which becomes orange-red with nitric acid, and blue with permuriate of iron. The latter property cannot always be satisfactorily developed.

4. It is useful, however, to separate the meconic acid also, because, as its properties are more delicate, it may be more satisfactorily detected than morphia; for this purpose, diffuse the precipitate by acetate of lead (par. 2), in a little water, transmit sulphuretted hydrogen, till the whole precipitate is blackened; filter immediately without boiling; then boil, and, if necessary, filter a second time. A great part of the impurities thrown down by acetate of lead will be separated with the sulphuret of lead, and the meconic acid is dissolved. But it requires, in general, further purification, which is best attained by again throwing it down with acetate of lead, and repeating the steps of the present paragraph. The fluid is now to be concentrated by evaporation, and subjected to the tests for meconic acid; more particularly to the action of perchloride of iron, when the quantity is small. If there is evidently a considerable quantity of acid, a portion should be evaporated till it yields crystalline scales, which have always a yellowish tint; these, when heated in a tube, yield an arborescent crystalline sublimate. (*See* Christison, *On Poisons*, chap. xxxii.)

It may be observed, in regard to what are termed the tests for opium, that they are, in fact, tests of morphia and of meconic acid. When morphia is present in such proportion that it can be obtained in crystals from its alcoholic solution, and leisurely and accurately examined, there is no difficulty in identifying it; but the tests which are most relied upon for its detection in very minute quantities namely, nitric acid and permuriate of iron, are, when so applied, equivocal and unsatisfactory. The reddening by nitric acid, or rather the orange-colour so produced, is destroyed by a little excess of acid, and is, moreover, not altogether peculiar to morphia, so that, when working upon a small fraction of a grain of suspected matter, the operator may be easily deceived. The reddening of the persalts of iron by meconic acid is certainly more definite; but then, sulphocyanic acid, and some other organic acids, produce a similar effect; and although, if we find meconic acid, we may, in these cases, fairly infer the presence of morphia or of opium, yet meconic acid is itself not poisonous. So that, in the absence of other proof, it must be allowed that, upon a subject of such importance as medico-legal evidence in a court of justice, it would be necessary to use extreme caution in regard to any opinion deduced from the usual tests.

OPOPONAX (οπος, *juice*, and πανακης, *all healing*). *Gummi-resina.* The gum-resin of the *Opoponax chironium.* *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbelliferæ.

The root of this plant furnishes a milky juice, which, dried in the sun, is the *opoponax* of the shops. It occurs in tears, and in irregular yellowish-brown masses, having somewhat of the odour of galbanum, and a bitterish taste. It is imported from Turkey and

India. In pharmacy opoponax ranks with ammoniacum and galbanum, but it has of late fallen into disuse, and might have been excluded from the Materia Medica.

ORIGANUM (ὄρος, *a hill*, and γαίω, *I delight*). Wild Marjoram. *Origanum vulgare. Cl.* 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. Ord.* Labiatæ or Lamiaceæ.

Wild marjoram is a warm and pungent aromatic herb. Its infusion was formerly used as a tonic and emmenagogue. It yields, on distillation with water, an acrid, pungent oil, of an agreeable odour, the use of which is confined to external applications; it is prescribed in stimulating liniments and for the relief of toothache. The average produce of essential oil from this herb is one pound from two hundred-weight; but it varies exceedingly with the season and culture of the plant. It is often sold under the name of *oil of thyme.*

Sweet Marjoram (*Origanum Marjorana*) is a native of Portugal and Syria, and cultivated in gardens chiefly for culinary, and sometimes for medical use.

ORNUS EUROPÆA, *see* MANNA.

OVUM. The Egg of the common fowl, *Phasianus gallus.*

Eggs are well known as nutritious food; the yolk, beaten up with a little wine and sugar, is a good restorative in cases of debility. The yolk of egg is often used as a medium for mixing or suspending insoluble or imperfectly soluble substances in water: it contains about 30 *per cent.* of oil, which may be obtained by expression from hard-boiled yolks which have been slightly torrefied. It had a place in old Pharmacopœiæ, under the name of *Oleum Ovorum*, and was celebrated as a remedy for deafness, a few drops being put into the ear night and morning; and it may have been useful as an unctuous application in cases of deficient ceruminous secretion. The remainder of the yolk is chiefly albumen: it also contains phosphorus.

The white of egg derives its characters from the presence of *albumen:* when heated to about 150° it coagulates. Albumen is also coagulated by alcohol and by several acids. The most delicate test of albumen in animal fluids is a solution of corrosive sublimate, which occasions a white cloud in extremely dilute albuminous liquids; another very sensible test of its presence is the ferrocyanuret of potassium, a few drops of distilled vinegar having been previously added.

Egg-shells are chiefly carbonate of lime; they contain about 1 *per cent.* of phosphate of lime and magnesia, and 2 *per cent.* of animal matter.

PAPAVER. *Capsulæ maturæ.* The ripe seed capsules of the *Papaver somniferum.*

As opium is obtained by wounding the capsules or poppy-heads, it follows that the entire capsule will contain the same principles as opium; opium is, however, the concrete juice of the *unripe*

capsules grown generally in warm climates: poppy-heads, when collected for medical use, are *ripe*, and are grown in this country. Owing chiefly to the uncertainty of our climate, the growth of the poppy for the purpose of collecting opium is seldom attempted: very excellent opium has, however, been produced in Britain (see *Trans. of the Society of Arts*, vol. xiv. *Quart. Journ. of Science*, vol. iv. *Edin. Philos. Journ.* vol. i.).

The ripe poppy-heads, when dried, and freed from the included seeds, which are oleaginous and not at all narcotic, furnish two valuable medicinal preparations, a syrup and extract; there is also a formula in the Pharmacopœia for a decoction.

Extract of Poppy. — Take of Poppy (capsules, dried, bruised, and) free from seed, fifteen ounces; Boiling distilled Water, a gallon. Macerate for twenty-four hours, then boil down to four pints and strain the liquor whilst it is yet hot; lastly, evaporate to a proper consistence.

Syrup of Poppy. — Take of Poppy (capsules, dried, bruised, and deprived of seed), three pounds; Sugar, five pounds; Boiling Water, five gallons. Boil the capsules in the water down to two gallons, and strongly press them. Boil down the strained liquor again to four pints, and strain while hot. Set aside for twelve hours that the dregs may subside; then boil down the clear liquor to two pints; add the sugar and dissolve it.

Decoction of Poppy. — Take of Poppy (capsules), sliced, four ounces; Water four pints. Boil for a quarter of an hour, and strain.

Extract of Poppy, when carefully prepared, is deemed to be a good substitute for opium, and may often be used where the latter occasions nausea and headache. From two to three, up to eight or ten grains, is the usual dose for an adult; its effect gradually decreases by habit, and twenty or thirty grains are occasionally taken by those who have accustomed themselves to its influence. From various causes, its activity is, however, uncertain; it should, therefore, be prescribed with requisite caution. The same remark applies to the *Syrup of Poppies*, and both preparations ought to be, as they generally are, superseded by opium, laudanum, and the syrups of acetate and of sulphate of morphia, which see.

Syrup of Poppies is thought by some to be a very useful and effective opiate, and given at bedtime, in the dose of one or two drachms, induces rest and slight tendency to perspiration. It should not be given to children without the utmost caution, and by no means trusted to nurses, for a teaspoonful has proved fatal to a healthy infant. It should be prepared strictly according to the directions above given, and should be kept in a cool place; when not thick enough, it is very prone to fermentation, especially in warm rooms; it is often carelessly prepared, and sometimes simple syrup with the addition of tincture of opium is substituted for it.

Decoction of Poppy is intended as an anodyne fomentation, but it is seldom more effectual than warm water; a solution of the extract of poppy, or a mixture of tincture of opium and hot water, may be more conveniently adopted where such an application is required.

PAREIRA. *Radix.* The root of the *Cissampelos Pareira. Cl.* 22. *Ord.* 10. Diœcia Dodecandria. *Nat. Ord.* Menispermaceæ.

This plant is a native of the West Indian Islands. It is a twining shrub with smooth stem.

This root, formerly called *Pareira brava,* was long-ago used as a tonic and lithontriptic. It has been reintroduced into our Materia Medica chiefly at the suggestion of Sir Benjamin Brodie. It is imported in pieces of various thickness, and two to three feet long; it is dense, ligneous, and of a yellowish-brown colour. Those samples which are of a very loose and fibrous texture and dark colour, are apparently the stems, and are inert compared with the wood of the root; the latter is difficultly obtained, and seldom met with in trade. It has a bitter-sweet taste, and yields its active principles to water and alcohol. The London Pharmacopœia directs an *Infusion* and *Extract.*

Infusion of Pareira. — Take of Pareira (root sliced), six drachms; Boiling distilled Water, a pint. Macerate for two hours in a loosely-covered vessel, and strain.

Extract of Pareira. — Take of Pareira root, sliced, two pounds and a half; Boiling distilled Water, two gallons. Macerate for twenty-four hours; then boil down to a gallon, and strain the liquor whilst hot; lastly, evaporate to a proper consistence.

The infusion may be used as a vehicle for the powdered root or the extract. From twenty to forty grains of the former, and from five to twenty grains of the latter, may be given for a dose. In chronic inflammation of the bladder, attended by secretion of ropy alkaline mucus, and in those cases of irritability of the kidneys and bladder in which the urine is white and turbid from the deposition of ammonio-magnesian phosphate, pareira often acts, according to some, as a specific. Sir Benjamin Brodie prescribes it with small doses of henbane; and in phosphatic diathesis, with nitric acid.

PETROLEUM. (*Petroleum Barbadense*). Barbadoes Petroleum. Mineral Tar.

This bituminous substance has been employed internally as a sudorific and diaphoretic, and externally as a stimulating application in cases of chronic rheumatism, porrigo, chilblains, and affections of the joints. In this country it never was in much repute. In Germany it has been extolled as an anthelmintic. The following are Schwartz's drops for the cure of tape-worm :—

℞ Petrolei ℥ss.; Tinct. Assafœtid. ℥vj. M. sit dosis gutt. 40 ter de die.

PHOSPHORUS. (φως, *light*, and φερειν, *to bear.*)

This simple substance was discovered in 1669, by Brandt, a merchant of Hamburg; he obtained it by the destructive distillation of the residue of the evaporation of urine. Kunckel, a German chemist, aware of the source whence it was derived, procured it by the same process, and about the year 1680 it was largely prepared under the direction of the celebrated Boyle, by his chemical

assistant, Godfrey Hankwitz, the founder of the chemical establishment long known as "Godfrey's," in Southampton Street, Covent Garden. Boyle described the method of preparing it in a tract entitled "*Aerial Noctiluca.*" Margraaf of Berlin, and Giobert of Turin, improved the process; but it is to Gahn and Scheele that we are indebted for the method of obtaining it which, with some practical improvements, is now generally adopted. Scheele discovered the existence of phosphoric acid in *bone-earth*, the residue of the calcination of bone: this substance is reduced to powder and digested for a day or two with half its weight of sulphuric acid diluted with enough water to give the mixture the consistency of a thin paste; it is thus decomposed and resolved into sulphate and superphosphate of lime. The latter is dissolved out by washing the mass, and separated from the residuary sulphate of lime by filtration; the filtered liquor is then evaporated nearly to dryness, mixed with about one-fourth of its weight of powdered charcoal, and strongly heated in a coated earthen retort, the beak of which dips into water, in which the vapour of the evolved phosphorus condenses in the form of a reddish-brown fusible substance. It is purified by fusion in hot water, and pressing it through a piece of chamois leather, and is usually cast into sticks by allowing it to cool under water in a glass tube.

In this process, the charcoal combines with the oxygen of the phosphoric acid, and carries it off in the form of carbonic acid; some undecomposed phosphate of lime and redundant charcoal remain in the retort, and the phosphorus distils over.

Pure phosphorus is transparent, or translucent and nearly colourless, but, as it occurs in trade, it is usually of a pale-fawn colour; it is of a waxy consistence. Its specific gravity is 1·7. It fuses at 108°, and at 550° it is converted into vapour, the specific gravity of which is 4·35. When fused at 150°, and then suddenly cooled, it becomes black; but when again fused and slowly cooled it regains its usual appearance. When very gradually cooled, it occasionally forms octoëdral crystals.

Phosphorus is characterized by its extreme inflammability. It undergoes a slow combustion at common temperatures, and is luminous in the dark, exhaling fumes having an alliaceous odour; when rubbed, or moderately heated, it bursts into a brilliant flame, throwing off copious fumes of phosphoric acid. It is sparingly soluble in absolute alcohol, and more so in ether; it also dissolves in fixed and volatile oils, in sulphuret of carbon, and in several of the liquid hydrocarbons.

The following are the characters of phosphorus given in the *Notes* of the Pharmacopœia:—

Phosphorus. — It is almost colourless, resembles wax, is translucent, evolves light in the dark. It is sparingly soluble in many distilled oils and in sulphuric ether. It should be kept in water, out of the access of light.

In combination with oxygen, phosphorus forms an oxide and

three acids, which have been termed *hypophosphorus, phosphorous,* and *phosphoric acids:* the latter only is used medicinally.

Phosphoric acid is obtained by the full oxidizement of phosphorus, which may be effected by its combustion at high temperatures, or by the action of nitric acid. It is also sometimes procured from the superphosphate of lime, resulting from the decomposition of bone-earth in the above-mentioned process. When anhydrous it consists of—

	Atoms.	Equivalents.	Per Cent.
Phosphorus	1	16	44·44
Oxygen	2½	20	55·56
Phosphoric Acid	1	36	100·00

The Pharmacopœia directs the preparation of *diluted phosphoric acid.*

Medical Uses of Phosphorus and Phosphoric Acid.—Phosphorus has not been much used in this country, but on the Continent it has been more extensively employed as a powerful diffusible stimulant, and has been occasionally prescribed in a great variety of disorders; namely, as a nervous stimulant in low fevers and Asiatic cholera, in convulsions and epilepsy, and in intermittent headache; and, above all, as a generative stimulant in certain cases of impotency. It accelerates the pulse, and promotes perspiration, and the secretion of urine, which is said to have become phosphorescent during its use. It is usually given either in ethereal or in oily solution. The *Ether Phosphoratus* of the Parisian *Codex* is prepared by dissolving three grains of phosphorus in a fluid ounce of sulphuric ether, of which, ten drops have been given every three or four hours in any bland or mucilaginous vehicle. Some prefer the oily solution prepared by digesting a drachm of phosphorus, cut into small pieces, in an ounce and a half of olive oil; after allowing the mixture to remain in a dark place for fifteen days, the solution is poured off, and may be flavoured with a few drops of oil of lemons. Of this *phosphorated oil,* from ten to thirty drops may be given two or three times a day.

But phosphorus must not be carelessly administered, for in small doses it acts as an irritant poison, producing inflammation and erosion of the stomach and bowels. Doses of three or four grains, less, have proved fatal to dogs; and even water in which phosphorus has been kept, has poisoned poultry. Its effects on man, though seldom witnessed, appear equally dangerous. A case is quoted by Dr. Christison, on the authority of M. Worbe, the subject of which was a stout young man, who took a grain and a half (in hot water?) after having previously swallowed half a grain without injury. In seven hours he was attacked with pain in the stomach and bowels, then with incessant vomiting and diarrhœa, tenderness and tension of the belly, and other symptoms of irritant poisoning, and he died exhausted in twelve days. Another fatal case, related by M. Fontenelle, is quoted from the *Revue Medicale* (1829, III., 429). An apothecary, after taking in one day first a

single grain and then two grains of phosphorus, without experiencing any particular effects, swallowed next day three grains at once, in syrup. In the evening he felt generally uneasy, from a sense of pressure in the abdomen, which continued for three days, and he was then seized with violent vomiting of a matter having an alliaceous odour. On the seventh day he had delirium, spasms, and palsy of the left hand, and died shortly after. A third case is mentioned on the authority of Dr. Flachsland, of Carlsruhe. The phosphorus was taken on bread and butter, by the advice of a quack, for the cure of impotency; the patient was a young man; the symptoms were violent pain of stomach and bowels, together with the discharge, by clysters, of small particles of phosphorus, and continual vomiting: he died in forty hours. On examination after death, the omentum and outside of the intestines were red, and fluid blood was discharged from the first incisions through the skin of the abdomen; the villous coat of the stomach, and the inner membrane of the duodenum, presented an appearance of gangrenous inflammation (probably black extravasation only); the large intestines were contracted to the size of the little finger, the mesenteric glands enlarged, and the spleen and kidneys inflamed.

In the therapeutic employment of phosphorus, the curious statement of Couerbe respecting its existence in the brain, should not be overlooked. It is said to be present in that organ to the amount of from two to two and a half *per cent.* in persons of sound intellect; but he asserts that it is in comparative deficiency in the brain of idiots, and redundant in that of violent maniacs, amounting, in the former, to not more than from one to one and a half *per cent.*, and in the latter to three, four, and four and a half *per cent.*

Phosphoric acid, like other acids, is refrigerant and tonic, but it has been especially used in those cases of urinary deposits in which the phosphates prevail, and in that state of the system which is frequently distinguished as the phosphatic diathesis; it has also been presumed, rather than proved, to be more useful than other acids in cases of exostosis, and other bony tumours. From ten to twenty drops of the diluted acid of the Pharmacopœia may be given three or four times a day in any proper vehicle.

PHYTOLACCA. *Radix et Baccæ.* The root and berries of the Poke. *Cl.* 10. *Ord.* 10. Decandria Decagynia. *Nat. Ord.* Phytolacceæ.

The Phytolacca Decandria is a native of all parts of the United States, as well as the south of Europe and north of Africa. It is sometimes, says Dr. Bigelow, known in this country by the names of cocum, garget, and pigeon berries. The root is dug for medical use late in autumn, after the stalks are dead. Its large rich leaves and clusters of purple berries, interspersed with green and unripe ones, and flowers still in bloom, make it readily recognisable by those who have once seen it.

The root of this plant is large, frequently exceeding a man's leg in thickness. When dried it is light and spongy, with a mild and somewhat sweetish taste. Both water and alcohol extract from it

a soluble portion, which seems to be a variety of extractive matter. The berries contain a succulent pulp, and yield, upon pressure, a large quantity of fine purplish juice. They have a sweetish, slightly acrid taste, with little odour.

Medical Uses.—Poke, or phytolacca, is a certain, though slow, emetic, and operates also freely as a cathartic, attended sometimes with narcotic symptoms. It differs from the other emetics in common use by both the slowness and length of its operation. An operative dose, continues Dr. Bigelow, is frequently an hour, and sometimes two, before it begins to produce vomiting; but after this operation has commenced, it not unfrequently goes on with great obstinacy for many hours. Although these effects may answer some indications in disease, they do not justify our placing poke in the same line with, or using it as a substitute for, ipecacuanha. There is, withal, considerable difference in its operation on different patients. On some it operates promptly and with mildness; on others it occasions distressing nausea, vertigo, and temporary insensibility of the retina. Large doses are apt to occasion hypercatharsis. Phytolacca is administered, in doses short of an emetic or purgative effect, in rheumatism. A decoction of the berries in milk has been recommended in scrofula.

The *dose* of the powdered root, as an emetic, is from *ten to thirty grains;* as an alterative, from *one to five grains.* A strong infusion of the leaves or roots has been recommended in piles; and Dr. Wood (*U. S. Disp.*) adds: that an ointment, prepared by mixing a drachm of the powdered root or leaves with an ounce of lard, has been used with advantage in psora, tinea capitis, and some other forms of cutaneous disease. An extract made by evaporating the expressed juice of the recent leaves has been used for the same purpose.

PILULÆ. (dim. of *pila*, a ball.) Remedies which are active in small doses, insoluble or difficultly soluble in water, or nauseous to the palate, are conveniently administered in the form of *pills.* They are generally strewed over with starch, magnesia, liquorice-powder, or lycopodium, to prevent their adhesion; and these powders, or the external application of gold or silver leaf, render them less apt to be tasted in the act of their deglutition.

With one or two exceptions, pill-masses should be excluded from the formulæ of a Pharmacopœia, and left to extemporaneous prescription; or their ingredients should be kept in powder, and formed into pills when required for use.

When long kept, most pills become hard, and proportionately difficult of solubility in the stomach; so that active remedies may thus lose their efficacy, or become so indurated as in many cases to be voided with little alteration, after having passed the stomach and bowels. Soap, soluble saline substances, and sugar, are good additions to obviate such source of inactivity. They should not exceed four or five grains in weight, and it is more agreeable to most persons to swallow two small, than one large pill. The

names and composition of the chief pills are given under the heads of the medicines from which they derive their name.

PIMENTA. *Baccæ immaturæ exsiccatæ.* The unripe dried berries of the *Eugenia Pimenta.* *Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Myrtaceæ.

This tree is common in the West Indies, especially in Jamaica.

The berries are gathered when green, and carefully dried in the sun. Their flavour is agreeably warm and aromatic, partaking of that of cloves. In pharmacy they often serve the purpose of more expensive spices, and are especially useful in covering nauseous and bitter flavours. The distilled water is a pleasant vehicle for saline purgatives and rhubarb, and the volatile oil (*Oleum Pimentæ*), which is of a reddish-brown colour, and heavier than water, is sometimes given in the dose of two or three minims, triturated with sugar, in cases of flatulent colic, or added to purgative pills and powders. The quantity yielded by a given weight of berries is very variable, fluctuating between one and five *per cent.*

Aqua Pimenta. — *Pimenta Water.* — Take of Pimenta, bruised, a pound, *or* Oil of Pimenta, two drachms; Proof Spirit, seven fluid ounces; Water, two gallons. Let a gallon distil.

When recently distilled, this water has a brownish hue, and slowly deposits a resinous sediment; in other respects, it keeps well, and retains its aromatic fragrancy.

PIPER CUBEBA, *see* CUBEBA.

PIPER LONGUM. Long Pepper. *Fructus immaturus exsiccatus.* The dried unripe fruit of the *Piper longum.* *Cl.* 2. *Ord.* 3. Diandria Trigynia. *Nat. Ord.* Piperaceæ.

This plant is a native of Malabar and Bengal. Its root is perennial, woody.

Long pepper is biting and pungent, but not aromatic. It contains piperin, acrid fatty matter, colouring and extractive matter, gum, and much bassorin, starch, woody fibre, malic and mineral acid salts. The ashes contain carbonate, sulphate, and chloride of potassium, carbonate and phosphate of lime, and traces of magnesia and oxide of iron.—(J. DULONG. *Journ. de Pharm.*, XI. 52.)

This species of pepper is employed in several pharmaceutical formulæ, but there seem no good grounds for preferring it to the common, or black pepper. (Gr. πεπερι, from πεπτειν, *to digest:* because it assists digestion?)

PIPER NIGRUM. Black Pepper. *Baccæ.* The *berries* of the *Piper nigrum.* *Cl.* 2. *Ord.* 3. Diandria Trigynia. *Nat. Ord.* Piperaceæ.

This plant is cultivated in various parts of India and its islands, and also in the West Indies.

The black pepper of commerce consists of the entire dried berries, with the pulp adhering. When in quantities, and recently unpacked, it has an agreeable and slightly aromatic odour. Its taste is intensely pungent, and a peculiar aroma resides in the skin or pulp. The acrimony of black pepper resides in a peculiar resin,

exclusive of which it contains a distinct crystallisable principle, discovered by Oersted, and afterwards more accurately examined by Pelletier, which has been termed *Piperin.*—(*Ann. de Chim. et Phys.*, tom. XVI.)

Piperin forms quadrangular prisms of a yellowish tinge, insoluble in cold water, and very slightly soluble in boiling water; readily soluble in alcohol, less so in ether, and soluble in, but not combining with, the acids. It has little taste, and a slightly aromatic odour, and is fusible at 212°.

Alcohol is the most perfect solvent of the acrid principle of pepper; water also extracts it in considerable proportion. When purchased in the ground or powdered state, it is apt to be adulterated; and even the entire corns have been imitated by a farinaceous paste rolled into the figure of the berry. This fraud is detected by pouring boiling water on the pepper, which disintegrates the spurious grains. The finest black pepper is generally termed *shot pepper*, from its density and hardness; that which is much wrinkled, or shrivelled, is of inferior quality.

What is called *white pepper* is the ripe berry stripped of its outer coat. What is sold under the name of *decorticated pepper*, is black pepper deprived of its husk by mechanical trituration. It is sometimes bleached by chlorine.

The uses of black pepper as a condiment are well known. In pharmacy it ranks with the most powerful vegetable stimulants, and is sometimes usefully combined with bitters, in dyspeptic affections attendant upon gout, and in checking nausea, vomiting, and hiccup. In relaxed sore throat, a gargle of infusion of black pepper may be substituted for that of capsicum. Pepper has been extolled as a febrifuge, more especially in the treatment of intermittents, and has been used alone, and with various preparations of cinchona. It is said that piperin is more effective in curing the paroxysms of ague than sulphate of quinia, and it has the advantage of comparative tastelessness and cheapness. It has been given in eight or ten-grain doses, in powder.

A remedy known under the name of *Ward's Paste* has long been celebrated in the cure of hemorrhoids, and of this, black pepper is the active ingredient. The following formula of the Pharmacopœia is intended for the same purpose. In inflammatory cases it is hurtful, but it may be given in the dose of one or two drachms in cases attended with debility and deficient secretion in the rectum.

Confection of Black Pepper. — Take of Black Pepper, Elecampane Root, each, a pound; Fennel Seeds, three pounds; Honey (despumated), Sugar, of each, two pounds. Rub the dry ingredients together to a very fine powder, and keep them in a covered vessel. But whenever the confection is to be used, the honey being added, pound them until they are thoroughly incorporated.

PIX ABIETINA. *Resina præparata.* The *prepared resin* of the *Pinus abies.* (*See* ABIETIS RESINA.)

PIX LIQUIDA. Tar. *Resina præparata liquida.* The *pre-*

pared liquid resin of the *Pinus sylvestris*. *Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Coniferæ. (The Scotch fir.)

This species of fir is indigenous in the north of Europe.

Tar is not a *prepared resin*, but an empyreumatic product obtained by a kind of distillation of the wood of the Scotch fir, which is cut into billets, and piled into a stack covered with turf; this is set fire to, and suffered to burn slowly, with the imperfect access of air; during this process the tar runs off at the bottom of the pile, and is collected in barrels. It is chiefly imported into England from Russia, Sweden, Denmark, and from the United States. *Tar-water*, prepared by pouring boiling water upon tar, was formerly employed as a diaphoretic and diuretic, and powerful alterative virtues were ascribed to it, but it has fallen into disuse. It has also been celebrated as an external application in ringworm, and some other cutaneous affections, but the eulogies which have been bestowed upon tar, in any of its therapeutic applications, appear ill deserved.

PIX NIGRA. Common Pitch. *Resina præparata solida.* "A solid *prepared resin*" of the *Pinus sylvestris*.

Pitch is inspissated tar; five barrels of tar yielding, on evaporation, about two of pitch. Its medical virtues resemble those of tar; it is limited to external use. The following ointments have a place in the Pharmacopœia, and are sometimes employed as detergent stimulants: —

Ointment of Tar. — Take of Tar, Suet, of each, a pound. Melt them together, and press them through linen.

Ointment of Pitch. — Take of Pitch, Wax, Resin, of each, nine ounces; Olive Oil, sixteen fluid ounces. Melt them together, and press them through linen.

PLUMBUM. Lead.

This metal is remarkable for its softness; it is of a gray colour, flexible, malleable, and ductile, and has considerable lustre. Its specific gravity is 11·4. Its fusing point is about 612°. It does not occur native in a metallic state, and its oxide is a very rare ore; some of its salts are of frequent occurrence, especially the carbonate; but its chief source is the sulphuret, which is known under the name of *Galena*. The reduction of this ore is a simple process; it is broken up and freed from its matrix, and heated to redness in a reverberating furnace, so as to burn off the sulphur; the reduced lead sinks to the bottom, and is run out into moulds; the scoriæ are again fused, with the addition of a portion of lime, and yield another batch of less pure metal.

The lead of commerce generally contains copper, iron, and traces of silver. When perfectly pure lead is required, it must be dissolved in nitric acid, and the resulting nitrate, after having being purified by two or three successive solutions and crystallisations, must be decomposed by heat, and reduced with a little black flux, in a crucible.

There are four oxides of lead, but of these the protoxide only is salifiable. It may be obtained by the exposure of red-hot melted

lead to the air in a shallow vessel, stirring it so as to renew the surface; or by exposing nitrate or carbonate of lead to a sufficient heat for their decomposition. It was formerly called *Massicot.* It is yellow, but becomes bright-orange when heated. At a high red heat it fuses, and is converted into *Litharge*, the *Plumbi Oxydum Semivitreum* of the Pharmacopœia. It is readily soluble in many of the acids, and with others it forms insoluble compounds. It dissolves in the solutions of the fixed alkalis, and is easily reduced to the metallic state when heated to redness with charcoal, or subjected to the action of a current of hydrogen, or carburetted hydrogen gas. This oxide is also soluble to a certain extent in pure water, a fact which will be adverted to in considering the toxicological history of lead. The equivalent of lead, upon the hydrogen scale, is 104, and this oxide consists of —

	Atoms.	Equivalents.	Per Cent.
Lead	1	104	92·85
Oxygen	1	8	7·15
Protoxide of Lead	1	112	100·00

When the preceding oxide is heated in a shallow vessel freely exposed to the air, it gradually absorbs an additional portion of oxygen, and acquires a fine red colour, forming the pigment known in commerce under the name of *Minium*, or *red lead:* this compound is generally regarded as a *sesquioxide*, composed of 104 lead and 12 oxygen. When minium is digested in nitric acid, it is partly reduced to the state of protoxide, which is dissolved by the acid, and partly converted into *peroxide*, which remains in the form of a brown insoluble powder, composed of 104 lead, and 16 oxygen. When oxalate of lead is heated to dull redness, a dark gray powder remains, which is a suboxide or *dioxide* of lead, being composed of 2 atoms of lead and 1 atom of oxygen (208 lead + 8 oxygen).

When solutions of the salts of lead are decomposed by the fixed alkalis, the oxide falls in the form of a heavy white powder, which is considered as a *hydrated oxide of lead*, but whether or not of definite composition has not been ascertained. It is employed, according to the directions of the *London Pharmacopœia*, in the process for obtaining sulphate of quinia.

The *chloride* and *iodide of lead* have each a place in the London Pharmacopœia; the former is used in the preparation of hydrochlorate of morphia, the latter as a remedial agent.

Chloride of lead is in the form of a white powder, soluble in about thirty parts of cold, and twenty of boiling water. It has a sweetish taste, is fusible, and concretes, on cooling, into a horn-like mass, formerly called *Plumbum Corneum.* It consists of—

	Atoms.	Equivalents.	Per Cent.
Lead	1	104	74·3
Chlorine	1	36	25·7
Chloride of Lead	1	240	100·0

Iodide of Lead. — Take of Acetate of Lead, nine ounces; Iodide of Potassium, seven ounces; Distilled Water, a gallon. Dissolve the acetate of lead in six pints of water, and filter; to these add the iodide of potassium, previously dissolved in two pints of the water. Wash, and dry the precipitate.

NOTE. — *Iodide of Lead* is entirely soluble in boiling distilled water, and, as the solution cools, the iodide falls in yellow shining scales. When heated, it fuses, and the greater part is dissipated, first in yellow, and then in violet-coloured vapour.

Iodide of lead consists of:—

	Atoms.	Equivalents.	Per Cent.
Lead	1	104	45·22
Iodine	1	125	54·78
Iodide of Lead	1	229	100·00

In the above formula for its preparation, the iodide of potassium and the oxide of lead (of the acetate) mutually decompose each other, producing iodide of lead and potassa; the latter unites to the acetic acid of the acetate to produce acetate of potassa.

The use of iodide of lead is chiefly confined to external application, in the form of ointment; it has dispersed obstinate scrofulous and other glandular tumours: it has also been administered internally, in similar affections, but other iodic compounds are probably preferable, and equally effective. It has been given in the dose of from half a grain to four grains, in the form of a pill.

Ointment of Iodide of Lead. — Take of Iodide of Lead, an ounce; Lard, eight ounces. Rub and mix.

The only oxy-salts of lead directed in the Pharmacopœia, are the *carbonate* and the *acetate*, and of these the former is among the articles of the Materia Medica, where, also, the acetate might safely have been placed, for it is exclusively prepared by the wholesale manufacturer, and never according to the Pharmacopœia formula.

CARBONATE OF LEAD (*Plumbi Carbonas*) is the *white lead* and *ceruse* of commerce. It is prepared by various processes, but that which is preferred (on account of its density and other peculiarities, for the manufacture of white oil paint) is obtained by exposing lead cast into forms for the purpose, to the fumes of acetic acid; it becomes gradually, under these circumstances, converted into a carbonate, being oxidized and salified by the products of the decomposition of the acetic vapour. It consists of—

	Atoms.	Equivalents.	Per Cent.
Protoxide of Lead	1	112	83·5
Carbonic Acid	1	22	16·5
Carbonate of Lead	1	134	100·00

The therapeutic uses of carbonate of lead are limited to its occasional external applications; it is the principal source of lead-poisoning, and will be again referred to under the toxicological history of this metal. It is sometimes used as a cosmetic, and as an application to the excoriated cuticle of infants: the latter is a dangerous and improper remedy.

Acetate of Lead. — Take of Oxide of Lead, in powder, four pounds and two ounces, Acetic Acid, Distilled Water, of each four pints. Add the oxide of lead to the acid mixed with the water, and dissolve it by a gentle heat. Lastly, evaporate the solution that crystals may be formed.

This salt, in consequence of its sweet taste, was formerly called *sugar of lead.* It occurs in crystalline masses, but by careful evaporation distinct crystals may be obtained, the primary form of which is a right oblique-angled prism (*see* PHILLIPS' *Translation of the Pharmacopœia*): they are permanent in the air, and soluble in about four parts of water. When the solution is exposed to air, it suffers partial decomposition, in consequence of the absorption of carbonic acid. The crystals include three atoms of water, and are composed of—

	Atoms.	Equivalents.	Per Cent.
Oxide of Lead	1	112	59
Acetic Acid	1	51	27
Water	3	27	14
Crystals of Acetate of Lead	1	190	100

Acetate of lead is a powerful sedative astringent; it is given in the dose of *half a grain to three or four grains*, (by some to a much greater extent,) in the form of a pill, or dissolved with a slight excess of acetic acid: the facility with which it is decomposed and resolved into difficultly-soluble compounds requires that the adjuncts and vehicles should be carefully selected. Its principal use is in urgent cases of internal hemorrhage, as of the lungs, stomach, or uterus; but in consequence of the spasm of the bowels, which it is apt to induce, it usually requires to be given with opium, and often with a mild aperient. In hemoptysis, where the usual remedies, especially nitre and dilute sulphuric acid, fail, acetate of lead may be given, care being taken to avoid substances which decompose it, and especially sulphuric acid and sulphates, by which it is rendered inert. In hematemesis and in menorrhagia acetate of lead may also be had recourse to, but in all these cases the necessity of active measures for subduing febrile symptoms, where the inflammatory diathesis prevails, must not be lost sight of; nor should the patient be suffered to continue the use of the remedy for a length of time.

Regarding the safety of this remedy, very different opinions are entertained. Dr. Paris says, "I feel no hesitation in pronouncing this salt of lead to be one of the most valuable resources of physic; from the results of numerous cases, I state with confidence that it is more efficient in stopping pulmonary and uterine hemorrhage than any other known remedy—'*nil simile, nec secundum;*' and that its application is equally safe and manageable; but it must not be combined with substances capable of decomposing it, nor must it be simultaneously administered with the medicines which are frequently prescribed in conjunction with it, as *infusion of roses, sulphate of magnesia, &c.*"—(*Pharmacologia.*)

Dr. Thomson observes that, "it is a valuable remedy in pul-

monary, uterine, and intestinal hemorrhages, in restraining which it has a very powerful influence. Combining it with opium is supposed to prevent the deleterious effects which salts of lead are apt to produce, when taken into the stomach, but this is an erroneous opinion. It is more advantageously administered with diluted distilled vinegar, to prevent its change into the carbonate, which renders it poisonous. Some years ago Dr. Hildebrand of Lemburg tried this salt in combination with opium, with seeming advantage, in phthisis, and it has been since occasionally used in this country; but as far as I have observed, it is not likely to be generally employed by British practitioners. In every instance in which this salt causes *colica pictonum* it is converted into carbonate of lead, which, as I have already said, is the only poisonous salt of lead; thence the addition of distilled vinegar is necessary to prevent decomposition."—(*Lond. Disp.*) This salt has also been much used of late years in the United States in subacute dysentery and diarrhœa, and by some in cholera; it is combined commonly with opium, and often with ipecacuanha. Dr. Henderson, of Edinburgh, extols its use in acute bronchitis with excessive secretion; he gives it to children in a dose of a quarter, half, or whole grain, every three or four hours in the twenty-four. In an adult the quantity given has not exceeded twelve grains in the day, in doses of from one to three grains. Dr. H. combines it with extract of hyosciamus and squill, in the form of a pill. The acetate of lead is occasionally useful in epilepsy and chorea.

Dr. Thomson's opinion, however, respecting the harmlessness of acetate of lead, is not generally admitted; and indeed the well-known mischievous effects of cider, wine, and other acid beverages when contaminated by lead, seem decidedly to militate against it. Dr. Christison observes, that even supposing the carbonate to be more active than other compounds in occasioning colic and palsy, as Dr. Thomson's inquiries would tend to show, the fact may be admitted, "without necessarily leading to the inference, that it is the *only* active compound of lead, or that other preparations must be converted into the carbonate, before they can act as slow poisons. For the superior activity of the carbonate may be owing to the great obstinacy with which its impalpable powder adheres to moist membranous surfaces, and the consequent greater certainty of its ultimate absorption. It certainly appears at least but consistent with a general law, to which hitherto no undoubted exception has been found, that the carbonate must be dissolved before it can act constitutionally."—(*Treatise on Poisons.*)

Mr. Pereira remarks that "though Dr. Thomson has clearly shown that lead colic more frequently arises from the carbonate than from any other salt of lead, he has, in my opinion, failed in proving that no other preparation of lead *can* produce it. Indeed if his opinion were true, it would constitute an exception to the general effects of the metallic preparations; for we do not find that the specific effects of arsenic, or of mercury, or of copper, or of

antimony are produced by one preparation only; so that, *à priori*, analogy is against the opinion. Furthermore, it is well known that the vapour of the oxide of lead taken into the lungs may produce colic, and that the ingestion of the acetate, citrate, and tartrate of lead is capable of exciting the same effect. Now Dr. Thomson explains these facts by assuming that the oxide of lead unites with carbonic acid in the lungs, and thus is converted into carbonate; and that the acetate, citrate, and tartrate are decomposed in the alimentary canal, and converted into carbonate. But it appears to me much more simple and consistent with analogy to admit that these preparations are of themselves capable of producing colic, than to assume that they undergo the changes here supposed. Moreover, in some instances in which colic was produced, it is unlikely that these changes could have occurred, owing to the excess of acid taken with the salt of lead."—(*Lond. Med. Gazette*, XVIII., 311.)

Bearing then in mind the dangerous consequences that may ensue from the improper or protracted use of the acetate, as well as of other soluble salts of lead, and the risk of administering it in unnecessarily large doses, it only remains to give a few of the formulæ for its administration: —

1. ℞ Plumbi Acetatis gr. iv.; Pulveris Opii gr. iij.; Confectionis Rosæ Caninæ q. s. Misce et divide in pilulas sex æquales, quarum sumatur una ter in die.
2. ℞ Plumbi Acetatis gr. iij.; Opii Pur. gr. j.; Extract. Conii gr. x. Fiat massa in pilulas tres dividenda, quarum sumatur una bis quotidie, superbibendo haustum aceticum.
3. ℞ Plumbi Acetatis gr. ij.; Aceti destillat. f℥j.; Aquæ Menthæ Piper. f℥j.; Syrupi Papaveris f℥ss. M. fiat haustus.
4. ℞ Plumbi Acetatis gr. j. Solve in Aquæ Rosæ f℥j. et adde Oxymellis f℥j.; Tinctur. Opii ♏v,; Tinctur. Digitalis ♏x. Fiat haustus quartis vel sextis horis sumendus.

The cases in which preparations of lead are used as external applications are very numerous; they furnish astringent and sedative remedies, and are chiefly prescribed in external inflammations; they also form the basis of several cerates and ointments, and of common plaster. The following are the officinal formulæ of the *London Pharmacopœia*:—

Solution of Diacetate of Lead.—Take of Acetate of Lead, two pounds and three ounces; Oxide of Lead in powder, one pound and four ounces; Water, six pints. Boil for half an hour, occasionally stirring, and when the liquor has cooled, add of distilled water as much as may be sufficient to make up six pints; lastly, strain it. (The specific gravity of this solution is 1·260.)

According to Mr. Phillips, this is a solution of an acetate of lead composed of two equivalents of oxide and one of acid; it is colourless, and very susceptible of decomposition, becoming milky when mixed with common water, owing to the presence of sulphuric and carbonic acid, and often rendered slightly turbid even when diluted with distilled water, which generally contains traces of carbonic acid. Its virtues were exorbitantly extolled by Goulard of Montpellier, whence the name *Goulard's Extract of Lead.*

Diluted Solution of Diacetate of Lead. — Take of Solution of Diacetate of Lead a fluidrachm and a half; Distilled Water, a pint; Proof Spirit, two fluidrachms. Mix.

This is *Goulard's Saturnine Lotion.* It might have been conveniently left to extemporaneous prescription, for the degree of dilution in which it is desirable to apply the solution of subacetate of lead varies with the nature of the case. The object of the addition of so small a quantity of proof spirit to the above solution is not manifest.

The undiluted solution, applied upon lint, occasionally heals old and troublesome sores. Dr. Vetch recommends it as possessing great efficacy in altering the violently purulent state of the membrane in conjunctival ophthalmia; in opaque cornea, he remarks that it is the only substance which he has found beneficial, from its astringency upon the palpebral surface, without exciting hurtful consequences as a stimulus: he adds, that although this solution of lead, when undiluted, merely occasions a temporary sensation, as if sand or gravel had got into the eye, yet it often causes much heat and smarting when diluted.

For collyria in inflamed conjunctiva, and for injections in gonorrhœa and gleets, the solution of acetate of lead is preferable to the diacetate. The proportion for eye lotions may be about *eight* or *ten grains* of the acetate to eight ounces of rose or elder-flower water; and for injections and lotions, twenty or thirty grains may be dissolved in the above quantity of water: these solutions must not be thickened with gum, because it forms an insoluble compound with the oxide of lead.

Cerate of Acetate of Lead. — Take of Acetate of Lead, in powder, two drachms; White Wax, two ounces; Olive Oil, eight fluid ounces. Melt the wax in eight fluid ounces of the oil, and then gradually add the acetate of lead, rubbed into powder, with the rest of the oil, and stir them with a spatula till they are mixed.

This is a good soothing application to inflamed surfaces, burns, scalds, and excoriations.

Compound Cerate of Lead. — Take of Solution of Diacetate of Lead, three fluid ounces; Wax, four ounces; Olive Oil, half a pint; Camphor, half a drachm. Mix the melted wax with eight fluid ounces of the oil; then remove them from the fire, and when first they begin to thicken, gradually add the solution of diacetate of lead, and stir them constantly with a spatula till they cool; lastly, mix them with the camphor dissolved in the remainder of the oil.

This cerate is applicable in the same cases as the former. "It is stated to be particularly serviceable in chronic ophthalmia of the tarsus, and for the increased secretion of tears, which so frequently affects the eyes of persons advanced in years."—(*Phillips.*)

Compound Ointment of Lead. — Take of Prepared Chalk, eight ounces; Distilled Vinegar, six fluid ounces; Plaster of Lead, three pounds; Olive Oil, a pint. Melt the plaster in the oil with a slow fire, then gradually add the chalk separately mixed with the vinegar, the effervescence being finished, and stir constantly till they are cool.

An ointment somewhat resembling this has long been used in the

hospitals under the name of *Neutral Cerate*, and is a soothing application to irritable sores, and at the same time improves the condition of indolent ulcers. But the ointment prepared as above-directed is too hard for use, and requires to be diluted by fusion with nearly an equal part of olive oil to render it soft enough to spread upon lint.

Plaster of Lead.—Take of Oxide of Lead, reduced to a very fine powder, six pounds; Olive Oil, a gallon; Water two pints. Boil them together over a slow fire, constantly stirring, until the oil and oxide of lead unite into the consistence of a plaster; but it will be proper to add a little boiling water, if nearly the whole of that which was used in the beginning should be consumed before the end of the boiling.

During the mutual action of the oil and oxide of lead at the temperature of 212°, or a little above it, the oil is saponified, and oleate and margarate of lead are produced; a considerable proportion of glycerine is at the same time set free, and retained in solution by the water, which should always be added in sufficient proportion, for when it is allowed entirely to evaporate, the glycerine is decomposed and the plaster spoiled; and unless water be present, no saponification results.

This plaster, when well prepared and spread upon linen, or occasionally upon leather, is a good application for the defence of excoriated surfaces, and is used to keep together the edges of wounds, and protect them from disturbance. It is less convenient for this purpose than adhesive plaster, but also less irritating. It is the *Diachylon Simplex* and *Emplastrum Commune* of former Pharmacopœiæ, and serves as the basis of many other plasters.

Toxicological History of Lead.— From the frequent use which is made of lead, cases in which its deleterious effects upon the system manifest themselves, are by no means uncommon. It is usually employed in the construction of pipes and cisterns, for the conveyance and retention of water, and, under certain circumstances, water may become impregnated with it to a very dangerous extent. Leaden vessels are also often used for the preservation of articles of food; salted provisions are not unfrequently prepared and preserved in them, and, they are sometimes used as reservoirs for milk. Vessels of earthenware, too, are not unfrequently glazed with oxide of lead, and when acted upon by acid, or alkaline liquids, are corroded, and give rise to injurious contamination. In consequence of the sweetness of the salts of lead, and the neutralising power of its oxide, it has been resorted to as a means of correcting acidity in wines, and other fermented and spirituous liquors; and, lastly, its mischievous effects often exhibit themselves in persons who are employed in arts and manufactures connected with it; as in painters, paper-stainers, glaziers, makers of white lead and of sugar of lead, potters, plumbers, sheat-lead, shot, and lead-pipe makers, glass-blowers, miners, and the persons employed in reducing the ores.

The action of water upon lead has already been adverted to (*see* Aqua).

It is evident, therefore, that distilled water should not be kept in leaden vessels; orange-flower water, which is frequently kept in copper bottles soldered with lead, is often dangerously contaminated, but in that case, galvanic action may be also concerned. Close examination will also generally enable us to detect traces of lead in waters which have been distilled through a leaden worm. The same precaution is requisite in regard to rain and snow water, and to the water of certain springs. In regard, however, to *common* river or spring-water, it is well known that it may not only be conducted through leaden pipes, but retained in leaden cisterns, with comparative, and generally, with perfect impunity. This arises from the protective influence of the saline ingredients of such waters, which, though present in very small quantity, exert a remarkable preservative power against that kind of action which has been described as belonging to distilled water. Sulphate of lime, sulphate of soda, chloride of sodium, carbonate of lime, and sulphate of magnesia, are substances commonly contained in water, and are effective preventives in regard to the solvent power of such water upon lead; so that, when kept in contact with lead, and filtered, no traces of the metal are discoverable in the filtered portion. Minute quantities of insoluble compounds of lead may, however, in such cases, be sometimes *diffused* in the water, but the risk of this contamination is temporary only, and after the water has been for a short time in the contact of the lead, an insoluble and protective film forms upon its surface, and firmly adheres to it; so that the lead augments, instead of decreasing in weight. This is the curious cause of the impunity with which lead is so constantly employed in the construction of pumps, water-pipes, and cisterns. But, it must be recollected, that *some waters* may be to a greater or less extent contaminated by passing through or retention in lead, and especially in *new* pipes and cisterns. This may arise from two causes; either from the extreme purity of the water (approximating it to distilled water), or, which is more frequently the case, from galvanic action. Of the former source of contamination, Mr. Brande has met with three instances; one at Tonbridge Wells, and two in the neighbourhood of London. But in these cases, though the presence of lead in the water was at first to an alarming extent, it gradually decreased, and at length disappeared, owing, no doubt, to the formation of an insoluble superficial film, or crust.

In respect to galvanic action, its mischievous influence may be variously produced; it sometimes arises where the sheet lead and solder are in contact, and more frequently from the introduction of iron bars, screws, or pipes, or of some other metal, in contact with lead, or from some accidental impurities or inequalities of composition in the metal itself. And in these cases, owing to the action of alkaline bases, as well as of acids, upon the lead, danger may occur not only where it is thrown into an electro-positive state, but also where it is rendered electro-negative.

The rapid corrosion which leaden pipes are in some cases known to have undergone, and supposed instances of extraordinary solvent powers of certain waters, are referable to such causes; so that whenever any new work has been done, or any new arrangement made in regard to the supply of water for domestic use, it should be carefully examined, and if any contamination exist, the cause should be immediately traced out and ascertained: if it arise from the mere ordinary action of the water upon the clean metallic surfaces, it will probably soon cure itself, or may be prevented, where possible, by allowing the water to remain for some time in the pipes and cisterns before they are used; previous to which they should be well cleansed by allowing a current to pass through them; they may then be employed as usual, taking the precaution of previously testing the water. In some cases, too, the method suggested by Dr. Christison of filling the pipes for a considerable period before they are used, with water holding some preventive salt in solution, may be adopted. For this purpose he recommends water, containing about one-25000th of phosphate of soda. But in general, any common *hard water* would answer the purpose. Where pumps are used to raise water from a well, more circumspection is requisite than in other cases; the friction of the piston, and the lodgment of the water in different parts of the pump, and galvanic causes, may here co-operate to produce contamination; the first portions of water delivered by the pump will, of course, be especially liable to it. In all these cases, the two states in which lead may occur must be borne in mind; the case of *solution* in the water is rare; that of *diffusion*, more common.

There is another method in which water may become tainted by lead, arising out of the use of leaden covers to tanks and cisterns, upon which vapour may condense, and drop back into the bulk of the water; it will, of course, act as distilled water.

Acidulated waters act upon lead and its oxides with different degrees of rapidity, and by sulphuric acid its action is considerably impaired. Dr. Christison found that if it contained one-4000th, or even only one-7000th of sulphuric acid, fifty grains of lead, kept in it for thirty-two days, gained a seventh or twelfth of a grain in weight, and were covered with crystals of sulphate of lead; a minute trace of lead was also detected in the water. Hydrochloric acid he found more active as a solvent; distilled water containing one-3000th of that acid acquired, in thirty-two days, a sweetish taste, and yielded, by evaporation, a considerable quantity of chloride of lead, while the lead rods lost weight, and were covered with acicular crystals of the same salt.

But the most common source of contamination with lead is referrible to the vegetable acids. Under ordinary circumstances, *acetic acid* soon attacks metallic lead; *citric acid* acts less, and *tartaric acid* still less energetically. If the lead be in the state of oxide, these actions are more rapid; so that the preservation of articles of food in vessels either of lead or glazed with lead, is

always hazardous. Milk has been rendered poisonous by keeping it in leaden troughs, and rum has been similarly contaminated apparently by passing through a leaden worm-pipe. Shot left in bottles has rendered wine poisonous, and the use of lead in the apparatus for making cider has led to the mischievous impregnation of that beverage. Both wine and cider have also been intentionally adulterated by lead in order to cover their acescency. Vinegar and pickles inadvertently kept in vessels of earthenware glazed with oxide of lead, have also been rendered poisonous from the solvent power of that acid.

Detection of Lead. It fortunately happens that lead is easily detected, and that several simple tests enable us unequivocally to ascertain its presence, even when in very minute quantity. Among these none is more effective than a saturated aqueous solution of *sulphuretted hydrogen*, which throws down a black precipitate of sulphuret of lead in all solutions of the metal, and blackens or discolours its insoluble combinations. It is true that there are several other metals which are similarly precipitated by this reagent, such as mercury, bismuth, silver, and copper; but these may be identified by other tests, and are not likely to occur where lead is usually looked for. *Iodide of potassium* is a valuable distinctive test of the soluble salts of lead; it produces with them a bright yellow precipitate of iodide of lead. *Chromate of potassa* also occasions a yellow precipitate of chromate of lead in similar cases. Lastly, when a slip of *zinc foil* is immersed in solutions of lead, small brilliant crystals of metallic lead are gradually deposited upon it. "This," says Dr. Christison, "is a very characteristic test, and also one of much delicacy, for I have found a small thread of zinc will very easily detect a twentieth part of a grain of lead dissolved in the form of acetate in 20000 parts of water. It acts also on the nitrate of lead. Its action is impaired or prevented by an excess of acetic or nitric acid." That zinc similarly precipitates many other metals, must also be borne in mind.

When lead is sought for in mixed fluids in which organic matters are also present, the following method has been recommended by Dr. Christison. A little nitric acid should be added to the suspected matter before filtration, to dissolve compounds of the salts of lead with albumen and other vegetable and animal principles; sulphuretted hydrogen should then be transmitted through the filtered fluid, and if a dark-coloured precipitate is formed, the whole is to be boiled and filtered to collect the precipitate. To ascertain that the precipitate contains lead, it may either be reduced before the blowpipe, or it may be heated to redness in a tube, and then treated with a little nitric acid, which will dissolve the lead. The solution is then to be diluted, filtered, evaporated to dryness, and gently heated to expel the excess of nitric acid. If the residue be dissolved in water, it will present the characters of lead to proper tests, among which iodide of potassium is to be preferred when the quantity is too small to use others; but all excess of nitric acid

must have been previously carefully expelled, since excess of that acid may of itself induce a yellow tint in the test.

If by this process lead is not discovered in the filtered portion of the mixed fluid, the matter upon the filter must be incinerated, and the residuum dissolved in nitric acid, and treated as above. When, in cases of lead poisoning, any sulphate or phosphate has been given as an antidote, the process of incineration must be adopted; otherwise it should, as far as possible, be avoided in medico-legal analysis, as it is not easily managed by unpractised persons.

Effects of Lead Poisons.—In large doses the soluble salts of lead produce the general symptoms of irritant poisoning, subject, however, to some peculiarities.

The important question regarding the presence or absence of lead in the blood of persons poisoned by it has not been satisfactorily determined: Schloepfer, Baruel, and Merat could not detect it either in the flesh, urine, or fæces; very different results, however, have been obtained by Dr. Wibmer, a German physiologist, quoted by Dr. Christison (*On Poisons*, chap. XVIII., § 2).

These remarkable experiments are supposed to account for the symptoms produced by lead poisons, by showing that they are concentrated in the muscular and spinal system; but, when repeated by Dr. Christison, no trace of lead could be detected in the spinal, and it was only very faintly indicated in the lumbar muscles. Dr. Christison also adverts to a probable source of fallacy to which these experiments may possibly be exposed, arising out of traces of the presence of *copper* in animal solids and fluids, as announced by M. Sarzeau.

In the human subject large doses of the soluble salts of lead act as irritant poisons, followed frequently by spasms and colic; they are not generally violent in their operation, and acetate of lead has been occasionally administered to the amount of from twenty to thirty grains daily, without exciting alarming symptoms; there is, however, that uncertainty in its effects which should lead to circumspection in the medicinal use of that salt.

Diseases Produced by Lead.—Prior to the development of more decided forms of disease, there are effects produced in the system by lead, constituting what may be called "a saturnine diathesis." The principal marks by which this state may be recognised are, according to M. Tanquerel, who, in his *Traité des Maladies de Plumb ou Saturnines*, has entered largely into the subject, are a peculiar bluish or bluish-gray tinge of the gums, which sometimes extends over the mucous membrane of the mouth generally, the teeth at the same time becoming discoloured and affected with caries; a sweetish, styptic, astringent taste in the mouth, with a peculiar fetor of the breath, sallowness of the skin, and dull yellow tinge of the conjunctivæ; general emaciation, and a small, soft, compressible pulse, and, in some rare cases, a considerable reduction in the number of its beats: of these symptoms, the discoloration of the gums and teeth is the most frequent and the most characteristic. It appears to be owing to the deposition of a very minute film of

sulphuret of lead on the mucous surface and on the enamel of the teeth, the former becoming of a bluish slate-gray colour, as before mentioned; the latter of a brown colour, which is deepest at the neck of the tooth, or the part in immediate contact with the gum. —(*British and Foreign Medical Review*, No. xx., Oct. 1840).

From the work just referred to, which gives a critical analysis of M. Tanquerel's treatise, I shall cull the following notice of the diseases produced by lead. It may be well to premise that the importance of attending to the premonitory symptoms above described, is shown by a statement of M. Tanquerel with respect to lead colic, from which it appears that of 1217 cases of this affection coming under notice, 1195 were previously affected with one or more of the symptoms specified, a timely attention to which, with temporary cessation from work, has, in many instances, been successful in averting the threatened attack.

1. *Lead Colic.* — Of the pathology and treatment of this disease it is not expected that I should speak in this place. The manner in which the poison is introduced into the system is the chief point for present consideration. Without denying that lead occasionally produces its deleterious effects through cutaneous absorption, it is now tolerably evident that by far the most frequent method by which the poison is introduced into the system, is absorption by the mucous membranes for digestion and respiration. Reference has been made already to the accidental contamination of water from leaden cisterns, pipes, &c., as well as from the adulteration of fermented and spirituous liquors, the last of which, by the way, are quite poisonous enough in that which distillers and venders would call their state of purity.

There can be no question but that in many instances colic is induced among workmen employed in lead works and trades in which lead is used, from the want of due care in the eating of their food, particles of lead being thus frequently conveyed into the stomach with the aliment; but the inhalation and consequent absorption by the pulmonary mucous membrane of the fine particles diffused through the atmosphere in the state of impalpable powder, in many of the operations carried on in the several departments of the works, would seem to be the most frequent cause of lead colic. The liability to colic as a consequence of the inhalation of lead, is not, however, confined to those actually engaged in the manipulations of this metal; and the author relates instances of this affection induced by sleeping in apartments recently painted.

The most numerous class affected with lead colic, next to the white-lead manufacturers, is that of house-painters; but there is no proportion in the frequency and danger of attack between these two classes — the first being by far the greatest sufferers. One of the most pernicious, perhaps the most pernicious, among the occupations specified in the table given by M. Tanquerel, is the making of German and glazed cards. On this point, after describing the processes in the manufacture, the reviewer very properly adds: It is to be hoped that the use of the glazed cards, the preparation of

which is so highly injurious to those engaged in it, will be dispensed with, the more especially as some accidents have arisen from young children having sucked the poison, where they have been incautiously permitted to obtain possession of them. Type-founders would seem to suffer much, since of 100 workmen engaged in type-founding, one-fourth had been attacked with colic once or oftener; this is, however, attributed to want of care in the management of their food, which many of them are accustomed to prepare in their workshops. Some compositors, also, who have contracted the injurious practice of putting the types in the mouth while correcting their pages, become liable to the disease.

2. *Lead Rheumatism*, or *Neuralgia.*—This is generally nothing more than the spasms or cramp-pains of the lead colic affecting the muscles of the limbs instead of those of the abdomen, and is most commonly a mere extension of that disease, although occasionally observed separate. According to M. Tanquerel, this, which he calls arthralgia, is, with the exception of colic, the most frequent result of lead poisoning. The pain, which is the most frequent symptom, occupies most frequently the lower extremities, then the upper extremities, the loins, the parietes of the chest, the back and the head.

3. *Lead Paralysis.*—The absorption of lead or its compounds into the system is stated to be the sole efficient cause of this description of paralysis, and it is very properly observed that what is termed mercurial paralysis, is altogether a different affection from paralysis. M. Tanquerel remarks, that in upwards of fifty cases of mercurial tremors observed in the hospital of *La Charité*, in no one instance was paralysis seen to supervene, and his researches among the workmen generally employed in the manipulation of this metal, and other metallic substances, lead to the conclusion that lead is the only mineral capable of producing paralysis properly so called. Generally, it requires a considerable time before the symptoms of paralysis show themselves, those only becoming affected who have been long engaged in leadworks, and who have already suffered from repeated attacks of colic: but it must be remarked, that authors have mentioned many exceptional cases to this proposition, in the fact of paralysis being the first morbid effect of the poison of lead.

4. *Anæsthesia from Lead.*—Twenty-three cases of anæsthesia were noticed by M. Tanquerel, in four of which the disease was deep-seated, in seven the loss of sensation was confined to the skin, and in twelve the eye was affected. In the eleven cases of deep-seated and superficial anæsthesia, three times there was paralysis of the corresponding muscles, four times the paralysis of motion and of sensation occupied different parts, and four times the loss of sensation was unaccompanied by loss of motion; in one case only did amaurosis and anæsthesia of the skin exist together. The lesion of sensation is always partial or of limited extent, sometimes confined to certain parts of the abdomen, of the chest or neck,

sometimes occupying the limbs; it may be complete or varying in degree, frequently shifting its place, or differing in extent; when deep-seated it is less mobile than when confined to the skin. Usually it makes its attack suddenly, and rapidly attains its fullest extent, though occasionally it is preceded by a slight numbness.

5. *Cerebral Affections from Lead.* — These include the delirium, convulsions, epilepsy, &c., which are observed in persons suffering from lead poisoning. M. Tanquerel has met with seventy-two cases of cerebral affections, which he attributes entirely to the action of lead as the efficient cause. He seems to think, however, that it requires the absorption of a larger proportion of lead particles to induce cerebral disease than is requisite for the production of colic, arthralgia, or paralysis; since he has only observed symptoms of this description in workmen exposed to the emanations from lead in large quantities. Those preparations of lead which are most readily diffused, for instance, ceruse and red lead, are stated to give rise to cerebral affections the most frequently. It is necessary also that a certain time, varying, however, from eight days to as many years, should elapse from the first exposure before the disease manifests itself. Convulsions are of very frequent occurrence in the cerebral affections resulting from lead poisoning, though rarely observed isolated. Five varieties of the convulsive form are described, which I deem it unnecessary to detail here.

There are well-authenticated cases of the occurrence of lead-colic as a consequence of the protracted use of sugar of lead and of saturnine ointments and lotions, and plasters, and though these are not so frequent as they have been represented, the possibility of their occurrence must be borne in mind whenever lead is internally or externally used.

Antidotes. — Cases of poisoning by large doses of sugar of lead are effectively treated by the adequate exhibition of the alkaline sulphates, such as sulphate of soda and sulphate of magnesia; these decompose the acetate, and form with its basis an insoluble and inert sulphate of lead: upon the same principle, phosphate of soda is an excellent antidote in cases of irritant poisoning by any salt of lead. With these chemical preventives, an emetic of sulphate of zinc may be given, where vomiting has not ensued; in other respects, the treatment will be the same as that of other cases of irritant poisoning; opiates and mild aperients being especially indicated.

PODOPHYLLUM. *Radix.* The root of the May Apple. *Cl.* 13. *Ord.* 1. *Nat. Ord.* Podophyllæ.

This plant, known also by the name of *mandrake*, is very generally met with through the United States. The flowers appear about the end of May and beginning of June, and the fruit ripens in the latter part of September. The leaves are said, but not, we believe, on sufficient evidence, to be poisonous. The fruit has a sub-acid, sweetish, peculiar taste, agreeable to some palates, and

may be eaten freely with impunity. From its colour and shape it is sometimes called *wild lemon.*

The root is the part used: the powder is light yellowish-gray, resembling that of jalap. The taste is at first sweetish; afterwards bitter, nauseous, and slightly acrid. The decoction and tincture are bitter. Dr. Wood (*U. S. Disp.*), quoting *Journ. of Phil. Col. of Pharmacy,* III., 273, tells us that a peculiar bitter principle has been discovered in the root by Wm. Hudgson, jun.: it is in pale-brown shining scales, unalterable in the air, very sparingly soluble in cold water, much more soluble in boiling water, soluble also in ether, and freely so in boiling alcohol. It has neither acid nor alkaline properties. Its taste, at first not very decided, in consequence of its feeble solubility, becomes at length very bitter and permanent; and its alcoholic solution is intensely bitter.

Podophyllum is one of our most certain and active cathartics, producing copious liquid discharges without much griping or other unpleasant effect. Its operation resembles jalap, but is rather slower; and by some is thought to be more drastic. Combined with calomel it is prescribed in different parts of the Union in remittent fevers and in hepatic disease. With cream of tartar it is adapted to most of the cases in which the compound powder of jalap is found to be serviceable. The *dose* of the powdered root is about *twenty grains.* An extract is prepared from it, possessing all its virtues in a smaller bulk.

PORRUM. *Bulbus.* The *bulb* of the *Allium Porrum. Cl.* 6. *Ord.* 1. Hexandria Monogynia. *Nat. Ord.* Liliaceæ.

The leek is a biennial, and a native of Switzerland; it flowers in June. The bulb consists of concentric layers upon a radical plate; the leaves are broad, and the stem a naked scape, bearing a spherical umbel of flowers, with rough-keeled petals, shorter than the stamens. It is a stimulant, possessing the general properties of garlic, but considerably milder. It is an excellent potherb, but no good reason can be given for retaining it in the list of the Materia Medica.

POTASSIUM. This metal is the basis of a numerous and important class of pharmaceutical agents, some of which are included in the list of the Materia Medica, and others inserted among the "Præparata et Composita" of the Pharmacopœia.

It is unnecessary here to describe the process for obtaining potassium, the details of which will be found in chemical works; it consists in decomposing the hydrate of potassa, by the action of charcoal or of iron, at a high temperature.

Potassium was originally obtained, in 1807, by Sir Humphrey Davy, who first decomposed potassa by the agency of the Voltaic pile: it is a metal of most extraordinary properties; it is blueish-white, and of great brilliancy, but instantly tarnishes on the exposure of its recently-cut surface to the air; it is considerably lighter than water, its specific gravity at 60° being 0·86. At the temperature of 32° it is hard, brittle, and crystalline; at 60° to 70° it admits

of extension by pressure, and has the consistency of wax; at 150° it enters into perfect fusion; and at a red heat it boils and is rapidly converted into a green vapour, so that at that temperature it admits of distillation in close vessels.

Potassa is the protoxide of potassium, and consists of oxygen 16.66—potassium 83.34 per cent.

The substance usually called *pure* or *caustic potassa* is a *hydrate* of the above oxide, and consists of:—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	84·2
Water	1	9	15·8
Hydrate of Potassa	1	57	100·0

Having premised thus much respecting the properties of potassium and the composition of potassa and its hydrate, we may now more particularly notice its combinations. Of these, the *Carbonate* may be first adverted to, as the source of the pure alkali and many of its salts.

The *Potassæ Carbonas impura* of the Materia Medica, is the product generally termed *pearl-ash;* it is almost exclusively obtained by the combustion of wood, the lixivium of the ashes of which yields, on evaporation, the alkaline substance called *potash*, which after having been heated in a proper furnace so as entirely to burn off all carbonaceous matter, is rendered more pure and white, and exported under the name of pearl-ash, or *impure carbonate of potash:* it, in fact, still contains a variety of impurities, which materially affect its value in the market.

The directions are given in the Pharmacopœia, respecting the purification and properties of this carbonate, which we shall not here insert.

Carbonate of Potassa can scarcely be so far purified by the means directed as to stand the proposed tests: when it is perfectly free from earthy impurities, it is entirely soluble in water, and if, after supersaturation with pure nitric acid, it is not affected by carbonate of soda, chloride of barium, or nitrate of silver, it neither contains earthy salts, nor sulphates, nor chlorides: traces of silica, however, adhere to it with great obstinacy. Where it is required of extreme purity, the decomposition of the crystallised bicarbonate, as above stated, must be resorted to, but for all ordinary pharmaceutical use, trifling impurities are unimportant.

Carbonate of potassa usually occurs in the form of a white granular powder, of a pungent alkaline taste, very deliquescent, and soluble in its own weight of water; it has a strong alkaline reaction on vegetable colours. It is insoluble in alcohol. In its dry state it is composed of—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	68·5
Carbonic Acid	1	22	31·5
Carbonate of Potassa	1	70	100·0

Carbonate of potassa may be obtained in crystals by suffering a

solution of it, of the specific gravity of 1·62, to cool slowly in a tall cylindrical vessel; these crystals contain, according to Berard, 2 atoms of water. Mr. Phillips regards the salt prepared as above directed, as a *sesquihydrate*, and composed, therefore, of —

	Atoms.	Equivalents.	Per Cent.
Carbonate of Potassa	1	70	84
Water	1½	13·5	16
Potassæ Carbonas of the Pharmacopœia	1	83·5	100

The *Solution of Carbonate of Potassa* was formerly known under the name of *Lixivium Tartari;* or, as obtained by the deliquescence of the carbonate exposed in a shallow vessel to moist air, it was termed *Oleum Tartari per deliquium.*

Bicarbonate of Potassa forms crystals, which are modifications of a right oblique-angled prism (see Phillips' *Translation of the London Pharmacopœia*). It is soluble in about four parts of cold water; the solution tastes slightly alkaline, and feebly reddens turmeric paper. When boiled, it loses carbonic acid, and gradually becomes a *sesquicarbonate.* At a red heat, it loses 1 atom of carbonic acid, together with its water of crystallisation, and an anhydrous carbonate of potassa remains. The crystals are composed of —

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	47·6
Carbonic Acid	2	44	43.6
Water	1	9	8·8
Crystallised Bicarbonate of Potassa	1	101	100·0

Effervescing Solution of Potassa is most conveniently prepared in the apparatus used by the manufacturers of soda water.

Solution of Pure or Caustic Potassa.—In the process for the preparation of the solution of pure or caustic potassa, the carbonate of potassa is decomposed by the lime, which abstracts the carbonic acid, and forms an insoluble carbonate of lime. The evolved potassa is retained in the solution, which should be clear and colourless. It feels soapy in consequence of its action upon the cuticle; its taste is acrid and caustic; it is apt to act upon flint glass, so that it should be preserved in green glass bottles, which contain no oxide of lead in their composition, and upon which alkaline solutions have little or no action. The *Liquor Potassæ* is the *Lixivium Saponarium*, and *Aqua Kali puri*, of former Pharmacopœiæ.

The *Hydrate of Potassa*, when perfectly pure, is white, hard, and brittle; but as it usually occurs it contains oxide of iron and of manganese, silica, and several other impurities. During its solution in water, much heat is produced, and a small quantity of oxygen gas is generally given off from it, in consequence of the presence of peroxide of potassium. It is generally cast into sticks, and is only employed externally.

Potassa with Lime. — Take of Hydrate of Potassa, Lime, of each, an ounce. Rub them together, and keep them in a well-stopped vessel.

In the Note upon this preparation, which is only used as an external caustic application, it is stated that it should not effervesce upon the addition of acids, and that it is only partially soluble in alcohol.

The preceding formulæ of the Pharmacopœia include all those preparations of potassium which are of an alkaline character, and which, therefore, as therapeutic agents, admit, in reference to their internal use, of one general definition and description.

The indications which the alkalis are calculated to fulfil, are various and important; and, under the heads of *Ammonia*, *Lime*, and *Magnesia*, are already partly before the reader. Potassa and its carbonates admit of many applications which are common to other alkaline remedies, and more especially to the corresponding preparations of *soda*. In medical practice, they are principally employed as *antacids*, *lithontriptics* and *alteratives*.

In that form of dyspepsia which is attended by excess of acid in the stomach, and which appears to result from disordered gastric secretion, rather than from any change analogous to fermentation suffered by the food itself, the alkalis are valuable remedies; but they are only to be regarded as chemical palliatives, affording temporary relief by neutralizing the free hydrochloric and lactic or acetic acid, which in the cases alluded to is the proximate cause of the symptoms. To effect this, the carbonates are generally preferable to the pure alkalis; but both, when long persevered in, gradually lose their efficacy: their dose, then, requires to be successively increased, and they tend to aggravate the remote cause of the complaint by debilitating the proper or normal powers of the stomach; hence the advantage, and even necessity, of combining alkaline treatment with tonics, and of selecting such alkalis, or, as they may here properly be called, antacids, as are least likely ultimately to debilitate and disagree. The slight inconvenience of the evolution of carbonic acid which follows the use of the carbonated alkalis is amply compensated for by the comparative impunity with which they may be employed; but, when long and carelessly persevered in, they are by no means harmless. In acid dyspepsia the state of the urine must be especially watched, and, when its acidity is so far diminished that it begins to assume an opposite character, alkalis must be avoided; if persevered in, the protecting secretions of the urinary passages are directly or indirectly affected, and emaciation and local and general debility ensue.

The dose of the *Liquor Potassæ*, as an antacid, is from *five to thirty minims*, twice or thrice a day, in conjunction with mild bitter tonics. Dinner is the meal after which dyspeptic acidity is generally most inconveniently prevalent, and the alkaline remedy should be taken about an hour before, and repeated at bed-time. But in all these cases, little permanent relief is attainable without abstemiousness, regular hours, and proper selection of food; and when medicines of the description we are now considering are

resorted to, as they often are, in order to enable the patient to indulge his palate with impunity, they are mischievous palliatives.

Carbonate of potassa is nauseous, and seldom prescribed; but the bicarbonate, in proper doses, has the advantage of comparative tastelessness, and is very effective, especially when the temporary flatulency arising from the evolution of its carbonic acid in the stomach is not objected to. From ten to thirty grains of this salt may be taken twice or three times a day, with the proper adjuncts. Where there are any reasons for the preference, the *Liquor Potassæ effervescens* may be resorted to.

As a lithontriptic, potassa and its carbonates are used where the lithic or uric diathesis prevails; that is, where the urine is morbidly acid, and deposits uric sediment; in those cases it may be given either in some common diluent, or in almond emulsion, and, if necessary, conjoined with proper diuretics; but a distinction must be made between those cases in which uric sand and uric deposits have become habitual, and those which are merely accidental and occasional; also, between uric deposits and those morbid states of the urine in which a pink (erythric) sediment of a different character makes its appearance, indicative of some chronic visceral disease, or consequent upon what is called a broken constitution. In these latter cases, alkalis, except in small doses, and combined with a tonic and alterative treatment, are in general hurtful. Lastly, in respect to the influence of alkalis upon the urine, their tendency so far to diminish its naturally acid state, as to lead to phosphatic precipitates, must not be forgotten; and where these appear, or where the tendency to red sediment is not decidedly diminished, they must be discontinued as prejudicial.

As an alterative, potassa is frequently given in scrofulous enlargements of the glands, in gouty enlargements of the joints, and in some cutaneous disorders, especially those which are connected with acidity of the primæ viæ.

The subjoined are some of the common alkaline formulæ, applicable to the above cases; but the vehicles and adjuncts both admit of infinite variation. First, as *antacids*:—

1. ℞ Liquoris Potassæ ♏x.; Infusi Cascarillæ f℥x.; Ol. Menthe. ♏ij.; Syrupi Aurant., f℥ss. M.
2. ℞ Potassæ Bicarbonatis ℈j.; Infusi Lupuli f℥x.; Spiritus Ammoniæ compos. ♏xv. M.

Secondly, as *lithontriptics*:—

3. ℞ Liquoris Potassæ Carbon. f℥ss.; Misturæ Amygdalæ f℥iss.; Tincturæ Hyoscyami f℥ss. M.
4. ℞ Liquoris Potassæ ♏xv.; Decoct. Hordei compos. f℥iss.; Tinct. Opii ♏v.

Thirdly, as *alterative* and *diuretic*:—

5. ℞ Liquoris Potassæ ♏x.; Decoct. Sarzæ f℥ij. M.
6. ℞ Liquoris Potassæ ♏xv.; Decoct. Scoparii compos. f℥iss.; Aquæ Cinnam. f℥ss. M.

Potassa and its carbonates, and the remark extends to the alkalies in general, exert a beneficial effect in irritation of the respiratory

passages,—catarrh, bronchitis, pertussis, and some forms of asthma. Experience makes me fully concur with Dr. Charles J. B. Williams (*Lectures on the Pathology and Diseases of the Chest*—published in Bell's Select Medical Library, 1839), when he expresses his conviction "that in the greater number of cases the alkaline remedies quiet the cough and prevent expectoration far better than the oxymels and acid linctus, or lozenges, that are commonly in use, and which, however they may appear at the time to 'cut the phlegm,' and cleanse the throat, tend to disorder the digestive organs, and often ultimately to increase the cough." Not only do the alkalies aid in the removal of the obstructing mucus already secreted, but, by favouring its looser flow, they tend to unload and reduce the congested membrane, and thus to relieve the dyspnœa that arises from its tumefaction. Laennec laid great stress on the resolvent power of potassa, even for the removal of incipient tubercles of the lungs. My own favourite combination is, for a child three years old,—R. Potass. sub-carb. ℈i.; Aquæ Camphor, Syrup G. Acaciæ, āā ℥ss.; Vin. Ipecac. ℥i. M. dosis cochl. parv. ter die. Laudanum may be added to this mixture according to the indications of the case. In pertussis the union of assafœtida with the alkali constitutes one of the best, if not the best, remedy for this disease, after the subsidence of the first acute symptoms. Belladonna, conium, hyosciamus, colchicum, may severally, on occasions, be conjoined with the potassa, and its kindred soda and ammonia. Dr. Williams is in the habit of giving either the liquor potassæ (xx. to xxx. minims), carbonate of soda (gr. xv. to xx.), or carbonate of ammonia (gr. iii. to v.), according to the character of the case, three or four times a day.

Other formulæ and uses of the bicarbonate and carbonate of potassa are adverted to under the head of Carbonic Acid (p. 119).

As an external application, the *Potassæ Hydras* (*Potassa fusa*) has long been employed as a powerful escharotic; it dissolves and combines with the cutis and forms a slough and ulcer, but the difficulty of limiting its action is such, that it is rarely employed, and the usual contrivances for preventing its spreading are not effectual. In deep-seated inflammation, and in diseases of the hip-joint and spine, issues are sometimes formed by its action; buboes in the groin are occasionally laid open by it, but the lancet is a preferable instrument for such purposes. It has been recommended for the removal of strictures in the urethra, but the difficulty of applying it, and its extreme deliquescent and spreading tendency, must at all events render it inconvenient if not dangerous for such purposes.

It is stated that the *Potassa cum Calce* is a more manageable escharotic, and less deliquescent, than the preceding; it is also, however, less active, and is a clumsy caustic.

A dilute solution of hydrate of potassa is sometimes employed as a detergent and stimulating lotion, and resorted to as a preventive of venereal infection, by washing the exposed surface with it. Two drachms of solution of potassa to four or six ounces of rose-

water, with the addition of a little spirit of wine, forms a wash which is frequently employed for cleansing the hair; it removes scurf, and becomes slightly saponified, but unless very dilute, and well washed out with warm water, it injures the appearance of the hair, and is said to have occasioned baldness.

Caustic potassa and its carbonate are placed, by toxicological writers, amongst the *irritant poisons*.

Carbonate of potassa resembles the caustic alkali in its general effects upon dogs, but is less active.

Dr. Christison states that he has not been able to find any case of poisoning, in the human subject, with the caustic alkalis, but that the effects of their carbonates have been several times witnessed, and appear closely to resemble those of the concentrated mineral acids. The symptoms are acrid taste, and destruction of the membranes of the mouth, burning and constriction of the throat and gullet; vomiting, and acute pain and tenderness of the abdomen, cold sweats, hiccup, and tremors, and afterwards violent colic and purging of bloody matter with membranous flakes. In a case quoted by Dr. Christison, of a boy who swallowed by mistake three ounces of a strong solution of carbonate of potassa, it proved fatal in twelve hours. In another case, an ounce of carbonate of potassa produced symptoms resembling those of acute gastritis, but the man recovered.

Dr. Christison, however, remarks that a more common form than the preceding is one similar to the chronic form of poisoning with the mineral acids, "in which constant vomiting of food and drink, incessant discharge of fluid, sanguinolent stools, difficulty of swallowing, burning pain from the mouth to the anus, and rapid emaciation, continue for weeks, or even months, before the patient's strength is exhausted; and where death is evidently owing to starvation, the alimentary canal being no longer capable of assimilating food." Illustrative cases are referred to in the *Med. Rep.* (vol. III. p. 118), in the *Edin. Med. and Surg. Journ.* (vol. xxx. p. 310), and in Sir Charles Bell's *Surgical Observations* (part I. p. 82). In all these cases the inner coat of the stomach was corroded, and there was ulceration of that viscus.

Of the antidotes to poisoning by the alkalis, the diluted acids naturally suggest themselves, and of these, diluted acetic acid would probably be selected; it would, however, appear that almond, or olive oil is preferable, but they require to be given in repeated and very large doses.

We may now proceed to the remaining compounds of potassium, with the exception of those which for obvious reasons have been elsewhere considered; such, for instance, as the *bromide* and the *iodide* of potassium, and the *compound solution* of the latter, which have been included under the heads Bromine and Iodine (see pages 99 and 269).

Sulphuret of Potassium. — Take of Sulphur, an ounce; Carbonate of Potassa four ounces. Rub them together, and place them upon the fire in a covered, crucible until they have united.

The result of the above process is not merely sulphuret of potassium, but a fused mixture of sulphuret of potassium and sulphate of potassa. So that the product is composed of:—

	Atoms.	Equivalents.	Per Cent.
Sulphate of Potassa	1	88	34·3
Sulphuret of Potassium	3	168	65·7
Potassii Sulphuretum (*Lond. Pharm.*)	1	256	100·0

The mutual action of *sulphur and potassium*, and of *sulphur and potassa*, and the changes consequent upon the action of the sulphurets of potassium upon water, will be more evident from the following details:—

When 40 parts of potassium are heated with 16 of sulphur, 56 parts of *sulphuret of potassium* are obtained, which, when put into water, furnishes 65 parts of hydrosulphate of potassa; that is, the water transfers 1 atom of hydrogen to 1 of sulphur, to produce hydrosulphuric acid; and 1 of oxygen to 1 of potassium, to produce potassa.

Sulphuret of potassium is also formed by the action of hydrogen, or of charcoal, at a red heat, upon sulphate of potassa; in which case the oxygen both of the sulphuric acid and of the potassa is carried off, either in union with the hydrogen or the carbon, and 1 atom of sulphur and 1 of potassium remain in combination.

When the solution of hydrosulphate of potassa is decomposed by an acid, hydrosulphuric acid gas is evolved, and there is no deposition of sulphur. But when acids are added to the solution of sulphuretted hydrosulphate of potassa, either sulphur or bisulphuret of hydrogen is deposited. If a *strong* solution of the sulphuretted hydrosulphate be poured into hydrochloric acid, a viscid substance falls, which is *bisulphuret of hydrogen:* but if hydrochloric acid be dropped into a *weak* solution, hydrosulphuric acid is evolved, and sulphur precipitated.

The *Potassii Sulphuretum* of the Pharmacopœia is of a dirty-yellow colour, inclining to green, a sulphurous smell, and a nauseous alkaline and bitter taste. It has been classed with expectorants, diaphoretics, and alteratives, and has been prescribed in doses of from two to five grains in pulmonary affections, in rheumatism, and in cutaneous disorders, united with soap, in the form of pill. Among the cases which justify its use are certain obstinate cutaneous eruptions, where other remedies have been tried in vain. The following are the formulæ:—

℞ Potassii Sulphureti, Saponis, āā ʒss. Divide in pilulas xxiv. quarum capiat unam quartâ quâque horâ, superbibendo cyathum decocti sarsaparillæ compositi.

The following lotion has been recommended in *tinea capitis:*—

℞ Potassii Sulphureti ʒiij.; Saponis duri ʒij. Solve in Aquæ Rosæ fʒij.; Spiritus Rectificati fʒj. Fiat lotio quâ irrorantur maculæ impetiginosæ, mane et vespere.

An ointment of sulphuret of potassa, containing about half a drachm of the sulphuret, triturated with an ounce of lard, has been

used in the cure of the itch: it appears, however, to posses no advantage over other less disagreeable applications.

I have frequently used the sulphuret of potassa with salines in solution, in cases of chronic rheumatism and cutaneous affections, also in chronic hepatitis. I direct as follows:—℞. Sulphat. Magnes. ℥i.; Sulphat. Potass. ʒij.; Sulphuret. potass. ʒi.; Aquæ fluvialis Oiss. M. Of this imperfect solution the patient is directed to take a wineglassful in half a pint of water once or twice a day. The effects are increased by a blue, pill of three to five grains, being taken over night.

As an antidote to poisons, sulphuret of potassa is properly laid aside; there is no case in which it can be judiciously administered.

Sulphate of Potassa. — The salt which remains after the distillation of nitric acid is bisulphate of potassa; when heated, its excess of acid is expelled, and the dry neutral sulphate remains, composed of—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	54·5
Sulphuric Acid	1	40	45·5
Sulphate of Potassa	1	88	100·0

The crystalline forms of this salt result from a primary right-rhombic prism, variously modified, and frequently forming bi-pyramidal hexagonal prisms. It requires sixteen parts of cold, and five of boiling water for solution; its taste is saline and bitterish; it is insoluble in alcohol. It forms a useful aperient, especially for children, in conjunction with rhubarb. Fifteen grains of this salt, with five of rhubarb, may be given to children of from four to six years of age, as an effectual though gentle means of cleansing the bowels. Of its combination with jalap in the compound powder, I have already spoken. In the dose of about two drachms it is aperient, but its difficult solubility is against its general use. It has been occasionally administered in pills, especially in cases of habitual constipation, conjoined with small doses of aloes.

The *bisulphate of potassa* remaining after the distillation of nitric acid generally contains sesquisulphate, and some sulphate of potassa, so that, to insure the production of a perfect bisulphate, the Pharmacopœia directs the addition of sulphuric acid, and crystallisation.

Bisulphate of potassa forms tabular crystals, which appear to be the secondaries of an octoëdron, with a rhombic base: they consist of—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	32·87
Sulphuric Acid	2	80	54·80
Water	2	18	12·33
Crystallised Bisulphate of Potassa	1	146	100·00

This salt is very sour, and soluble, one part requiring only two of water at 40°, and less than an equal weight at 212°, for solution.

It is insoluble in alcohol. Exposed to a red heat it loses its excess of acid, and is reduced to the state of neutral sulphate. It is scarcely ever used. Where a sour saline remedy of this kind is required, it is easily formed by the addition of dilute sulphuric acid to sulphate of potassa. Dr. Barker (*Dubl. Pharm.*) says, this salt may be used to form a cheap effervescing purgative salt as follows: 13 grains of bisulphate of potassa and 72 grains of crystallised carbonate of soda, to be separately dissolved in two ounces of water. Although conjoined with rhubarb, it would cover the bitter taste of the latter, without injuring its medicinal properties.

Potassæ Nitras. *Nitrate of Potassa.*

Nitrate of Potassa, *Nitre* or *Saltpetre* (*Sal petræ*) is exclusively supplied from the English Indian territories. It is imported from Bengal mostly in an impure state, and refined in England, by solution and crystallisation. It is an article of much consumption as an ingredient in gunpowder; it is also largely employed as a source of nitric acid, and for other purposes in the arts. When nitre is heated with combustible substances, it acts as a powerfully oxidizing agent; mixed with charcoal, and deflagrated by throwing the mixture into a red-hot crucible, it yields carbonate of potassa; with phosphorus, phosphate of potassa; and with sulphur, a mixture of sulphite and sulphate of potassa. Gunpowder is an intimate mixture of about 77 parts of nitre, 12 of charcoal, and 10 of sulphur. Nitre is composed of—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	47·1
Nitric Acid	1	54	52·9
Nitrate of Potassa	1	102	100·0

Nitre is diuretic, refrigerant, and sedative; when given in small doses, it diminishes arterial action, and is therefore used as a sedative refrigerant in inflammatory complaints, excepting, perhaps, those of the urinary organs: it passes off by the kidneys. The dose of nitre is from five to twenty grains, in ten or twelve drachms of liquid; the best vehicles are those of a mucilaginous nature, and almond emulsion. If intended as a refrigerant, the draught, as Dr. Paris has observed, should be swallowed immediately after the salt has been dissolved; in such cases it may be directed as follows:—

℞ Potassæ Nitratis pulver. grana viij.; Pulver. Tragacanth. compos. ʒss. M. fiat pulvis quartis horis ex aquæ frigidæ cochlear. iij. sumendus.

In inflammatory and particularly in pulmonary and rheumatic cases, nitre may be combined with diaphoretics, such as saline draughts, or mixtures containing tartarised antimony:—

1. ℞ Potassæ Carbonatis ℈j.; Succi Limonum recentis fʒss.; Misturæ Camphoræ fʒj.; Potassæ Nitratis gr. x.; Syrupi Rhœados fʒj. M. fiat haustus quartâ quâque horâ sumendus.

2. ℞ Liquoris Ammoniæ Acetatis, Aquæ Menthæ Virdis, āā fʒij.; Aquæ destillatæ fʒiiiss.; Potassæ Nitratis ʒss.; Vini Antimonii Potassio-tartratis fʒss. Fiat mistura cujus sit dosis cochlearia tria ampla tertiâ vel quartâ quâque horâ.

A drachm dissolved in water, and then diffused in a quart of flaxseed tea, makes a drink which is a good adjuvant to venesection and tart. ant. in pneumonia, pleuritis, and acute rheumatism. A quart should be drunk in the day.

Nitre is a good addition to gargles for inflammatory sore throat:—

℞ Potassæ Nitratis ʒiss.; Mellis Despumat. fʒij.; Aquæ Rosæ fʒvj. M. fiat gargarisma.

Or, —

℞ Potassæ Nitratis ʒij.; Decocti Hordei fʒvij.; Oxymellis Simplicis fʒj. M.

The cold produced by the solution of powdered nitre in water, is increased by the addition of sal ammoniac; such a solution may sometimes prove useful as a refrigerant lotion, more especially where ice cannot be procured. For this purpose, one part of a mixture of equal weights of powdered nitre and sal ammoniac may be dissolved in ten or twelve parts of the coldest water that can be obtained.

Cases of poisoning by nitre are not unfrequent, in consequence of its resemblance to sulphate of soda, or Glauber's salt; and of the baneful custom which prevails, in some shops, of keeping these salts in neighbouring drawers. The effects of nitrate of potassa seem to be partly those of an irritant, and partly of a narcotic poison.

The effects of over-doses of nitre on man are variable. Dr. Alexander took an ounce and a half, largely diluted, in the course of twenty-four hours, without ill effect; and, occasionally, where an ounce or more has been swallowed by mistaking it for sulphate of soda, it has been ejected by vomiting, without much ill effect. But dangerous, and even fatal consequences, are not uncommon, such as great pain of the abdomen, bloody stools and vomiting, dysentery, nervous affections,—chorea, palsy, and tetanus; such symptoms have sometimes terminated fatally. The appearances after death are those of violent inflammation of the stomach and intestinal canal, detachment of portions of the villous coat of the stomach, and red and black spots.

The treatment in these cases consists in promoting vomiting, in the use of mucilaginous drinks, and the general remedies requisite in counteracting the effects of irritant and corrosive poisons.

Potassæ Chloras. *Chlorate of Potassa.* This salt is prepared in great perfection and purity by the wholesale manufacturers, and is used in large quantities for making Lucifers, Prometheans, and similar sources of instantaneous light. It is obtained by passing chlorine through a solution of potassa (or its carbonate), and allowing the liquid to remain for some hours in a cool place. It consists of:—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	48·7
Chloric Acid	1	76	61·3
Chlorate of Potassa	1	124	100·0

Chlorate of potassa is by far the best source of pure oxygen gas.

As a medicine, this salt is placed, like nitre, among the refrige-

rants and diuretics; it has sometimes been supposed to act by imparting oxygen to the blood; it has been prescribed by Dr. Stevens in cholera (*On the Blood*, p. 296), but further inquiries are requisite to establish its therapeutic uses. The usual dose is from ten grains to half a drachm. (*See* CHLORIDE OF SODIUM.)

Tartrate of Potassa.—This salt is generally sold in the form of a granular powder, but it ought always to be crystallised, and perfectly neutral, so as to show no alkaline or acid reaction to the tests of turmeric and litmus. Its primary form is a right oblique-angled prism, with cleavages parallel to the lateral planes. It has a bitterish salt taste, and dissolves in about twice its weight of water. It is slightly deliquescent in a moist atmosphere. It is the *Tartarus solubilis* and *tartarisatus* of former Pharmacopœiæ. By a red heat it is decomposed, and converted into carbonate of potassa. It consists of —

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	42·1
Tartaric Acid	1	66	57·9
Tartrate of Potassa	1	114	100·0

In doses of from two to six drachms, this salt is a good aperient, especially in combination with senna, or rhubarb; it clears the bowels without griping. The following are useful forms of it :—

1. ℞ Infus. Sennæ f℥x.; Potassæ Tartratis ʒij.; Infus. Serpent. fʒss. M. fiat haustus aperiens.
2. ℞ Pulv. Rhei ℈j.; Potassæ Tartratis ʒj.; Olei Menthæ Pip. gutt. iij. M. fiat pulvis.
3. ℞ Potassæ Tartratis ʒj.; Pulveris Rhei ʒj.; Aquæ Menthæ Piper. fʒvij.; Infus. Serpent. fʒss.; Syrupi Zingiberis fʒss. M. fiat mistura aperiens. Cochlearia tria pro dosi.
4. ℞ Potassæ Tartratis ʒiss.; Misturæ Amygdalæ f℥xiv.; Spiritus Myristicæ, Syrupi Tolutani, āā fʒss. M.

The last form is a useful, mild aperient, in cases of uric deposits, for the salts of potassa with vegetable acids, have an alkaline reaction upon the urine. Acids cannot be conjoined with tartrate of potassa, as they abstract part of its base, and throw down bitartrate of potassa.

The following is Klein's *Pulvis lenitivus Hypochondriacus*:—

℞ Flavedinis Cort. Aurant., Rhei Pulver., Potassæ Tartratis, āā ʒss.; Olei Cajuput. gutt. iij. M. ft. pulvis pro una dosi.

Potassæ Bitartras. Bitartrate of Potassa (*crystals*). — It is sparingly soluble in water. It reddens the colour of litmus. By a red heat it is converted into carbonate of potassa.

Tartar, as originally deposited in wine casks, is of a brownish-red colour, and is purified by dissolving it in boiling water, and adding albumen and wood ashes: the former coagulates, floats, and entangles various impurities, whilst the latter occasions an effervescence, throwing these up to the surface, whence they are removed by repeated skimmings. Sometimes aluminous earth

is used to precipitate the colouring matter, and sometimes the colour is destroyed by well-burnt charcoal.

Bitartrate of potassa is a brittle white salt, the primary form of which is a right-rhombic prism. It tastes sour and gritty, and requires sixty parts of cold, and fifteen of boiling water for its solution. When heated in the open fire, it becomes converted into carbonate of potassa (hence called *Salt of Tartar*). It generally contains traces of tartrate of lime. The crystals of tartar contain—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	25·3
Tartaric Acid	2	132	70·0
Water	1	9	4·7
Bitartrate of Potassa	1	189	100·00

In the dose of a drachm, repeated twice or thrice a day, bitartrate of potassa proves aperient, but is apt to excite pain and flatulence of the bowels. Conjoined with jalap, it forms an hydragogue and diuretic purgative, already noticed as useful in dropsical affections. A weak solution of tartar, flavoured with sugar and lemon-peel, is the pleasant refrigerant drink called *imperial;* the following are the proportions:—

℞ Potassæ Bitartratis ℥ss.; Sacchari Purif. ℥iv.; Corticis Limonum recent. ℥ss.; Aquæ ferventis Oiij. M. et cola quando frigidus sit.

An electuary of tartar and honey is said to be efficacious as a vermifuge.

Acetate of Potassa.—Take of Carbonate of Potassa, a pound; Acetic Acid, twenty-six fluid ounces; Distilled Water, twelve fluid ounces. To the acid, previously mixed with the water, add the carbonate of potassa, to saturation, then filter. Evaporate the solution in a sand-bath, cautiously heated, till the salt becomes dry. Entirely soluble in water and in alcohol. The solution neither affects litmus nor turmeric.

In the above process, the carbonic acid of the carbonate of potassa is expelled by the acetic acid, and the dry acetate of potassa is obtained by the evaporation of the solution. During the evaporation, however, the salt separates in the form of loosely coherent spongy pellicles, which may be successively removed, and furnish it in a good form for use. Those who prepare it on the large scale, fuse it, and, on cooling, it concretes into a lamellar mass, formerly called *Terra foliata Tartari.*

Acetate of potassa has an acetic odour, and pungent saline flavour; it is very deliquescent, and soluble in about its own weight of water; it is also soluble in alcohol. It consists of—

	Atoms.	Equivalents.	Per Cent.
Potassa	1	48	48·5
Acetic Acid	1	51	51·5
Acetate of Potassa	1	99	100.00

This salt is regarded as a diuretic and diaphoretic aperient. As it is always administered in solution, it might have been left to extemporaneous prescription. It used to be, I know, frequently prescribed in this way: it might, when sweetened, take the place often of the

neutral mixture. It is a good febrifuge when tartar-emetic is added. Without adjuncts it is not effective as a diuretic ; as a diaphoretic it ranks with citrate of potassa. It is given in doses of from twenty to sixty grains, generally dissolved in some of the aromatic distilled waters or bitter infusions, and with diuretic adjuncts, as in the following formula. In doses of four to six drachms it is said to be aperient, but as such is never administered :—

℞ Potassæ Acetatis ℥ss. ; Infusi Quassiæ, Aq. Cinnamomi, āā f℥vj. ; Aceti Scillæ Spiritûs Ætheris Nitrici, āā f℥ss. M. fiat haustus ter in die capiendus.

Ferrocyanide of Potassium (*crystals*). — It is entirely dissolved by water. When gently heated, it loses 12·6 per cent. of its weight. It slightly changes the colour of turmeric. Its precipitate, with the preparations (solutions) of sesquioxide of iron, is blue ; that with the preparations (solutions) of zinc, white. When burned, its residue is soluble in hydrochloric acid, and again precipitated by the addition of ammonia. 100 parts yield 18·7 of sesquioxide of iron.

This salt may be obtained by digesting Prussian blue (cyanide of iron) in a solution of potassa, and evaporating the resulting solution till it crystallises ; it is, however, usually prepared by calcining a mixture of two parts of carbonate of potassa with five of horn, hoof, or other similar dry animal matter, and a small proportion of iron filings. The mixture, during calcination, is carefully stirred as long as fetid vapours are exhaled ; it is then allowed to cool, dissolved in water, filtered, and evaporated so as to yield crystals.

As a *remedial agent*, ferrocyanide of potassium, *prussiate of potassa*, is remarkably inert ; it has been given in large doses without any important consequences : it passes off with extraordinary rapidity by the urine, but has not, I believe, been satisfactorily detected in the blood. It seems probable that they who have ascribed active powers to it as a sedative and anodyne, have either not used it pure and alone, or that it has undergone some uncommon decomposition in the stomach. The curious proximate, and ultimate composition, however, of this salt, and the peculiar state of combination in which its elementary iron is held, together with the extreme facility of its transit by the kidneys, and the probability of its giving origin, under particular circumstances, to active hydrocyanic or ferrocyanic compounds in the stomach, are circumstances which render further inquiries respecting its physiological and therapeutic effects desirable.

Iodo-Hydrargyrate of Potassium. — The account of this preparation, though it belongs properly to this article, would have found a place under "*Iodinum*" but for an accidental circumstance connected with the arrangements of the press.

Dr. William Channing of New York, in a communication to the *Am. Journ. of Med. Science*, Vol. xiii., p. 388–403, pointed out the many advantages in the cure of different diseases, which he had procured by the employment of the deuto-iodide of mercury, dissolved in a solution of iodide of potassium, so as to form the *iodo-hydrargyrate of potassium;* a salt first discovered and named by M. Bonsdorf, of Finland, in 1826. Dr. Channing did not deem

it necessary, in preparing this salt for exhibition, to take the trouble of crystallising it in order to obtain a solution of a definite strength, inasmuch as a solution, combining a fraction more than eight grains of the iodide of potassium with eleven grains of the iodide of mercury, may be used, as containing twenty grains of the iodo-hydrargyrate of potassium; the difference, if any, being too small to merit consideration. The substances incompatible with this compound are the mineral acids, the fixed and volatile alkalies, with their carbonates, acetate of lead, nitrate of silver, sulphuret of potassa, and all preparations containing free chlorine.

The cases in which this medicine was used by Dr. Channing were, chronic bronchitis simulating phthisis, and as a palliative in this latter disease; also in pleuropneumonia, and ascites, and in acute inflammation of the throat and chest. Dr. C. specifies aphthæ, tonsillitis, pharyngitis, chronic gastro-enteritis, colitis, constipation and dyspepsia, amenorrhœa, leucorrhœa, herpes, psora, psoriasis, and scrofula, as the diseases in which the remedy displayed the best effects. Stress is laid on its reducing the morbid frequency of the pulse.

The formula given by Dr. Channing is:—℞ Deuto-iodiod. hydrarg., gr. iv.; Hydriodo (iodid.) potass., ℈i.; Aq. destill., ℥i. M. Ft. sol. Take five drops in water three times a day. After a while, in the case of the first patient related, twenty-five drops twice a day were given. Fifteen drops a day were equivalent to a quarter of a grain of the iodo-hydrargyrate of potassium. In one case of a delicate lady the medicine was prescribed at the beginning in a dose of a forty-eighth part of a grain, gradually increased to a twelfth of a grain *per diem* in two doses: but it was found necessary, on account of its "excessive action," to reduce this to the original dose. Under other circumstances, however, as "during protracted collapse," three grains of the salt have been administered in fifteen hours, in gradually increased doses, "with no other than the intended effect apparent, excepting the production of three copious alvine discharges, closely resembling, in all respects, those of a healthy child."

Dr. Hildreth (*Am. Journ. Med. Science*, Vol. xxvi., p. 312–22), gives his testimony corroborative, in the main, of the opinions of Dr. Channing, respecting the remedial nature of the iodo-hydrargyrate. But *in limine* he excepts cases of phthisis, which he found to be aggravated by its use; and wisely objects to it also in *inflammations* of the lungs and other organs, until, as he says, "I have lost all confidence in the lancet, tartar-emetic, revulsives, &c." Personal observation induces him to believe that the medicine is almost exclusively adapted to diseases of a chronic or sub-acute character. Dr. Hildreth then goes on to specify the diseases in which he has found it to be decidedly beneficial, viz., dyspepsia, diseases of the liver and spleen, amenorrhœa, dysmenorrhœa, leucorrhœa, and glandular enlargements of a scrofulous character.

After putting all confidence in the accuracy of Dr. Channing's

observations, respecting the remedial value of the iodo-hydrargyrate of potassium, we have no positive evidence of its possessing advantages superior to the iodide of mercury without the complication of the potassium. I can say, that, although I have not used the salt in question, I have cured, or notably relieved, cases of all the diseases specified by Drs. Channing and Hildreth, (except phthisis,) by the administration either of the tincture if iodine or the solution of the iodide of potassium, or the compound solution of iodine prepared in the manner already specified.

In the form of ointment applied to scrofulous and other tumours, it is prescribed as follows:—℞ Deuto-iodiodid. hydrarg., gr. viij.; Hydriod. potass., ℈ij.; Adeps, ℥i. M. This should be applied to tumours two or three times daily: should it prove too irritating to the skin, a farther addition of lard will be required.

PRINOS VERTICILLATUS. Black Alder. This is an indigenous tree, the bark of which is praised by some as a tonic: its powers are inconsiderable.

PRUNA. Prunes. *Drupæ exsiccatæ.* The dried fruit of the *Prunus domesticus.* *Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Amygdaleæ.

The tree which yields this fruit is a native of Asia and Greece, although now naturalised to Europe, growing wild in coppices, and flowering in April and May.

Prunes are imported from the Continent and of various qualities; they are mildly laxative, and constitute a part of the *Confectio Sennæ* of the London Pharmacopœia.

PRUNUS VIRGINIANA. *Cortex.* The Bark of the Wild Cherry. *Cl.* 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Amygdaleæ.

The inner bark is the part employed in medicine: its taste is bitter, with a certain degree of aromatic flavour, which makes this article, particularly in the form of infusion, agree well with most weak stomachs. The *dose* of the powdered bark is from *thirty* to *forty grains.* From a recent analysis by Mr. Proctor, of Philadelphia, it appears to contain volatile oil, hydrocyanic acid, starch, resin, tannin, gallic acid, fatty matter, lignin, red colouring matter, salts of lime and potassa, and iron. In the quantity of two drops the volatile oil proved fatal to a cat in ten minutes (*Journ. of the Phil. Coll. of Pharm.* VI. 8.)—*U. S. Disp.*

The above analysis would seem to explain and confirm the opinion before held of the wild cherry bark, displaying, in addition to its tonic and astringent properties, mild narcotic effects. Hence its adaptation to dyspepsia with neuralgic symptoms, chronic catarrh and bronchitis, particularly when associated, as is so often the case, with a morbid state of the stomach. In diseases of simple irritation, as of morbidly excited heart, this medicine would seem to exert a decidedly sedative operation. Dr. Eberle states, that copious draughts of the cold infusion, taken several times a day, and continued for nearly two weeks, had the effect of reducing his

pulse from seventy-five to fifty strokes in the minute. The infusion is prepared by the addition of half an ounce of the bruised bark to a pint of cold water. Macerate for twelve hours and strain. The dose is two or three fluid ounces, or a common wineglassful, three or four times a day.

PRUSSIC ACID, *see* HYDROCYANIC ACID.

PTEROCARPUS (πτερον, *a wing*, καρπος, *fruit.*) *Lignum.* Red Saunders. The wood of the *Pterocarpus santalinus. Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Leguminosæ.

This lofty tree is a native of the mountains of Coromandel and Ceylon; is imported in blocks from India; it is used occasionally to impart colour to tinctures, but is itself quite inert. The term *Santalin* has been applied by Pelletier to the colouring principle. (*Ann. de Chim. et Phys.* LI. 192.)

PULEGIUM (from *pulex*, a flea, because the odour of its leaves, when burned, is said to destroy fleas). *See* MENTHA.

PULVERES. Powders.

The ingredients of the *compound powders* should be of such a nature as to suffer little from long exposure to air; and neither deliquescent, efflorescent, nor volatile. It has been supposed that some substances suffer considerable change in consequence of the facility with which air acts upon them when in a state of powder; and this, not so much in consequence of the evaporation or loss of any volatile ingredient, as by the absorption of oxygen, and the consequent change of some of their more fixed principles, especially the extractive matter; but, although some such change may take place in some powders, there is no evidence of any corresponding diminution of their medicinal virtues.

In the preparation of the officinal compound powders, especially of those which contain ingredients of very different specific gravities, or which consist of inert, combined with very active substances, the utmost attention is required to insure perfect and equable mixture. For this purpose, such of them as have been passed through a sieve should be afterwards triturated for a sufficient time in a shallow mortar, in such a way as to blend all their parts thoroughly together; after which, they should be shaken as little as possible, for mere agitation often tends to separate their ingredients. These powders should be kept in well-corked bottles, and should not be much exposed to air or light.

PUNICA GRANATUM, *see* GRANATUM.

PYRETHRUM (from πυρ, *fire;* from the hot flavour of the root). *Radix.* Pellitory Root. The root of the *Anthemis pyrethrum. Cl.* 19. *Ord.* 2. Syngenesia Superflua. *Nat. Ord.* Asteraceæ. (Anacyclus pyrethrum. *Lindley.*)

This plant is a native of Barbary, Arabia, and Syria.

When chewed, pyrethrum excites a copious flow of saliva, and is often effective as an ingredient in stimulating gargles, and in cases of relaxed uvula; it is also a valuable palliative in toothache. In paralysis of the muscles of deglutition, from ten grains

to a drachm of the powdered root have been given conjoined with other stimulants. The following *Compound Tincture of Pyrethrum* may be applied upon cotton to the affected tooth and gum, for the relief of the tooth-ache :—

℞ Pyrethri Radicis contus. ℥ss.; Camphoræ ℥iij.; Opii ℥j.; Olei Caryophyllor. ℥ij.; Spirit. Vini rectificat. ℥vj. M. et digere per dies decem. Cola.

PYROLA (from *pyrus*, the pear tree; because its leaves resemble those of the pear). *See* CHIMAPHILA.

QUASSIA. *Lignum.* The wood of the *Quassia excelsa. Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Simarubaceæ. (Picræna excelsa. *Lindley.*)

This handsome tree is a native of South America and some of the West Indian Islands; it is common on the plains and lower mountains of Jamaica.

Quassia wood is imported in billets from the West Indies. It is said to have been named after *Quassi*, a slave, who used it as a secret remedy in the cure of the fevers of Surinam. It has a pure and intense bitter taste, which it readily imparts to water and to proof spirit. The usual form of its administration is the *infusion.* It has the advantage over most other vegetable infusions of not decomposing metallic salts; nor is it blackened by iron; hence it is a good vehicle for a variety of mineral tonics. In some cases of dyspeptic debility, especially that brought on by habitually taking too much wine, the stomach will sometimes be relieved by the following formula :—

℞ Infusi Quassiæ f ℥iss.; Zinci Sulphatis ¼ gr. M. fiat haustus bis die sumendus.

An infusion of quassia, sweetened by brown sugar, is an effectual poison for flies, and should be preferred to the more pernicious compounds generally used for that purpose.

The nature of *quassin*, the peculiar bitter principle of this wood, has been very imperfectly ascertained.

The following is the only officinal preparation of quassia directed in the *London Pharmacopœia :* —

Infusion of Quassia. — Take of Quasia, rasped, two scruples; Boiling distilled Water, a pint. Macerate for two hours in a lightly-covered vessel, and strain.

QUERCUS. *Cortex.* Oak Bark. The bark of the *Quercus pedunculata. Cl.* 21. *Ord.* 6. Monœcia Polyandria. *Nat. Ord.* Corylaceæ.

Oak bark has often been substituted for cinchona in the treatment of febrile diseases, but it has never been found more effectual than other common astringent tonics, and perfectly inadequate to the cure of obstinate intermittents; this inefficacy may be explained by the non-existence of any principle in oak bark corresponding to the salifiable bases of the cinchonæ. It has been prescribed in obstinate diarrhœa, and in alvine hemorrhages, and is recommended by Dr. Underwood "in the malignant coryza, or *snuffles*, of infants, when in spite of keeping the bowels regular, and the use of cordials, the child becomes weak and pallid."

Oak bark has been used in substance, in the *dose* of from *ten to twenty grains*, but it is difficultly reduced to a sufficiently fine powder, so that the infusion or decoction is by far the best form.

Decoction of Oak Bark. — Take of Oak bark, bruised, ten drachms; Distilled Water, two pints. Boil down to a pint, and strain.

QUINIA, *see* CINCHONA CORDIFOLIA (page 130.)

REFRIGERANTS. "Substances which directly diminish the force of the circulation and reduce the heat of the body without occasioning any diminution of sensibility or nervous energy." (PARIS, *Pharmacologia.*) The list agreeably to this definition must be small.

RESINA (from 'ῥέω, *I flow*). The resin of the *Pinus sylvestris.* (*See* PIX LIQUIDA, and TEREBINTHINA.)

This resin is defined in the Materia Medica of the Pharmacopœia as the "*Residuum resinæ liquidæ postquam terebinthinæ oleum destillatum est.*" "The residue of the liquid resin after the oil of turpentine is distilled."

When *common turpentine*, (Terebinthina vulgaris) which exudes from the Scotch fir (and from other species), is subjected to distillation with water, the *oil of turpentine*, as it is termed, passes over, and the resin remains in the still, forming what is callad *common*, or *yellow resin:* and which, when fused and again cooled, becomes brown and transparent, and is called *colophony*, or *fiddler's rosin.* It has the general characters of the resins, namely, it is fusible, inflammable, insoluble in water, and soluble in alcohol; it has little taste or smell.

By the action of cold rectified spirit, (specific gravity ·833) colophony is separable into two distinct forms of resin: the one soluble in the cold, and the other remaining insoluble. Both these resins combine with salifiable bases, and form distinct compounds which have been examined and described by Unverdorben (*Poggendorf's Annalen*, xi. 47): he terms the former *pinic acid*, and the latter *silvic acid.*

Resin is an ingredient in several plasters and ointments, and in the following formulæ of the Pharmacopœia: —

Plaster of Resin. — Take of Resin, half a pound; Plaster of Lead, three pounds. Add the powdered resin to the plaster of lead liquefied by a gentle heat, and mix them.

This is the common *adhesive plaster*, which, when properly spread upon linen, or occasionally upon soft leather, is of such important use in various surgical operations. In spreading it, care should be taken not to overheat it, by which its adhesiveness is impaired; and that the linen on which it is spread be dry, otherwise it cracks off.

Cerate of Resin. — Take of Resin, Wax, of each a pound; Olive Oil, sixteen fluid ounces. Melt the resin and the wax together over a slow fire; then add the oil, and press the cerate whilst yet warm through linen.

This cerate has long been known under the name of *yellow basilicon.* It is employed as a slightly-stimulating application to foul and indolent ulcers.

Plaster of Pitch. — Take of Burgundy Pitch, two ounces; Resin of the Spruce Fir, a pound; Resin, Wax, of each, four ounces; Expressed Oil of Nutmegs, one ounce; Olive Oil, Water, of each two fluid ounces. Add first the resin of the spruce fir, then the oil of nutmeg, the olive oil, and the water, to the pitch, resin, and wax melted together. Lastly, mix them all, and boil down to a proper consistence.

This is a relic of old pharmacy; it is a stimulant application, and, spread upon soft leather, is sometimes applied to the thorax in pulmonary affections, and to rheumatic joints; like other stimulating plasters, it occasionally creates inconvenient uneasiness upon irritable skins.

RHAMNUS (from ῥάμνος, *I annoy;* from its thorns). *Baccæ.* Buckthorn Berries. The berries of the *Rhamnus catharticus. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Rhamnaceæ.

An English shrub, flowering in May, and ripening its berries in October.

The juice of the berries is a drastic purge scarcely ever used, except in veterinary practice. It once had repute as promoting watery discharge from the bowels, in cases of dropsy.

The use of the following syrup is limited to horse-balls: —

Syrup of Buckthorn. — Take of the Juice of fresh Buckthorn berries, four pints; Ginger, sliced, Pimenta, bruised, of each six drachms; Sugar, four pounds. Set by the juice for three days that its dregs may subside, and strain. To a pint of the clear juice, add the ginger and pimenta; then macerate with a gentle heat for four hours, and strain; boil down that which is left to the measure of a pint and a half; mix the liquors; add the sugar and dissolve it.

RHATANY, *see* Krameria.

RHEUM. *Radix.* Rhubarb. The root of the *Rheum palmatum. Cl.* 9. *Ord.* 3. Enneandria Trigynia. *Nat. Ord.* Polygonaceæ.

It is curious that the species of *rheum* which affords the officinal rhubarb, is still undetermined. Professor Royle is of opinion that the officinal drug is obtained in the heart of Thibet, from some hitherto undescribed species. "The rhubarb of commerce," he says, "is well known to be brought by the Chinese to the Russian frontier town of Kiachta, according to the treaty formed between those powers in 1772.

Dr. Lindley, in his *Flora Medica*, has described nine species of *rheum*, leaving it, however, still doubtful, from which of them the commercial varieties are obtained.

Three varieties of rhubarb root are known in trade, — namely, Russian Rhubarb, Turkey Rhubarb, and Chinese, or Indian Rhubarb. The first two exactly resemble each other, and are generally extremely select and carefully dried; the latter is stated, upon the authority of Rehman, to be the produce of the same plant, but dried with less care. It would appear that the quality and appearance of rhubarb is greatly dependent upon the skill with which the process of drying is conducted.

The term *Turkey Rhubarb* is said to be applied to the Tartarian rhubarb carried into Turkey through Natolia, but that the greater

part is conveyed to Kiachta, "where it is examined by a Russian apothecary, and sent to Petersburgh. The pieces are roundish, and perforated with a large hole; they are of a yellow or reddish colour on the outside, somewhat soft and friable, and when broken exhibit many diverging streaks of a beautiful bright-red colour. Agreeably to the contract with Russia, all the rhubarb which is rejected must be burned: and even that which is approved must undergo another cleaning before it is finally packed for St. Petersburgh. At this examination, each piece is struck with a small mallet to detach from it any impurities or decayed parts."—(Thomson's *Lond. Disp.*)

East Indian, or *China Rhubarb*, as it is termed, is purchased at Canton by the agents of the East-India Company; it has a less select character than the former, and though much of it is a very good quality, it is often largely mixed with decayed and with hard or stony pieces. All rhubarb is dressed, and often cut and coloured for the market, its goodness, therefore, can only be accurately judged of by cutting each piece, and examining its interior. It breaks with a hackly fracture, it exhibits a mottled texture with streaks of red and gray, its colour is peculiar, and its taste bitter, astringent, and nauseous, tinging the saliva of a bright brown; its powder is bright yellow inclining to buff. It cuts easily and is moderately hard; the less select pieces are either woody or spongy, or tinged with streaks of a rusty tinge, or sometimes worm-eaten, and they are very deficient in the peculiar odour and taste of the finer varieties.

Several analyses have been made of rhubarb, but without any satisfactory results as concerns the nature of its active principle; it is generally represented as containing a considerable relative proportion of oxalate of lime, but in the samples which Mr. Brande examined, he could not satisfy himself of the presence of oxalic acid. According to Dr. A. T. Thomson, Russian rhubarb contains more tannin, oxalate of lime, and resin, than the Chinese; the Chinese more extractive and gallic acid than the Russian; he has also given a copious comparative table of the effects of various reagents on the aqueous infusions of the Russian and Indian rhubarb. The soluble matter of good rhubarb amounts to between 60 and 70 *per cent.*

The following preparations of rhubarb are directed in the present *London Pharmacopœia*:—

Infusion of Rhubarb.—Take of Rhubarb, sliced, three drachms; Boiling distilled Water, a pint. Macerate for two hours in a lightly-covered vessel, and strain.

Extract of Rhubarb.—Take of Rhubarb, powdered, fifteen ounces; Proof Spirit, a pint; Distilled Water, seven pints. Macerate for four days with a gentle heat, then strain, and set by, that the dregs may subside. Pour off the liquor and evaporate it, when strained, to a proper consistence.

Compound Rhubarb Pills.—Take of Rhubarb, in powder, an ounce, Aloes, powdered, six drachms; Myrrh, powdered, half an ounce; Soap, a drachm; Oil of Caraway, half a fluidrachm; Syrup, as much as may be sufficient. Mix the powders with each other, then pound all together till incorporated.

Rhubarb is an important article of the Materia Medica, and calculated to fulfil several indications. In doses of from fifteen to thirty grains it is aperient, emptying the bowels, but not always, without griping, and acting afterwards as an astringent; hence its peculiar use in common diarrhœa. It is best given in some aromatic water, or conjoined with a few grains of powdered cinnamon, which covers its nauseous flavour. Combined with other purgatives, it affords a useful series of pharmaceutical compounds. It may be given with saline purges; and especially with sulphate of potassa.

The following is also a good aperient mixture, of which an ounce and a half may be taken in the morning, as a mild cleanser of the bowels:—

℞ Pulv. Rhei ℈ij.; Potassæ Tartratis ʒi.: Aq. Menthæ Piper. fʒvj.; Syrup. Zingiberis fʒss. Misce.

Rhubarb is also an excellent adjunct to calomel.

In doses of from three to six grains, rhubarb acts as a tonic and astringent, and is given as such in a variety of dyspeptic affections. It is conveniently formed into pills, with a little water only; but these pills should not be kept too long, as they may become inert by induration. It also may be combined with bitter extracts, or aromatic oils, or spices, as in the above *Pilulæ Rhei Compositæ*. Rhubarb, ipecacuanha, and soap, make a good pill for dyspepsia and chronic diarrhœa. It is often advisable to conjoin it with carbonate of soda, magnesia, or other antacids: for such combinations, the *Infusion* is a good formula.

The *Extract of Rhubarb* is very mild in its operation, and is useful as an adjunct to aperient and alterative pills; as in the following formula:—

℞ Extract. Rhei ℈j.; Pilulæ Hydrargyri ℈ss. Misce, et divide in pilulas viij. Sumantur duæ omni nocte.

Rhubarb speedily passes off by the kidneys, and may frequently, by the aid of an alkali, be detected in the urine within ten minutes after it has been received into the stomach; in the course of an hour or two it disappears, and after a few hours reappears, a second absorption taking place, according to Sir Everard Home, from the colon.

Dr. Abercrombie recommends, as a very valuable remedy in the treatment of croup, a combination which consists of carbonate of iron with rhubarb and musk.

RHŒAS (from *ῥέω, I scatter.*) *Petala.* The petals of the Red Poppy. *Papaver Rhœas. Cl.* 13. *Ord.* 1. Polyandria Monogynia. *Nat. Ord.* Papaveraceæ.

The petals are only useful as a colouring material, in which capacity they form the basis of the *syrup of red poppy* (*Syrupus Rhœados*).

RICINI OLEUM. Castor Oil. *Oleum e seminibus expressum.* The expressed oil of the seeds of the *Ricinus communis. Cl.* 21. *Ord.* 8. Monœcia Monodelphia. *Nat. Ord.* Euphorbiaceæ.

This is a glaucous plant cultivated in India, America, Africa, and Europe; it is said to be a native of Greece. At Parnisus in the Morea, it is called *wild vine*, from its vine-like leaves. "In the

Bosphorus it is called *Kroton*, from the resemblance of its seeds to the tick-insect which fastens on dogs' ears." (*Hort. Trans.*, VI.) It is extremely variable in size; "when it is cultivated in Great Britain, an annual three or four feet high; in India sometimes becoming a pretty large tree, of many years duration; at least such is Roxburgh's statement. Clusius saw it in Spain with a trunk as large as a man's body, and fifteen to twenty feet high; and Ray found it in Sicily as big as our common alder trees, woody, and long-lived. But Willdenow considers the arborescent kinds, which are more than annual, as distinct species, which he calls *R. viridis*, *Africanus*, *lividus*, and *inermis*; they do not, however, appear to be anything more than mere varieties."—(*Lindley.*)

The seeds are acrid and drastic, but afford, on expression, a pale, fixed oil, of a nauseous smell and taste, and leaving a very slight sensation of acrimony on the palate. In the West Indies, the oil is sometimes separated by boiling the decorticated seeds in water; in this case it is deeper-coloured, more acrid, and more liable to become rancid; generally, also, more active as a purgative. Some of the oil as it now occurs in the market is absolutely colourless, and has scarcely any taste; it appears to have been decoloured or bleached, and in this state it is often almost inactive; so that the oil which is of a straw colour, and which has both taste and smell, though only in a slight degree, is to be preferred.

Castor oil congeals at about 0°; exposed to air it gradually becomes rancid, and very thick and viscid: it dissolves in absolute alcohol and in ether. Its specific gravity is about ·960. If it form a milky mixture when shaken with its bulk of alcohol, or if any portion remain undissolved it is probably adulterated with some other fixed oil. The complicated products of its destructive distillation have been examined by Bussy and Lecanu. (*Journ. de Pharm.*, XIII., 68.) When heated with a little nitric acid, castor oil is converted into a substance resembling hard butter; it occasionally undergoes an analogous change in the bowels, and is passed in a solid form, and in one case, in indurated nodules, which were at first regarded as biliary concretions.

Castor oil is a valuable aperient; for, in doses of from half an ounce to an ounce, it evacuates the bowels, with little irritation; it is especially useful in cases of irritation, or where there is spasm, or where increased action of the system is particularly to be avoided. It is, however, very liable to nauseate to a distressing extent, and is often rejected from the stomach; effects which may in some measure be prevented by giving it in aromatic waters, or with coffee. We should, however, be cautious in giving castor oil in cases of obstructed bowels, where vomiting may prove injurious; in hernia, for instance, or where there is a determination of blood to the head. It may sometimes be administered in the form of an emulsion, rubbed up with mucilage or yolk of egg, though in this way it is generally more nauseous, unless blended with aromatics.

℞ Olei Ricini f℥vj.; Vitelli Ovi q. s.; Aquæ Menthæ Piper. f℥x. M. fiat haustus aperiens.

The oil should be first triturated with the yolk of egg, and the peppermint water gradually added, so as to form an even mixture. About half the yolk of an egg will generally suffice. Half an ounce of castor oil shaken up with double the quantity of water gruel, makes a smooth emulsion, and is not very disagreeable: it is the form of administration which I generally recommend as the best and simplest. Some persons suffer from irritation of the rectum by using castor oil,

ROSA CANINA. *Fructus pulpa.* The pulp of the fruit of the Dog Rose.

ROSA CENTIFOLIA. *Petala.* The petals of the Damask Rose.

ROSA GALLICA. *Petala.* The petals of the Red Rose. *Cl.* 12. *Ord.* 5. Icosandria Polygynia. *Nat. Ord.* Rosaceæ.

The *confection of Dog Rose* is employed for the purpose of embodying powders into the form of pills, and as the basis of pectoral electuaries and linctuses, but it soon becomes hard and candied when kept, so that it is scarcely ever found in the apothecaries' shops fit for use. It is commonly known under the name of *Conserve of Hips.* The confection of red rose is preferable.

Rose Water. — Take of the petals of the Damask Rose, ten pounds; Proof Spirit, seven fluid ounces; Water, two gallons. Let a gallon distil.

Spirit of wine ought not to be added to this water; it does not materially tend to its preservation, and confers upon it a stimulating power, which, as it is chiefly used in ophthalmic applications, ought to be avoided.

During the distillation of roses there passes over a considerable portion of concrete oil, smelling of the flower, but not so pleasant, and soon becoming rancid. Genuine *attar of roses* is not, it is said, prepared by distillation, but by putting a quantity of carefully picked rose-leaves into a clean jar or cask, with water just sufficient to cover them; the vessel is then set in the sun for a few days, and in about a week the attar collects in the form of a scum upon the surface, and is removed by a piece of cotton.

Rose-water is generally directed, in preference to simple distilled water, in collyria and lotions containing acetate of lead or sulphate of zinc.

℞ *Confectio Rosæ Gallicæ.* — Rosæ Gallicæ, libram; Sacchari, libras tres; Rosæ petala in mortario lapideo contunde; tum, adjecto saccharo, iterùm contunde, donec corpus unum sit.

Confection of Red Rose. — Take of Red-Rose Petals, a pound; Sugar, three pounds. Pound the rose-petals in a stone mortar; then, having added the sugar, again pound them till incorporated.

The *Confection of Red Rose* is good for the formation of sulphate of quinia or of calomel and other powders into pills, and it does not dry and candy so soon as the confection of dog rose; nor is it liable to mouldiness or fermentation. It is the basis of some elegant pectoral conserves or electuaries, and is sometimes prescribed

rubbed up with new milk, and strained, as a nutritive tonic for debilitated convalescents.

In the following formula it is used as an adjunct to cinchona :—

1. ℞ Confect. Rosæ Gallicæ ℥ss. Tere cum decocti Cinchonæ lancifol. ℥viij. et cola.
2. ℞ Colaturæ f℥iss.; Acid. Sulphur, dilut. ♏v.; Extract. Cinchonæ grana v. Misce, fiat haustus sextâ quâque horâ sumendus.

The chemist may perhaps object to the union of the tannin of the rose with the alkaloid of the bark in the above formula, but it is unimportant.

Compound Infusion of Roses. — Take of Red-Rose Petals, dried, three drachms; Diluted Sulphuric Acid, a fluidrachm and a half; Sugar, six drachms; Boiling distilled Water, a pint. Pour the water upon the rose petals in a glass vessel; then mix in the acid. Macerate for six hours, and strain the liquor lastly, add the sugar to it.

This compound infusion is an agreeable acid drink in febrile disorders, and an elegant vehicle for a variety of remedies. It covers the saline bitterness of sulphate of magnesia; it is a good solvent for sulphate of quinia, for, although the astringent matter tends to precipitate the quinia, the excess of acid redissolves the precipitate; bitter tinctures and infusions are not incompatible with it, and it is useful in the composition of gargles containing the acids, nitre, alum, tincture of capsicum, &c. The alkalies and alkaline earths, when the acid is saturated by them, change its red colour to green; alum renders it purple.

All the preparations of the *red rose* should be made with the petals of the bud just before it expands; and in this state they should be carefully dried, so as to preserve their brilliant colour, and should be picked from the stalks and calyces: they should be kept in a dry place, and in a bottle or canister, as they are liable to become mouldy and worm-eaten.

ROSMARINUS. *Cacumina.* The *tops* of the *Rosmarinus officinalis. Cl.* 2. *Ord.* 1. Diandria Monogynia. *Nat. Ord.* Labiatæ.

This evergreen plant is a native of the South of Europe; it flowers in the English gardens in April and May, and is occasionally cultivated in this country.

Distilled with water or alcohol, the tops impart an agreeable fragrancy. A weak infusion of fresh rosemary leaves furnishes a pleasant and wholesome substitute for tea, and is particularly agreeable to some dyspeptic stomachs and nervous habits. The essential oil is yielded in the proportion of about one drachm from each pound of the fresh herb; it is a fragrant stimulant, and often prescribed in liniments and ointments.

Spirit of Rosemary. — Take of Oil of Rosemary, two drachms; Rectified Spirit, a gallon; Water, a pint. Mix; then, by a gentle fire, let a gallon distil.

Distillation is here superfluous, for the oil may be at once dissolved in the rectified spirit; the product is a pleasant perfume, and limited to external use, as an addition to lotions and liniments. It

is a leading ingredient in Hungary water, and in most of the compounds called vulnerary or arquebusade waters. *Hungary water*, as it is generally sold, is a mixture of the spirits of lavender and rosemary, but the following is the genuine recipe:—

Take of fresh Rosemary, in blossom, four pounds; Fresh Sage, eight ounces; Ginger Root, two ounces. Cut, bruise, and pour upon them twelve pints of rectified spirit, and two pints of water. Distil, with a slow fire, eleven pints.

Eue de Cologne also contains oil of rosemary: there are several formulæ for it; among them the following:—

Take of Alcohol, one pint; Oil of Bergamot, Oil of Orange-Peel, Oil of Rosemary, of each, one drachm; Bruised Cardamom Seeds, one drachm; Orange Flower Water, one pint. Distil (from a water-bath) one pint.

RUBEFACIENTS. Stimulating applications, which irritate and redden the skin, without proceeding to the extent of vesication.

RUMEX (from *Rumex*, a spear, from the shape of its leaves). *Folia.* The leaves of the common sorrel, *Rumex acetosa.* *Cl.* 6. *Ord.* 2. Hexandria Digynia. *Nat. Ord.* Polygonaceæ.

This English perennial is common on banks and in pastures; it flowers in June.

Sorrel has a pleasant acidity, and contains binoxalate of potassa; it is an excellent article in some culinary sauces, when skilfully dressed; its medical uses are very doubtful; it is, however, represented as refrigerant and diuretic. The expressed juice of the leaves, diluted with water, or made into whey, affords a useful drink in cases of inflammatory fever; and eating them daily as a salad may prove serviceable in some cutaneous affections.

RUTA (from ῥυω, *I preserve:* from its medicinal powers). *Folia.* Rue. The leaves of *Ruta graveolens.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Rutaceæ.

Rue is a native of the South of Europe: and is cultivated in our gardens.

The nauseous, but strong and penetrating odour of rue, places it among the antihysterics, and it is described as antispasmodic and emmenagogue, but it is of uncertain and unimportant efficacy. According to Cartheuser, 320 pounds of rue afford one pound of essential oil.

This *Confection of Rue* is the old *Electuarium e Baccis Lauri.* It is only used in the form of enema, for which, from half a drachm to a drachm is dissolved in half a pint of gruel, and administered in cases of flatulent colic, and occasionally in some of the convulsive affections of infants. Rue in infusion has obtained some reputation in domestic practice as an anthelmintic.

SABADILLA (or *Cevadilla;* from *Ceveda*, a Spanish word. *Semina.* The seeds of the *Helonas officinalis.* (*Asagræa officinalis*, Lindley. Spike-flowered Asagræa.) *Cl.* 23. *Ord.* 1. Polygamia Monœcia. *Nat. Ord.* Melanthaceæ.

This is a bulbous plant, and a native of Mexico. It was ascertained by Messrs. Schiede and Deppe to produce at least part of the *Sabadilla-seeds* of the shops, the use of which has become so

general for the manufacture of veratria. Their taste is bitter, acrid, and permanent.

Analysis of sabadilla gives, with other common principles, *sabadillin* (veratria) and cevadic acid. Sabadilla has been employed internally as an anthelmintic in both tape and thread worm. The tincture, rubbed on the skin, causes a stinging sensation, similar to that produced by veratria. After its use for some days a slight eruption appears on the skin. Rubbed over the cardiac region, it, in some instances, reduces the frequency and force of the pulse in a marked degree. The alcoholic extract has nearly the same effects, when taken internally as veratria. It also induces sensations of heat and tingling on the surface of the skin, and sometimes acts as a diuretic. Dr. Turnbull (*on the Medicinal Properties of the Ranunculaceæ*, in Bell's Select Med. Library, 1839) has given the extract with benefit in painful rheumatic and neuralgic affections. Though it is applicable in all the maladies for which veratria has been recommended, it is rarely administered by the mouth. The tincture has been used as a rubefacient in chronic rheumatism, and, rubbed over the heart, in some cases of nervous palpitation.

It may, in fact, be employed as a cheap though convenient substitute for the tincture of veratria.

Of the powder (*Pulvis Sabadillæ*) the *dose* for an adult is from *two* to *six grains*, gradually increased. In one case of tape-worm, half a drachm was taken daily for fourteen days.

The saturated tincture (*Tinctura Sabadillæ*) is made, according to Turnbull, of Sabadilla seeds, freed from their capsules and bruised, any quantity; Rectified Spirit, *as much as will cover them*. Digest for ten days. Used as a rubefacient liniment in chronic rheumatism and paralysis. It is rubbed over the breast in nervous palpitation. The *extract* is made by evaporating the saturated tincture with a very gentle heat to a proper consistence. *Dose*, *one-sixth* of a grain, gradually increased. It is given in the form of pill in rheumatic and neuralgic cases.

Veratria. This alkaloid is obtained from the seeds of the sabadilla. A pound of the seeds furnishes about a drachm of the impure veratria, or that of commerce. It is contained, also, in the roots of the *Veratrum album*, and in other species. It is, when pure, in the form of a white powder, of a pungent, but not bitter taste, fusible below 212°, and concreting as it cools into a translucent yellow mass. Boiling water only dissolves about one-thousandth of its weight of veratria, but it is readily soluble in alcohol, and somewhat less so (contrary to the statement in the above note) in ether (Pelletier *et* Caventou, *Ann. de Chim. et Phys.* xiv. 76). It restores reddened litmus to blue, and neutralises the acids; its salts, with the exception of the supersulphate and hydrochlorate, are stated to be uncrystallisable.

Medical Uses of Veratria.—This alkaloid is a powerful topical stimulant, and a most energetic sternutatory; its use has hitherto been almost entirely limited to external application in neuralgia,

subacute rheumatism, and gout, and some other painful affections, and in some forms of paralysis. The following ointment and liniment have been used in such cases:—

1. ℞ Veratriæ ℈j. tere cum Olivæ Olei ʒj. et adde Unguenti Cetacei ʒvij. Misce.

2. ℞ Veratriæ grana viij.; Solve in Alcohol, Linimenti Saponis, āā fʒss. Pro linimento.

The frictions are to be continued until the heat and tingling caused by the veratria are very sensibly felt. Veratria is given in a dose of *one-twelfth of a grain*, by Turnbull, as follows: — ℞. Veratria gr. i.; Extract hyosciam., Pulv. Glycyrrhiz. āā gr. xii. M. ft. pil. xii. Sumat æger pil. i. omni tertia horâ.

These applications, however, require caution in their use. One-twelfth of a grain has excited vomiting and purging. Injected into a vein, also in very small quantity, Andral found it to cause death by tetanus, without any symptoms of local irritation (*see* Veratrum).

SABINA. Savine. *Cacumina recentia et exsiccata.* The fresh and the dried tops of the *Juniperus Sabina*. *Cl.* 22. *Ord.* 13. Diœcia Monadelphia. *Nat. Ord.* Coniferæ, or Pinaceæ.

This plant is a native of the midland parts of Europe: it is cultivated as an ornamental shrub in some other countries.

The odour of savine is strong and peculiar, its taste acrid and bitter; its active qualities appear chiefly to reside in an essential oil, of which it affords a considerable relative quantity on distillation, but which has not, we believe, been chemically examined. Savine is a powerful uterine stimulant, and is occasionally administered in amenorrhœa, though always requiring caution, lest it induce inflammatory action. There are also other disorders in which savine has been employed, such as gout and rheumatism; and it has been given as a vermifuge, in the dose of eight or ten grains of the powder twice or thrice a day. Dr. Chapman eulogizes the savine in chronic rheumatism, particularly in the cases in which there is coldness of the skin and general inertia. Dose, 12 to 15 grains three times a day, gradually increasing the quantity. The principal use, however, of savine, is as an external stimulant, especially for keeping up the discharge of vesicated surfaces. The dried leaves in powder are sometimes sprinkled upon indolent and unhealthy sores; but the *Ceratum Sabinæ* of the Pharmacopœia is the most generally useful form for the application of this remedy; it induces a purulent discharge from blistered surfaces, with less irritation than cantharides.

Cerate of Savine. — Take of Savine, bruised, a pound; Wax, half a pound; Lard, two pounds. Mix the savine with the lard and wax melted together in a water-bath; then press them through linen: the melted cerate should be rubbed in a stone mortar, previously warmed, till it cools.

SACCHARUM (*Sacchar*, Arab.). Sugar. Sacchari Fæx. Treacle. *Succus præparatus.* The prepared juice of the *Sac-*

charum officinale. *Cl.* 3. *Ord.* 2. Triandria Digynia. *Nat. Ord.* Graminaceæ.

The general properties of cane sugar are well known: in reference to its ultimate chemical constitution, it belongs to that group of organic compounds which are atomically represented by carbon + water, its ultimate elements in the *anhydrous state* being—

	Atoms.	Equivalents.	Per Cent.
Carbon	12	72	44·4
Hydrogen	10	10	6·2
Oxygen	10	80	49·4
Sugar	1	162	100·0

Dobereiner regards crystallised sugar as a compound of 6 atoms of carbon, 6 of hydrogen, and 6 of oxygen; the carbon being equally divided between the oxygen and the hydrogen, so as to constitute a *carbonate of hydrocarbon.*

As an article of the Materia Medica, sugar is chiefly employed to cover the taste of nauseous remedies, and to prevent the spontaneous changes to which some vegetable products would be subject. It is to a certain extent nutritive, and in large quantity, aperient. It is useful in giving bulk to and subdividing some heavy powders and highly-active medicines. There are some persons with whom it disagrees, producing acidity of the stomach, and other troublesome dyspeptic symptoms; and there are cases of the relief of obstinate maladies of the stomach, by abstinence from sugar.

Melasses, or *Treacle*, which is an impure form of sugar, is sometimes used in forming powders into pill-masses.

SAFFRON, *see* Crocus.

SAGAPENUM. *Gummi-resina Ferulæ species incerta.* A gum-resin, the produce of an uncertain species of *Ferula.*

Sagapenum is imported from Smyrna and Aleppo, in masses made up of agglutinated pieces, of a pale and dark brown colour. It has a warm and alliaceous flavour, resembling weak assafœtida.

The medical properties of sagapenum resemble those of the other fetid gums, and it is generally administered in combination with them; upon the whole, however, it is an unimportant article of the Materia Medica. From five to ten grains are given in the form of pills, or as an adjunct to emmenagogues and antispasmodics. It enters into the composition of the compound galbanum pills, and the confection of rue; and is conjoined with aloes in the following formula:—

Compound Pills of Sagapenum. — Take of Sagapenum, an ounce; Aloes, half a drachm; Syrup of Ginger, as much as may be sufficient. Pound them together till incorporated.

From four to eight grains of this pill may be given in cases of hysteria and chlorosis, and for the relief of habitual costiveness in nervous and hypochondriac habits.

SAGO. *Medullæ Fœcula.* The starch of the pith of the

Sagus Rumphii. *Cl.* 21. *Ord.* 6. Monœcia Hexandria. *Nat. Ord.* Palmaceæ.

Sago is the produce of several varieties of palm; it is prepared from the soft cellular substance of the trunk, which is blended with water, and the starchy deposit is granulated and dried. It has the leading chemical characters of starch, but has no claim to a place in the Materia Medica, being used exclusively as a light and agreeable farinaceous food. The palest sago, provided it is free from mustiness, is that which is preferred in trade.

SALICIN. *Willow Bark* has long been used as a febrifuge tonic, and frequently as a substitute for cinchona. It contains a crystallisable principle, *Salicin*, which is a valuable bitter, and may occasionally be employed as a substitute for sulphate of quinia. It exists in some willow bark to the extent of five *per cent.*

Salicin is soluble in about twenty parts of cold water; boiling water dissolves it abundantly. It has a bitter flavour; but it does not neutralise or combine with acids; in fact, it contains no nitrogen, and is therefore not an alkaloid.

When concentrated sulphuric acid is added to a very dilute solution of salicin, it gives it a deep orange colour; this has been proposed as a delicate test of the presence of salicin.

Further experiments are wanting to establish the merits of this remedy as a febrifuge, although it has the recommendation of Dr. Cullen in its favour. Dr. Atkinson, in an essay on the subject, relates sixteen cases of disease in which the infusion of the bark (of the *Salix latifolia*) was productive of the best effects. A strong decoction of willow bark, with some aromatic adjunct, forms a cheap and useful tonic, as in the following formula: —

℞ Cort. Salicis contus. ℥iij.; Aquæ, oct. ij. decoque ad octarium j. et cola.

℞ Colati liquoris f℥vij.; Aquæ Cinnam. f℥vj.; Syrupi Aurantii f℥ij. M. sumat quartam partem ter die.

SALIX. Willow.

Several native species of this very extensive genus have been advantageously introduced into medical use. The one indicated by the U. S. Pharmacopœia, the *Salix alba*, has a bark which is extremely bitter, and possesses considerable astringency. It yields its active properties to water, with which it forms a reddish-brown decoction. Pelletier and Caventou found, among its ingredients, tannin, resin, a yellow colouring matter, gum, and an acid. The proportion of the tannin is so considerable that the bark has been used for tanning leather. A crystallisable principle has been obtained from it which is called *salicin*. When pure, it is in white, shining, slender crystals, very bitter to the taste, with the peculiar flavour of the bark. It is soluble in cold water, much more so in boiling water, soluble in alcohol, and insoluble in ether and the oil of turpentine.

The bark of the willow has been employed as a substitute for

Peruvian bark, especially in intermittent fever; it is susceptible of the same modes of exhibition with this latter. Of late years, the salicin has acquired considerable reputation in the cure of periodical fevers; but after making due allowances for the fervor of its admirers, we cannot regard it as rivalling in this respect the quinia and its salts. The doses of salicin is from two to eight grains, to be so repeated that from twenty to forty grains may be taken daily, or in the interval between the paroxysms of an intermittent. Externally, decoction of the willow bark has been found useful as an external application in old ulcers.

SAMBUCUS. *Flores.* Elder flowers. The flowers of the *Sambucus niger.* *Cl.* 5. *Ord.* 3. Pentandria Trigynia. *Nat. Ord.* Caprifoliaceæ.

The elder is a common indigenous tree in England, covered by rough gray bark.

Water distilled from elder flowers acquires their peculiar odour, and is used as a vehicle for various cosmetic and ophthalmic applications. The *Unguentum Sambuci* is lard similarly scented; but no efficacy is in either case derived from the elder flowers. A jam or rob of elder-berries was formerly much esteemed as a diuretic laxative, and was used as a common domestic remedy for the cure of gravel.

The bark of the elder tree is said to be a hydragogue purgative, and emetic in large doses. It has been given in dropsy, and as an alterative in some cutaneous affections. The decoction, made by boiling an ounce of the bark in sixteen ounces of water down to ten, is the best form for its exhibition; of this, a fourth part may be taken two or three times a day.

In distilling elder-flowers, a butyraceous oil passes over along with the water, which is needlessly included among the *distilled oils* of the Pharmacopœia.

The Ointment of Elder is used for the same purposes as the *Unguentum Cetacei*, over which it possesses no advantage but a pleasant smell.

SANGUINARIA CANADENSIS. *Radix.* Blood-Root. *Cl.* 13. *Ord.* 1. *Nat. Ord.* Papaveraceæ.

The blood-root, or, as it is sometimes called, *puccoon*, is an herbaceous perennial plant. The root is horizontal, abrupt, often contorted, about as thick as the finger, two or three inches long, fleshy, of a reddish-brown colour on the outside, and brighter red within. When broken, it emits a bright vermillion or orange-coloured juice. This plant grows abundantly throughout the whole United States, preferring rich loose soils and shady situations, and flowering in March and April. All parts are active, but the root alone is officinal. The latter has a faint narcotic odour, and a bitterish, very acrid taste; the pungency of which remains long in the mouth and fauces. It yields its virtues to water and alcohol. Its medicinal virtues are rapidly diminished by time.

The late Dr. Dana, continues Dr. Wood (*U. S. Disp.*), obtained from it a peculiar alkaline principle which he denominated *sanguinaria*, upon which the acrimony, and perhaps the medical virtues of the root depend. Sanguinaria, obtained by the process indicated by Dr. Dana, (*Ann. Lyc. of Nat. Hist.*, New York, II., 250) is a white pearly substance, of an acrid taste, very sparingly soluble in water, soluble in ether, and very soluble in alcohol. With the acids it forms salts, soluble in water, all of which have some shade of red, crimson, or scarlet, and form beautiful red solutions. They are acrid and pungent to the taste, particularly the muriate and acetate.

The sanguinaria may be regarded as an acrid narcotic, causing vomiting. When given in smaller doses, so as to excite nausea, and repeated at frequent intervals, it lessens the frequency of the pulse in a manner somewhat analogous to the operation of digitalis. This, however, is a secondary effect; its first being an acceleration of the action of the heart. It has been given in catarrh, typhoid pneumonia, croup, rheumatism, and other diseases in which the secretors are to be moderately stimulated. The *dose*, as an emetic, is from *ten to twenty grains*, given in powder or pill: the latter is preferable on account of the great irritation of the throat produced by the powder when swallowed. For other purposes the dose is from *one to five grains*, repeated at intervals, according to the effect desired. Sometimes an infusion or decoction is given, in the proportion of half an ounce to the pint. The emetic dose of this preparation is from half a fluid ounce to a fluid ounce. The tincture is officinal. An infusion in vinegar has been employed advantageously as a local application in obstinate cutaneous affections. — (*U. S. Disp.*)

SAPO. Soap. *Sapo ex olivæ oleo et sodâ confectus.* Soap made of olive oil and soda. *Sapo mollis ex olivæ oleo et potassâ confectus.* Soft soap made of olive oil and potassa.

Hard soap, proper for pharmaceutical purposes, is made with soda and vegetable oil, generally olive oil. The white soap, usually called *Castile soap*, is that which is preferred; it should be nearly inodorous, and of a bland alkaline taste; not greasy, or efflorescent. It forms an opalescent solution in distilled water, and is perfectly soluble in alcohol, forming a solution which gelatinises if it be sufficiently concentrated. Soap is decomposed by the acids, and by acidulous and earthy salts; it is this reaction which causes soap to become milky, and often to form insoluble compounds when used with *hard water*, and the purity of water and its fitness for washing and general domestic purposes, may be well judged of by the alcoholic test, which produces a degree of turbidness proportionate to the saline impurities (see page 65.)

Soap is used internally as a remedy for uric gravel, and in large doses is said to prove singularly effectual; but it is extremely apt to impair the digestive powers of the stomach, and lay the founda-

tion of obstinate dyspepsia. Soap is a proper addition to pills which are intended to be kept for any time; it prevents their induration, and renders them more soluble in the stomach; it also modifies the efficacy of some of the purgatives, probably by increasing the solubility of their active parts. Soap is a good addition to spirituous liniments; it renders them less rapidly vaporisable, and better adapted for friction upon the part affected.

Soap is decomposed by several vegetable decoctions and infusions; being almost always at hand, it is occasionally useful as an antidote to some poisons, such as metallic salts and acids; in these cases a teacupful of a strong solution of soap in warm water should be swallowed as soon as possible; if it produce vomiting, the dose should be repeated. Added to plasters, soap prevents their induration.

Soap, scraped into thin shavings, and dried by a gentle heat, may be reduced to powder, and is used in this state as an ingredient in cleansing hand-powders; such, for instance, is the *Pulvis Saponis mundificans* of the *Pharmacopœia Batava*, composed of 12 ounces of finely-powdered Spanish soap, 2 ounces of effloresced carbonate of soda, 3 ounces of powdered orris root, 2 pounds of fine almond meal, and of the essential oils of lemons, lavender, and bergamot, each 40 drops, with 10 drops of oil of cloves.

The common soaps are compounds of stearic, margaric, and oleic acids, with alkaline bases (see *Manual of Chemistry*).

Soft soap is made with potassa instead of soda. Common soft soap, made with potash-ley and tallow, is an excellent detergent for the destruction of vermin.

The following are the principal formulæ of the London Pharmacopœia in which soap is concerned: —

Compound Soap Pills. — Take of hard Opium, in powder, half an ounce; Soap, two ounces. Pound them together till incorporated.

Five grains of this pill contain one grain of opium; it is a useful formula, especially when it is wished that the word *opium* should not appear in the prescription.

Soap Cerate. — Take of Soap, ten ounces; Wax, twelve ounces and a half; Oxide of Lead, in powder, fifteen ounces; Olive Oil, a pint; Vinegar, a gallon. Boil the vinegar with the oxide of lead over a slow fire, assiduously stirring them till they unite; then add the soap, and again boil in the same manner till all the moisture is evaporated; lastly, with these mix the wax previously dissolved in the oil.

This cerate will sometimes soothe and allay irritation, when other forms of lead fail, so that it is not unfrequently used as a cooling dressing.

Plaster of Soap. — Take of Soap, sliced, half a pound; Lead Plaster, three pounds. Add the soap to the melted plaster, then boil down to a proper consistence.

This is a useful plaster when others irritate, and, with the addi-

tion of a little resin, forms a mild adhesive plaster. It is one of the best corn plasters.

Linimentum Saponis, *see* Camphora, p. 112.

SARZA. *Radix.* Sarsaparilla. (*Spanish*, from *Zarza*, a bush; and *Parilla*, a little vine.) The root of the *Smilax officinalis*. *Cl.* 22. *Ord.* 6. Diœcia Hexandria. *Nat. Ord.* Smilaceæ.

The root commonly known under the name of Sarsaparilla (corrupted, probably for the sake of brevity, in the present Pharmacopœia, into *Sarza*), is apparently obtained from several species of *Smilax*. The variety which is most esteemed is said to be the produce of the *Smilax officinalis* (of Humboldt and Bonpland), which grows upon the banks of the river Magdalene, near Bojorque, in South America. It is called *sarsaparilla* by the natives of the district, who send it in large quantities to Carthagena and Mompox, whence it is shipped for Jamaica and Cadiz: it is that variety of the root which is known in our market under the name of *Jamaica sarsaparilla*.

This variety (or *red sarsaparilla*) is made up into small bundles, not trimmed or closely packed, and tolerably free from impurities; when opened out, it presents long slender runners, issuing from a common root, and more or less abundant in small fibres; it has a deep reddish-brown cuticle, and the interior has the same tint. When chewed, it tinges the saliva, is not particularly mucilaginous, and after a while tastes bitterish, with a slight and peculiar acrimony; it affords a pale-brown powder. It yields a larger quantity of extractive and less amylaceous matter than the other varieties.

Honduras Sarsaparilla (*mealy sarsaparilla*) is probably the produce of the *Smilax syphilitica* of Willdenow. Honduras sarsaparilla is imported from the bay of Honduras; it is found in the drug-market in larger bundles than the former; it is exteriorly of a dirty or grayish-brown, and exhibits a white amylaceous interior, surrounding the central fibre; it is readily torn or divided longitudinally, and is the kind of sarsaparilla which is usually seen in druggists' shops, cut into small split lengths. It has less taste than the former, but when long chewed, the same distinctive flavour is perceptible. The bundles are usually so made up as to exhibit a fair exterior, and large and fine lengths are generally rolled transversely round them. When opened out, the root is smaller within, and often black, damaged, or decayed; stones or clumps of wood are often wrapped up in the centre.

Lisbon Sarsaparilla.—The sarsaparilla which is found in the drug-market under this name, is made up into neat cylindrical bundles, generally smoothed or cut at the ends, and about a yard in length and ten inches in diameter. It is not in much estimation when the preceding varieties can be procured. It is more woody, and less abundant in soluble matter. It is said to be the produce of Brazil, growing between the sources of the Orinoco and the Rio Negro; but as most of the varieties of sarsaparilla were formerly

imported through Lisbon, there are other kinds which occasionally bear this name in the market.

Lima Sarsaparilla is a variety which more resembles this *Jamaica* than any other; but it is in larger bundles, and altogether a coarser and less select article; it is in considerable demand in the London market, that which is freshest, cleanest, and most fibrous being preferred.

Vera Cruz, or Mexican Sarsaparilla, is, according to Lindley, the produce of the *Smilax medica:* it is little known in the London drug-market, and esteemed of very inferior quality.

There are several analyses, which have been published, aiming at precision, and at the discovery of what may be termed the *active principle* of sarsaparilla, but the results of these inquiries are too much at variance with each other to enable us to draw any satisfactory chemical conclusions upon the subject, and are at present wholly unimportant as regards the therapeutic agencies of this root.

In 1825, Palotta gave a process for obtaining an alkaloid which he termed *parilline*, and Thubeuf gives one for obtaining what he terms *sasseparin*. (*Journ. de Pharm.* x.)

Batka concludes that the substance described by Palotta is an acid, and calls it *parillinic acid* (*Journ. de Pharm.* xx.); and Poggiale, after examining the various results of the preceding analysis, concludes that, under different names, they have described one and the same substance. (*Journ. de Chim. et Med.* x.)

The virtues of sarsaparilla have been very differently estimated; the evidence is, however, decidedly in its favour as a valuable *alterative* remedy; for it has cured cutaneous eruptions, nodes, anomalous pains in the bones and joints, and other symptoms which arise in certain constitutions, and are often considered as the joint effect of mercury and of the venereal virus, though frequently independent of either: in such cases we have ample testimony in its favour. As an antidote to syphilis, for which it seems originally to have been introduced, it deserves no confidence. Mr. Pearson observes, "that its beneficial effects are often demonstrated in the treatment of foul untractable spreading sores, and in more than one form of scrofula." In some of those debilitated states of body announcing a broken constitution, sarsaparilla has been effectually prescribed. It requires to be taken in large doses, and long persevered in.

In debilitated habits, it sometimes excites profuse perspiration, an effect which may, to a certain extent, be prevented by combining with it small doses of dilute sulphuric acid, where such a remedy is not contraindicated. Sometimes it agrees best with the stomach when conjoined with small quantities of alkalis. Sometimes it acts upon the bowels; but generally none of these bad effects result from it, and in the cases alluded to it relieves pain, the patient gets comfort and sleep, and often singularly acquires flesh during its use.

Sarsaparilla is occasionally administered in the form of powder, but this unnecessarily loads the stomach with a quantity of indigestible woody fibre, so that either an *extract*, a strong *decoction*, or a *syrup*, are usually substituted.

Extract of Sarsaparilla. — Take of Sarsaparilla, cut, two pounds and a half; Boiling distilled Water, two gallons. Macerate for twenty-four hours; then boil down to a gallon, and strain the liquor while hot; lastly, boil it down to the proper consistency.

The proportion of extract afforded by sarsaparilla is very various, and samples of the root apparently resembling each other yield it in very different quantities. From twenty to thirty pounds have been obtained from one hundred-weight.

In this and all the other preparations of sarsaparilla, great attention should be paid to the selection of the root, the Jamaica sarsaparilla being certainly preferable to the other varieties. It should not be made, as it often is, of the chumps, and inferior bundles of the root which are rejected in garbling it for sale; and great care should be taken not to injure it by excess of heat during evaporation, which should always be performed by a steam-heat very little above 212°. It is no doubt a convenient and portable form of sarsaparilla, but other preparations are more certain, and, among them, what has been termed a *liquid extract*, consisting of the decoction of sarsaparilla, so far concentrated by boiling down, that a fluid ounce contains an ounce weight of the dry extract. This, when carefully and honestly prepared, is an excellent form of the remedy, and one which will seldom disappoint the practitioner. The addition of a few cloves, allspice, or a little orange-peel is sometimes thought to improve its flavour. The dose of the extract is from two to three or four drachms twice a day; and of the above liquid extract, the same quantity in fluid measure. It may be diluted with a wineglassful of water.

It is stated in the *London Dispensatory*, "that it appears by Mr. Pope's experiments, that by submitting the root, cut transversely, to the action of steam, or of distilled water, at a temperature somewhat below boiling, an elegant soluble extract may be obtained, containing all the virtues of the plant, not liable to decomposition, and applicable to the various purposes of extemporaneous prescription, whilst, by the method ordered in the formula of the London College, an insoluble inefficacious extract only is obtained." The extract is certainly sometimes injured by heat, and otherwise carelessly prepared, but it by no means necessarily follows that by adopting the usual method, the extract should either be insoluble or without efficacy.

Decoction of Sarsaparilla. — Take of Sarsaparilla, sliced, five ounces; Boiling distilled Water, four pints. Macerate for four hours in a lightly-covered vessel near the fire; then take out, and bruise the sarsaparilla. When bruised, return it to the liquor, and again macerate in the same manner for two hours; afterwards boil down to two pints, and strain.

Nothing is gained by the troublesome macerations and bruisings.

It will be quite enough that the root should be well beaten and bruised, or crushed, before it is subjected to boiling, and then it easily yields the whole of its active and soluble matter. But for a course of sarsaparilla some of the following preparations are preferable : —

Compound Decoction of Sarsaparilla. — Take of boiling Decoction of Sarsaparilla, four pints ; Sassafras, sliced, Guaiacum Wood, rasped, Liquorice Root, bruised, of each, ten drachms ; Mezereum, three drachms. Boil for a quarter of an hour, and strain.

The celebrated *Lisbon Diet-drink* was a similar preparation.

By Fermentation. — Dr. Hancock (*Med. Bot. Transact.*), recommends the Sarza root, in the proportion of ℔ii. to be bruised and fermented with Guaiacum bark, Anise seed and liquorice root, each ℥iv.; Mezereum (bark of the root) ℥ij.; Brown Sugar or Melasses ℔ij and a little yeast to hasten fermentation : on these ingredients pour boiling water, four gallons ; and let the mixture stand for a few days in the sun or equivalent heat, stirring it occasionally until fermentation is produced. It is then fit for use, and may be taken in doses of a cupful twice or thrice a day, gradually increasing the quantity until some effect is perceived. It usually increases perspiration and augments the alvine and urinary discharges.

By the addition of Acids. Another method recommended by Dr. Hancock for extracting the active properties of this, as well as of vegetable remedies in general : it is to infuse the bruised roots in boiling water, adding a little spirit and muriatic or sulphuric acid, and press them ; repeating the infusion in boiling water, and again pressing out the liquor. "A quart of this preparation will have more effect than gallons of the decoction prepared by the direction of the Pharmacopœias."

The dose in which these decoctions are usually given is from four ounces to a pint or more daily. They have been prescribed in chronic rheumatism ; in obstinate cutaneous eruptions ; in indolent ulcers ; in glandular affections ; in diseases of the periosteum and bone attended by obscure pains, wasting of the flesh, tenderness of the part, tumours and nodes ; and in that state of the habit known among medical men under the term *cachexia*, but which it is not easy to define : in such cases, sarsaparilla, as has been above remarked, often proves a valuable remedy, and sometimes effects a cure when other alteratives have long been administered in vain, and where the diseased state of the system has been of many years' duration. It may be well to repeat, that to insure success, attention must be paid to the quality of the sarsaparilla, and to its preparation, and it must be taken in large doses, and for a long time ; hence the advantage of the concentrated decoctions, of solution of extract in decoction, of a concentrated syrup, and other analagous forms. Inattention to the quality of the drug, administering it in insufficient quantity, and want of perseverance in its use, are the sources of those opinions of its inefficacy which we often hear quoted. In the after-treatment of syphilis, and in cases where mercury has unkindly affected the system, and in pseudo-syphilis, sarsaparilla possesses restorative powers not hitherto observed in any other article of the Materia Medica.

Syrup of Sarsaparilla. — The following is the formula of the U. S., the London, and the Dublin Pharmacopœiæ: — Take of Sarsaparilla, bruised, two pounds; Guaiacum Wood, rasped, three ounces; Red Roses, Senna, Liquorice Root, bruised, each two ounces; Oil of Sassafras, Oil of Anise, each five minims; Oil of Partridge-berry, three minims; Sugar, (refined), eight pounds; Diluted Alcohol, ten pints. Macerate the sarsaparilla, guaiacum wood, roses, senna and liquorice root in the diluted alcohol, for fourteen days, then expose, and filter through paper. Evaporate the tincture, by means of a water-bath, to four pints and a half; then add the Sugar, and dissolve it so as to form a syrup. With this, when cold, mix the oils previously triturated with a small quantity of the syrup. *Dose, half a fluid ounce,* which is thought to be equivalent to nearly a drachm of the root.

The sugar is apt to disagree with some stomachs, which is sometimes prevented by adding five to ten drops of solution of potassa to each dose.

SASSAFRAS. *Radix.* The root of the *Laurus Sassafras. Cl.* 9. *Ord.* 1. Enneandria Monogynia. *Nat. Ord.* Lauraceæ. (*Sassafras officinalis.* Lindley, *Flora Medica.*)

This is a small tree, native in the woods of North America from Canada to Florida. It is cultivated in Jamaica; and will bear the cold of the climate of England.

Sassafras is imported in logs with more or less of the bark upon them; they consist of the root and trunk, the wood of which is cut into shavings for medical use. It has a warm and sweetish aromatic flavour, most powerful in the bark, and yields, on distillation with water, an essential oil, the properties of which have been examined by Bonastre. (*Journ. de Pharm.* xiv.)

Oil of sassafras is heavier than water, its specific gravity being about 1·09, but when shaken with water it separates into a heavy portion which sinks, and a lighter portion which floats upon the surface. It was supposed that the lighter portion was oil of turpentine with which the oil of sassafras had been adulterated, but Bonastre has shown that this is not the case. The adulterations usually practised upon it, and the means of detecting them, are stated in his paper.

Infusions and decoctions of sassafras were formerly in high repute as antisyphilitics and lithontriptics, but have now fallen into disuse: they are diuretic and diaphoretic, and therefore alterative; they have been employed in gout, rheumatism, and cutaneous affections, and are still used in conjunction with guaiacum and sarsaparilla, but may on the whole be regarded as unimportant. The name *sassafras* implies the supposed virtues of this plant in destroying stone in the bladder (from *saxum frango.*) Sassafras tea is used as a depurative in many parts of the country in place of the common tea.

SCAMMONIUM. (A corruption of the word *Chamozah,* Arabic.) *Gummi resina.* Scammony; the gum-resin of the *Convolvulus Scammonea. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Convolvulaceæ.

This is a common plant in Greece and the Levant. The root of this plant furnishes, by incision, a milky juice, which concretes into the *scammony* of commerce, a substance chiefly imported from

Aleppo. The mode of collecting it is described by Dr. Russell. (*Hist. of Aleppo.*) The ground is cleared away from the root, the top of which is cut off in a sloping direction, and the milky juice which flows is collected in a shell, each root yielding only a few drachms, which run off in the course of twelve hours. The juice of several roots is put together, and it soon hardens, forming *genuine scammony*. The Jews purchase it while soft, and mix it with the expressed juice of the stalks and leaves, flour, ashes, sand, and whatever else that answers the purpose.

Scammony occurs in various states of purity ; and an extremely inferior and evidently adulterated article is brought from Smyrna in cakes, said to be the produce of a species of *Secamone*, and occasionally of the *Cynanchum Monspeliacum*, or *Montpellier scammony*.

Aleppo scammony comes into the market in packages called *drums*, weighing about 100 pounds each : it is massive, or more or less porous, of a dark olive colour externally, and, when broken, exhibiting in some parts of its interior a gray or greenish-brown tint and a softer texture. It has a peculiar caseous odour, which should be strong and fresh, and it should *lactify*, or easily rub into a milky mixture with water. Those drums which are very soft in the interior, of a pale or dirty-green colour, of fetid or nauseous odour, or those which are black or inodorous, and which do not become superficially milky when wetted and rubbed, and are very heavy, are of doubtful purity. It is said that a factitious article, composed of jalap, senna, manna, gamboge, and ivory black, is sometimes sold for scammony. The colour of *good scammony* in powder is light greenish-gray, with a tint of green, and when rubbed up with water it forms a pale greenish-gray emulsion, without deposit, and strongly smelling of the drug.

From the quantity of insoluble residue afforded by the analyses of Bouillon, Lagrange, and Vogel, it is obvious that a very impure article must have been examined ; the fact is, that at present scammony may be had of all degrees of purity, containing, that is, from 4 or 5 up to 80 or 85 *per cent.* of foreign matter, and at all prices between fourteen and thirty-two shillings per pound: the cheaper varieties, amongst other impurities, usually contain so large a quantity of carbonate of lime, as to effervesce with a diluted acid like a piece of lime-stone ; they are not intrinsically worth half-a-crown a pound, and are said to be manufactured expressly for the English market, the most celebrated in the world for the consumption of *cheap* and consequently spurious drugs.

The *resin* of genuine scammony is very soluble in alcohol ; that from Aleppo scammony is paler coloured than the resin of Smyrna scammony, and may be rendered perfectly colourless by animal charcoal, without detriment to its purgative qualities.

Scammony is a very useful drastic purge in conjunction with others of the same class, being rarely given alone, in consequence of its uncertain operation and tendency to gripe. It enters into

several of the compound purgatives of the Pharmacopœia, and is a good auxiliary to calomel, especially for cleansing the bowels of children, when loaded, as they sometimes are, with viscid mucus. For this purpose, the old *Pulvis Basilicus*, composed of equal parts of calomel, scammony, and jalap, is an effective mixture; but it will not always remain upon the stomach. The average dose of scammony is from five to fifteen grains. Its activity resides in its resinous part; the residue is inert. In some old Pharmacopœiæ, a variety of methods of correcting the acrimony of scammony are described, and to such preparations they gave the name of *diagrydia*. According to Planche (*Journ. de Pharm.* XVIII. 184) milk is an excellent vehicle for the resin of scammony; when triturated with it, it forms a permanent emulsion: he conjoins it with very small doses of hydrocyanic acid, as in the following purgative mixture:—

Take of Resin of Scammony decoloured by animal charcoal, eight grains; Milk, either hot or cold, three ounces; Sugar, two drachms; Laurel Water, four drops. Triturate them together.

The following officinal formula of scammony is directed in the *London Pharmacopœia*:—

Compound Powder of Scammony. — Take of Scammony, Hard Extract of Jalap, of each, two ounces; Ginger, half an ounce. Rub them separately into a very fine powder; then mix them.

This is a good purge, the activity of the scammony being aided by the jalap, and corrected by the ginger. The dose is from eight to fifteen or twenty grains.

SCILLA. *Bulbus recens.* Squill. The fresh bulb of the *Scilla maritima*. *Cl.* 6. *Ord.* 1. Hexandria Monogynia. *Nat. Ord.* Liliaceæ.

The squill is a native of Spain, Portugal, Sicily, and the Levant, growing in sandy places, and generally near the sea.

The bulbs are imported from the Levant, packed in wet sand; they have a nauseously bitter and very acrid flavour, and are generally cut into slices, and dried for pharmaceutical use; an operation which ought not to be performed at a temperature exceeding 212°. The peculiarities of squill have been referred to a distinct bitter principle, called by Vogel *scillitin*, which constitutes 45 *per cent.* of the whole.

The *red* and the *white* squill, are both met with in the drug market; they do not differ essentially in composition: the latter is, however, generally preferred, and if purchased in the dry state, should be free from mouldiness, and of a pale buff tint. "The dry outer scales of the bulb, and the young and tender interior ones, are inert, or nearly so, and should be rejected; the intermediate scales are, for obvious physiological reasons, the part in which the energy of the plant principally resides." — (*Lindley.*)

Squill is an important article of the Materia Medica; when administered in large doses, it is purgative and emetic; but it is chiefly employed in smaller doses as an expectorant and diuretic,

in conjunction with other remedies. From half a grain to a grain of powdered squill, with three grains of ammoniacum, may be given every six hours to increase and facilitate expectoration; in some cases it may properly be conjoined with the fetid gum-resins; in others, where there is heat and febrile tendency, it may be given with antimonials and saline remedies. Conjoined with demulcents, and occasionally with ipecacuanha, the tincture of squill relieves the troublesome irritation of common coughs and hoarseness. With nitre and calomel it has enjoyed much reputation in the treatment of hydrothorax.

As a diuretic, squill is combined with calomel, digitalis, opium, and other adjuncts; but in cases attended by any degree of active inflammation, it should scarcely be administered, unless accompanied by aperients and diaphoretics, and occasionally by venesection.

As an emetic, squill is seldom resorted to except in the chronic coughs of old persons, and occasionally where the bronchiæ are loaded with viscid mucus: in such cases, half an ounce of the oxymel in two ounces of warm water is sometimes successfully resorted to. "Squill," Dr. Thomson says, "is a very uncertain emetic, a very small dose producing the most cruel vomiting in some persons, while in others the largest doses do not even excite nausea: where, however, it readily and moderately induces vomiting, it proves more useful in hooping-cough and croup than any other emetic."

In large doses, squill has the properties of a narcotico-acrid poison. It produces vomiting, diarrhœa, bloody urine, and ultimately narcotic symptoms. "Lange mentions an instance of a woman who died from taking a spoonful of the root in powder to cure tympanitis. She was immediately seized with violent pain in the stomach, and in a short time expired in convulsions. The stomach was found everywhere inflamed and in some places eroded. Twenty-four grains of the powder have proved fatal. I have seen a quarter of an ounce of the syrup of squills, which is a common medicinal dose, cause severe vomiting, purging, and pain."—(Christison, *On Poisons*, Chap. xxxvi.)

These statements are sufficient to point out the caution with which full doses of squill should be given, especially in delicate habits.

The officinal formulæ of squill are the following:—

Tincture of Squill. — Take of Squill, recently dried, five ounces; Proof Spirit, two pints. Macerate for fourteen days, and filter.

Of this useful form of squill, from twenty to thirty minims in ten or twelve drachms of liquid is considered as a full dose for an adult, and as about equivalent to a grain of the powdered squill. The tincture varies considerably in colour according as it is prepared with the pale or red squill. The common saline draught, or almond mixture, or ammoniacum mixture, are good vehicles for this remedy.

Vinegar of Squill. — Take of Squill recently dried, fifteen ounces; Distilled Vinegar, six pints; Proof Spirit, half a pint. Macerate the squill with the vinegar in a gentle heat, in a closed glass vessel, for twenty-four hours; then press it out and set by, that the dregs may subside; lastly, add the spirit to the clear liquor.

This preparation is apt to become turbid by keeping, and has nothing to recommend it in preference to the tincture. The dose is from half a drachm to two drachms, in any vehicle with which vinegar is not incompatible.

Oxymel of Squill. — Take of Honey, three pounds; Vinegar of Squill, a pint and a half. Boil down in a glass vessel, with a slow fire, to the proper consistence.

From half a drachm to two drachms of this oxymel may be given as an expectorant, or half an ounce as an emetic, in cases where such a remedy is wanted. The evaporation required to reduce it to a due consistency is objectionable, and it should be prepared with an acetic solution of squill strong enough, when mixed with the despumated honey heated in a water-bath, to form a compound of proper consistency.

A mixture of equal parts of this oxymel and syrup of poppy, is a valuable sedative expectorant when taken in small and often-repeated doses, and when gently swallowed in an undiluted state it allays the irritation of catarrhal cough and hoarseness.

Compound Pills of Squill. — Take of Squill, recently dried and powdered, a drachm; Ginger, in powder, Ammoniacum, in powder, of each two drachms; Soap, three drachms; Syrup, as much as may be sufficient. Mix the powders with each other, then pound them with the soap and add the syrup, that a proper consistence may be obtained.

These pills are expectorant and diuretic, but when given with either object, they require adjuncts, and the ginger is sometimes objectionable. It is generally supposed that the efficacy of squill is injured by keeping, whence, probably, the Pharmacopœia always directs it to be recently dried: if so, a pill-mass is a bad formula; it is, perhaps, always advisable to recur to extemporaneous prescription, where squill is employed, more especially as it usually requires to be combined with ipecacuanha, calomel, digitalis, emetic tartar, or some other active remedy. From three or four to ten or twelve grains of the above pill twice or thrice a day is used as a warm expectorant.

SCOPARIUS. Broom. *Cacumina recentia.* The fresh tops of the *Cytisus Scoparius.* *Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Fabaceæ or Leguminosæ.

The common broom is met with in dry sandy thickets, hedges, and fields in England, and is cultivated in our gardens. It flowers in May and June. It is a large bushy shrub, with long, straight, angular, smooth, dark-green branches; the leaves are deciduous, ternate, small and smooth, the upper ones generally simple. The legumes are large, containing fifteen or sixteen seeds. *Sal Genistæ*, or *salt of broom* is obtained by burning the whole plant: it contains a large proportion of carbonate of potassa.

The physiological effects of this plant on animals are similar to

those on man. Withering says that it prevents the disease called rot in sheep, and is salutary in dropsy, to which sheep are liable. According to Loudon, it is apt to produce disease of the urinary organs, to prevent which, a plentiful use of water is recommended. On man, it operates in large doses as an emetic and purgative. In smaller doses it is diuretic and mildly laxative. As a diuretic, broom-tops have been celebrated by Mead and Cullen. The latter found it in use among the common people, and, from his own experience, inserted it in his catalogue. He prescribed it to some of his patients in the following manner: — Half an ounce of fresh broom-tops to be boiled in a pound of water till one-half of this is consumed; and of this decoction he directed two table-spoonsful every hour, till it operated by stool and urine; "and by repeating this exhibition every day, or every second day, some dropsies have been cured." Mr. Pereira adds to this statement his own testimony of the beneficial effects of this remedy as a diuretic. "I cannot," he says, "call to mind a single case in which it has failed to act on the kidneys. In some cases, it produced a most marked and beneficial effect on the dropsical effusion. According to my experience, it is more certain than any other diuretic in dropsies. Dr. Pearson (*Observ. on Broom-seed*, 1835) terms broom a *tonico-diuretic;* and says it improves the appetite and invigorates the whole system." Experience at home might be cited of a like favourable character, to show the diuretic powers of the broom. I have seen it operate actively in this way in anasarca after various approved diuretics had been used in vain.

Broom-tops are usually given in the form of *infusion* or *decoction*. The *seeds*, which keep much better than the tops, and on that account have an advantage over the latter, may be used in the form of powder, in doses of grs. x. to xv. in mint-water or cold ginger tea. To promote the operation of broom, diluents should be freely given. The seeds are, however, sometimes emetic, and are said to contain some *cytisin*, and to partake of the poisonous qualities of the laburnum seed. Broom tea (*infusum scoparii*) is made by adding to scoparium ʒi. distilled water Oj. Macerate for four hours in a lightly covered vessel and strain. A *decoction* is to be preferred to the infusion. Dose, as a diuretic in dropsy, fʒi. to fʒij. The compound decoction (*decoctum scoparii compositum*) is directed to be made as follows, by the *London Pharmacopœia:* Scoparium, Juniper fruit, Dandelion, of each ʒss.; Distilled Water, Oiss. Boil down to a pint and strain. The Edinburgh College directs — Broom tops and Juniper tops of each ʒss.; Bitartrate of Potassa ʒiij.; Water Oiss. Boil them down together to a pint and then strain. Diuretic and laxative, Dose fʒi to fʒij. The Extract of the Dublin College, (*extractum spartii scoparii*) is prepared by the evaporation of the decoction of the tops. Diuretic and laxative. Employed only as a diuretic in dropsy, ʒss. to ʒi. Rarely used.

SENEGA. *Radix.* The root of the *Polygala Senega*, or

Rattle Snake root. *Cl.* 17. *Ord.* 3. Diadelphia Octandria. *Nat. Ord.* Polygalaceæ.

This plant is a North American perennial, common in the mountainous parts of the United States, and especially in Virginia and Pennsylvania, where it is known under the name of *Seneka snake root.* Its root sends up several stems about a foot high, erect, slender, round, smooth, and of a reddish colour.

Senega root is imported into England from Virginia, in bales of two or three hundred-weight. It is inodorous, pale-brown, and wrinkled; its virtues reside in the exterior cortical portion; the central woody part is inert. Its acrimony manifests itself when chewed, and it promotes a copious flow of saliva. Its infusion reddens litmus, a property depending, according to Peschier, upon the presence of a peculiar acid, which Quevenne calls polyalic.

Senega has been extolled as a powerfully-stimulant diuretic and expectorant, and in large doses it vomits and purges; it is, however, one of those numerous articles of the Materia Medica, the use of which is limited to a few individuals who think well of it, whilst it is seldom prescribed by the generality of practitioners. To promote the separation of the tracheal films of coagulum in croup, a strong decoction of senega, in the proportion of two ounces of the bruised root to a pint of water, has been usefully employed, frequently taken in small quantities into the mouth. In bronchitis after venesection, or in the chronic variety of the disease, also in bastard pneumonia, the senega is highly recommended. In amenorrhœa it is also used with advantage. As an antidote to the effects of the bite of the rattlesnake, it may possibly be useful where other stimulants are not to be had, especially in its recent state; but where ammonia, ether, brandy, and other analogous remedies, are at hand, senega goes for nothing. Senega has been highly extolled in a variety of other disorders, in lethargy, rheumatism, scrofula, asthma, as an alterative in cachectic debility, and as a powerful emmenagogue; but the high encomiums bestowed upon it are not yet borne out by practical experience.

Alcohol is the most effective solvent of the active principle of senega, but the decoction retains its acrimony, and may be used as a vehicle for small doses of the powder, and proper adjuncts. From *five to thirty grains* of the powder have been given three or four times a day, combined with aromatics, camphor, and occasionally opium, to check the nausea which it is apt to produce.

Decoction of Senega.— Take of Senega, ten drachms; Distilled Water, two pints. Boil down to one pint, and strain.

From half an ounce to an ounce of this decoction is given as a dose; it is especially commended by Dr. Ives in ascites occurring in phlegmatic habits, and unattended with febrile excitement: the following are formulæ:—

1. ℞ Decocti Senegæ f℥ss.; Decocti Scoparii compos. f℥j.; Spir. Juniper. compos., Spir. Ætheris Nitrici, āā f℥j. M. fiat haustus quartâ quâque horâ sumendus.

2. ℞ Decoct. Senegæ f℥ij.; Infus. Scoparii f℥iij.; Tinct. Scillæ f℥ss.; Syrup. Papaver. f℥iij. M fiat mistura. Sumatur tertiam partem ter die.

SENNA. *Folia.* The leaves of the *Cassia lanceolata* and *Cassia obovata.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Leguminosæ.

The senna of commerce is generally a mixture of the leaves of two or more species of *Cassia* with those of some other plants, and more especially with the leaves of Cynanchum oleæfolium or argel, Tephrosia Apollinea, and Coriaria myrtifolia: to these also the leaves of the Colutea arborescens, and even of Buxus sempervirens, are sometimes superadded.

The species of *Cassia* which yield the genuine senna of commerce are described by Dr. Lindley under the specific names *elongata* and *acutifolia:* they are annuals and natives of Upper Egypt, and of Nubia, and probably of the interior of India. The dried leaves of *C. elongata* are imported from Calcutta under the name of *East Indian senna;* it is called in the Indian bazaars, *Tinnivelly senna,* being cultivated at Tinnivelly on the Malabar coast; it is also called *Senna Mekki,* having been raised in India from Mecca senna seeds.

In the uncertainty which exists respecting the species from which the acute-leaved sennas are obtained, Dr. Lindley takes *C. elongata* as the type.

The *Cassia acutifolia* is a native of Upper Egypt and Nubia, between the Nile and the Red Sea; it furnishes the *Alexandrian senna;* the principal difference between it and the species just described consists in *the legumes being much shorter and rounder.*

The *Aleppo* and *Italian senna* is the produce of the *Cassia obovata,* found in the high and dry uncultivated lands of Mysore, Egypt, desert of Suez, Nubia, Central Africa, and Cape de Verd. It is a perennial herbaceous plant, with erect, or procumbent smooth stems; leaves equally pinnate, quite smooth, with no gland upon the petiole; leaflets four to six pair, obovate, rounded, but mucronate at the apex, unequal at the base, the uppermost gradually the largest, stipules narrowly triangular, rigid, acute, spreading. Racemes erect, rather lax, axillary, stalked, either longer or shorter than the leaves.

Of the plants with which senna are commonly or occasionally mixed, the leaves of *Tephrosia Apollinea* are obovate, and somewhat wedge-shaped; those of *Coriaria myrtifolia* ribbed; those of *Cynanchum Argel* pale greenish-yellow, very thick, and veinless.

Qualities of Senna.—The characters which should guide us in the selection and purchase of senna, are chiefly a bright fresh colour, and an agreeable smell, somewhat resembling that of tea. It should not be too largely mixed with the above-named adulterations, nor with stalks, seedpods, and other extraneous matter, nor very much broken, nor very dusty.

Senna has, when chewed, a nauseous and bitterish flavour,

peculiar to itself; boiling water dissolves about a third of the weight of the leaves, and affords a brown infusion, nauseous both in smell and taste, and liable to decomposition; it gradually deposits a yellow powder, and is precipitated by the strong acids and by oxalic acid, by the carbonated alkalis and lime-water, by nitrate of silver, by the acetates of lead, by the sulphates of iron, and by many other metallic salts. Proof spirit dissolves a large portion of senna, and forms a brown active tincture. Alcohol and ether yield green solutions.

Senna has been chemically examined by Bouillon la Grange (*Ann. de Chim.* xxxv.), and the effects of various re-agents on infusion of senna have been described by Mr. Battley (*Lond. Med. Rep.* xv. 169). According to Lassaigne and Feneulle, the activity of senna, as a purge, depends upon the presence of a peculiar vegetable principle, which they have termed *cathartine.*

The other proximate principles of senna-leaves are said to be a little colouring albuminous matter, much mucilage, a fixed and a volatile oil, malic acid and the malates of potassa and lime, chloride of potassium, the sulphates carbonates and subphosphates of potassa and of lime, silica, and lignin.

Senna is a valuable purgative remedy, but it is very rarely employed alone, from its tendency to gripe and produce spasmodic pains and flatulency: in conjunction with, and as an auxiliary to other aperients and purgatives, it is in constant use, and many such mixtures clear the bowels with speed and certainty.

Compound Infusion of Senna.—Take of Senna, fifteen drachms; Ginger, sliced, four scruples; Boiling distilled Water, a pint. Macerate for an hour in a lightly-covered vessel, and strain.

The *infusion* is the most useful and generally employed preparation of senna, and is prescribed chiefly in conjunction with saline purgatives, and with other aperients; the usual dose being from one to two ounces. The infusion of senna is rendered more agreeable, and less apt to decompose, by substituting a drachm of bruised cloves for the ginger. One of the many forms of the ordinary *black dose* has been already given (page 312); the following are analogous formulæ, and may either be used alone or as cleansers after calomel purgatives:—

℞ Potassæ Tartratis ʒj.; Infus. Sennæ compos., Aquæ Pimentæ, āā fʒvj. M. fiat haustus laxans.

℞ Infus. Sennæ fʒiv.; Magnes. Sulphatis ʒj.; Aquæ Menthæ sativ. fʒij. M. sumat cochlear. iv. mane primo et repet. post horas tres, si opus sit.

The addition of syrups to these combinations renders them to most palates more nauseous, without aiding their efficacy; half an ounce of manna is, however, occasionally added to the above mixture. A purgative which has gained some celebrity under the name of *gout cordial*, is a mixture of equal parts of the tinctures of senna, rhubarb, and aloes; it is usually sweetened with sugar candy.

Syrup of Senna is intended as a purgative for children, the dose being from two to four drachms.

The Confection of Senna, which is the *Lenitive Electuary* of former Pharmacopœiæ, is an agreeable and useful aperient, though it is apt to ferment in warm weather and sometimes gripes when given alone. It is a good vehicle for the exhibition of some of the more powerful cathartics. The dose is from two to four or six drachms: when the bowels are sluggish, or where it is required to keep them more than usually active, a tea-spoonful may be taken every morning, or night and morning, as occasion may require. The preparation of this electuary, according to the common formula, is tiresome and expensive, and there are many temptations to sophistication. Dr. Paris says, that jalap, blackened with walnut liquor, is frequently substituted for the pulp of cassia; and that the great bulk of it sold in London is little else than prunes, figs, and jalap. He adds, "I understand that a considerable quantity is also manufactured in Staffordshire, in which unsound and spoilt apples enter as a principal ingredient. The preparation sold at Apothecaries' Hall is certainly unique in excellence."

SERPENTARIA. *Radix.* Virginia Snake-root. The root of *Aristolochia Serpentaria. Cl.* 20. *Ord.* 4. Gynandria Hexandria. *Nat. Ord.* Aristolochiaceæ.

The term *Aristolochia* is derived from the virtue attributed to these plants of cleansing the lochia after child-bearing; hence the English name *birthwort*, by which the only British species, the *A. clematitis*, is distinguished. The *A. Serpentaria* is a native of the woods in the southern and middle parts of the United States. It has a perennial fibrous root, of a brown colour, attached to a horizontal caudex, from which several slender stems arise, crooked and jointed, and less than a foot high.

Dried serpentaria root is imported into England in bales of three or four hundred-weight each; it is generally extremely foul, and often mixed with roots of *Collinsonia præcox.* The cleanest, freshest, and largest roots, and those which have the peculiar aromatic odour in the greatest perfection, are to be preferred; they have a pungent, bitterish flavour.

Serpentaria has been analysed by Chevalier (*Journ. de Pharm.*), who obtained from it volatile oil, starch, resin, gum, albumen, a yellowish bitter acrid substance soluble in alcohol and water, malate and phosphate of potassa and of lime, iron, and silica.

Serpentaria is a stimulating tonic and diaphoretic, useful in idiopathic and exanthematous fever of the typhoid character, in which it may be conjoined with cinchona, as it is so often, with us, in intermittent fever; it is a good stomachic tonic in some forms of dyspepsia, and in cold infusion allays often irritability of stomach and vomiting: it is occasionally used as a gargle in putrid sore throat: it is much less used in England than in Germany, where it is commonly prescribed as a tonic in cases of convalescence, where such are indicated, and especially where nervous debility has been predominant. The dose of the powdered root is from five to twenty, or even thirty grains, twice or thrice a day. An infusion (which

should be double the strength of that of the Pharmacopœia) is a good form for its administration, in the dose of an ounce or an ounce and a half.

Infusion of Serpentaria. — Take of Serpentaria (root, bruised), half an ounce; Boiling distilled Water, a pint. Macerate for four hours in a lightly-covered vessel, and strain.

The tincture ought to be regarded as one of the many medicinal drams, the use of which has often created an appetite and begun the habit of the habitual drinking of ardent spirits.

SEVUM. Mutton suet.

This is one of the hardest varieties of fat; it is used to give consistency and greasiness to some ointments and plasters.

SIALAGOGUES (σιαλον, *saliva*, and αγω, *I expel*). Remedies which excite an uncommon flow of saliva; they either act topically, as *pyrethrum, senega*, &c., or constitutionally, as *mercury*.

SILVER, *see* ARGENTUM.

SIMARUBA. *Radicis Cortex.* The bark of the root of *Simaruba officinalis.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Simarubaceæ (*Simaruba amara*).

This tree, which attains the height of sixty feet, is a native of moist sandy places in Guyana and Cayenne, and common on the Port Royal mountains, Jamaica. It has long creeping roots.

Simaruba bark is imported in bales chiefly from Jamaica; it is generally in narrowish strips, several feet in length, and folded lengthwise. It is usually of a dirty buff colour, rough, and extremely fibrous, and is often presented for sale dirty and dusty, and apparently spoiled by keeping; it is inodorous and bitter, and contains, according to Morin and Rouen (*Journ. de Pharm.*, 1822), a peculiar bitter principle, which they term *quassina*, together with a volatile oil having a benzoic odour, resin, gallic acid, malic acid, malate and oxalate of lime, acetate of potassa, an ammoniacal salt, oxide of iron, and alumina.

Simaruba is occasionally prescribed in diarrhœa depending upon dyspepsia; it has, however, nothing to recommend it in preference to the numerous analogous articles of the Materia Medica: some have praised it in intermittent fever, and it has been celebrated as a remedy for dysentery, but it is a drug of questionable utility. The dose of powdered simaruba is from ten to thirty grains, but it is more usually given in the form of decoction or infusion.

Infusion of Simaruba. — Take of Simaruba, bruised, three drachms; Boiling distilled Water, a pint. Macerate for two hours in a lightly-covered vessel, and strain.

SINAPIS. *Semina.* Black Mustard Seed. The seed of *Sinapis nigra.* *Cl.* 15. *Ord.* 2. Tetradynamia Siliquosa. *Nat. Ord.* Brassicaceæ, or Cruciferæ.

The mustard plant is a common annual, found in fields and waste places over a great part of Europe, and common in the United States. It is cultivated for domestic use.

For domestic use, and for most medical purposes, the seeds of

the above, and of the *Sinapis Alba*, or white (yellow) mustard, are either mixed or used indiscriminately; the black seed is, however, the more pungent. It has scarcely any odour till bruised, when it becomes pungent; its taste is acrid and biting. It yields, on pressure, about eighteen *per cent.* of a yellow, bland, inodorous, fixed oil, which is aperient in large doses, thicker than olive oil, and of specific gravity 0·917. It is soluble in ether and in anhydrous alcohol, and is occasionally used in the manufacture of soap. White mustard seed yields nearly double the quantity of a similar oil. When the mark, after the expression of the fixed oil, is distilled with water, a volatile oil, of a strong and penetrating odour, passes over, which does not exist ready formed in the seed, but is a result of the action of water, analogous to that by which the oil of bitter almonds is formed. The specific gravity of this oil, at 68°, is 1·015; its boiling point, 290°. It is soluble in alcohol and ether, and, aided by heat, is a good solvent of sulphur and phosphorus. The specific gravity of its vapour is 3·40. It is energetically acted upon by nitric acid, and one of the products is sulphuric acid. It absorbs ammonia, and produces with it a crystalline compound. The ultimate elements of this oil are very remarkable, being, according to the analysis of Dumas and Pelouze (*Ann. de Chim. et Phys.* LIII.)—

Carbon	49·53
Hydrogen	5.02
Oxygen	11·74
Nitrogen	13·45
Sulphur	20·26
	100·00

The large proportion of sulphur, as well as of nitrogen, in this oil, are striking peculiarities, and lead to some curious questions, both as to the original source of the former in the plant itself, and to the state of combination in which it exists in the seed. The terms *sinapin* and *sulpho-sinapisin* have been applied to this oil.

The uses of mustard as a stimulating condiment are well known; it is also diuretic, emetic, and rubefacient, or vesicant.

The bright yellow powder, sold under the name of *flour of mustard*, and used at the table, is a compound of powdered black and pale mustard seed, cayenne pepper, wheat flour, and turmeric.

Mustard whey is sometimes used to promote the secretion of urine in dropsies; it is made by boiling half an ounce of bruised mustard seed in a pint of milk, and straining it to separate the curd; of this a fourth part is taken three or four times a day. In the dose of about two drachms, the bruised or powdered seed is emetic; it may be taken in a wine-glassful of water, and its operation promoted in the usual way. It will sometimes operate in cases of apoplexy or palsy, when other remedies fail. A few years ago, white mustard seed was a favourite remedy in dyspepsia, chlorosis, and many of those anomalous nervous complaints to which females in the higher ranks of life are especially subject: it

was swallowed whole, to the amount of three or four table-spoonsful daily; but cases of its lodgment in the large intestines, and of fatal ulceration having occurred from such absurd and improper employment of it, it has of late fallen into disuse. I have seen violent gastritis caused by it when taken in this way.

As an external irritant and vesicant, mustard poultices, or *sinapisms*, are not unfrequently substituted for blisters, especially with a view of causing a counter-irritation, or revulsion, in a remote part of the body, in cases of coma and delirium; also, in gastritis, and in various neuralgic affections; hence the application of sinapisms to the calves of the legs and soles of the feet: but these cataplasms should not be indiscriminately or incautiously applied, for they sometimes induce troublesome ulceration, and even gangrene.

Cataplasm of Mustard.—Take of Linseed, Mustard seed, of each, powdered, half a pound; Boiling hot vinegar, as much as may be sufficient to produce the consistency of a cataplasm. Mix them.

Owing to the frequent adulterations of the mustard flour, I commonly recommend the cataplasm to be made of it alone and vinegar; directing earlier attention to the state of the skin with reference to its rubefaction, than when the usual combination is employed.

SOAP, *see* Sapo.

SODA. Oxide of Sodium. *Natron. Mineral alkali.*

The demands for this important alkali were formerly almost exclusively supplied from Spain, Sicily, and Teneriffe, where a very impure carbonate of soda was prepared by burning certain plants, more especially the *Salsola soda*, which was largely cultivated for the purpose upon the coast of the Mediterranean. This substance, called *Barilla*, was imported from Spain and purified in England. Of late, carbonate of soda has been most extensively and successfully manufactured in England from common salt, which is converted by the action of sulphuric acid into sulphate of soda, and this decomposed by calcination with lime and coal, so as ultimately to form a carbonate (see *Manual of Chemistry*).

Pure or caustic soda is obtained from carbonate of soda by the action of quicklime, exactly as potassa is procured from carbonate of potassa, but it is not used in medicine. It may be decomposed by processes similar to those resorted to for the decomposition of potassa.

Sodium is a soft malleable metal, of a brilliant silvery hue, but instantly tarnishes on exposure to air. Its specific gravity is about 0·672. It fuses at 190°, and is volatile at a white heat. When heated a little above its fusing point, it takes fire and burns into soda, or oxide of sodium, which consists of—

	Atoms.	Equivalents.	Per Cent.
Sodium	1	24	75
Oxygen	1	8	25
Soda	1	32	100

Soda, like potassa, is usually met with in the state of hydrate,

constituting what is termed pure or caustic soda, and containing —

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	78·1
Water	1	9	21·9
Hydrate of Soda	1	41	100·0

Carbonate of Soda of commerce, as now prepared by the wholesale manufacturers, is so nearly pure, that its solution and subsequent crystallisation are quite sufficient to render it fit for medical uses; it forms efflorescent crystals, resulting from a primary oblique rhombic prism. It is soluble in about twice its weight of cold water, and the solution tastes and reacts alkaline. It consists of —

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	22·25
Carbonic Acid	1	22	15·25
Water	10	90	62·50
Crystallised Carbonate of Soda	1	144	100·00

When the crystallised carbonate is exposed to heat it readily fuses, and, at a red heat, it loses the whole of its water of crystallisation, and remains in the form of an opaque, white, porous, and pulverulent mass: it then constitutes the *Dried Carbonate of Soda*. The anhydrous salt consists of: —

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	59·25
Carbonic Acid	1	22	40·75
Anhydrous Carbonate of Soda	1	54	100·00

Sesquicarbonate of Soda is made by dissolving the carbonate of soda in water, then filtering, and adding carbonic acid until the salt subsides: it is then to be wrapped in linen, and pressed, by a gentle heat. In the above process, a bicarbonate of soda is probably at first precipitated, which, during the process of drying "with a gentle heat," loses a portion of its carbonic acid, so as to remain chiefly in the state of sesquicarbonate. When the salt which falls during the passage of a current of carbonic acid through a strong solution of carbonate of soda is washed with cold water, and rendered as dry as possible by strong pressure, it contains a large relative proportion of bicarbonate. According to Mr. Pereira, "the so-called sesquicarbonate of soda of the shops, usually, if not invariably, contains carbonate and bicarbonate of soda."

Native carbonate of soda occurs in considerable abundance in Africa, near Fezzan; in Maracaybo, one of the provinces of Venezuela, in South America; and also in the soda lakes of Hungary. This has been shown by Mr. Phillips to be a true *sesquicarbonate*.

The sesquicarbonate of soda is much less soluble in water than the carbonate. According to Rose, the bicarbonate of soda requires no less than thirteen parts of water at 60° for its solution. When the bicarbonate of soda is boiled with water, it loses carbonic acid, and then becomes a sesquicarbonate.

Medical Uses of the Carbonates of Soda.—Pure soda is scarcely ever prescribed medicinally; it might be, and, by some practitioners, is used, as a substitute for pure potassa, but there appears no good reason for the preference. The carbonates of soda are, however, upon the whole, preferable as antacids, lithontriptics, and alteratives, to the carbonates of potassa; they are less unpleasant to the palate, and seem, in many cases at least, to agree better with the stomach. From ten to thirty or forty grains of the crystallised carbonate of soda may be given twice or thrice a day, in an ounce and a half of almond mixture, where the object is to correct a red sediment and acid state of the urine; or in cases of acidity of the stomach, flatulency, and other dyspeptic symptoms, it may be given with bitters, in some such form as the following:—

℞ Sodæ Carb. ℈j.; Infus. Gentianæ compos., Aquæ Pimentæ, āā f℥vj. M.

Like other alkalies, if given in too large or continuous doses, it occasions a film of ammonia-magnesian phosphate, or a deposit of white sand composed of it and of phosphate of lime, in the urine. Two drachms, taken in the morning upon an empty stomach, in a large cup of tea, produced a sensible effect on the urine voided ten minutes afterwards, and in two hours the urine became opalescent and alkaline.

Carbonate of soda, in large doses, has been recommended in *tic douloureux*, but the remedy is uncertain. It has gained some confidence in the treatment of scrofula, and has been supposed to confer upon burnt sponge its chief efficacy; but there, iodine is probably the beneficial agent. The alkaline carbonates are, however, no doubt effective alteratives in some forms of scrofulous diathesis. In pertussis and common catarrh and bronchitis, carbonate of soda, as well as carbonate of potassa, is a good remedy if combined with admitted expectorants, or with ipecacuanha, or sometimes, especially in pertussis, with assafœtida.

The dried carbonate of soda is of course effective in much smaller doses than the crystals; one part of it may generally be considered as equivalent to two, or somewhat more, of the common crystallised carbonate. It is especially useful as an ingredient in powders and pills, and not being deliquescent, as is the case with carbonate of potassa, there is no inconvenience from its exposure to air. The following, and similar formulæ, may be used in cases of dyspeptic acidity:—

1. ℞ Sodæ Carbonatis exsicc., Extracti Rhei., Extracti Gentianæ, āā ℈j. Fiat massa in pilulas xij. dividenda quarum sumantur duæ bis die.

2. ℞ Sodæ Carbon. exsicc. gr. x.; Pulv. Rhei, Pulv. Cinnam., āā gr. v. Fiat pulvis ante prandium sumendus, et vespere si opus sit.

The following are antacid stomachic powders, taken with advantage at bed-time, to prevent the ill effects of too much meat and drink upon a gouty or dyspeptic habit:—

1. ℞ Sodæ Carb. exsiccat., Magnes Carbon., Cretæ Preparatæ, Pulv. Calumbæ, āā gr. x.; Pulv. Cinnamomi gr. v. M. fiat pulvis horâ somni sumendus è cyatho aquæ.
2. ℞ Sodæ Carbonatis, Magnesiæ Carbonatis, Pulver. Flor. Anthemid. āā gr. x. M.

By supersaturation with carbonic acid, as in *Soda Water*, and in the *Liquor Sodæ Effervescens*, the nauseous alkalinity of carbonate of soda is concealed, and its powers as an antacid and lithontriptic, through considerably modified, are not materially impaired: it must, however, be recollected, that much of what is sold under the name of *soda water*, is merely water highly impregnated with carbonic acid, and that its effects, especially as a lithontriptic, are accordingly inverted. By some manufacturers soda water is faithfully prepared of single, double, and treble strength, containing, in the half-pint bottle, half a drachm, one drachm, and one drachm and a half of the crystallised carbonate, duly supersaturated with carbonic acid.

The *Sodaic Powders*, sold as a substitute for soda water, consist of sesquicarbonate of soda and tartaric acid; about thirty grains of each being usually put up in separate papers, and directed to be mixed in a half-pint tumbler of water: this forms a pleasant effervescing draught, and containing tartrate of soda, it is slightly aperient, but different in composition and effect from genuine soda water; like the other salts of vegetable acids with alkaline bases, however, its operation upon the urine is that of an antacid, and much mischief occasionally results from the superabundant and incautious use of beverages of this kind, as well as of soda water; they seem, in some cases, to modify, dilute, or even dissolve the protecting secretion of the inner coat of the bladder, and probably, also, of the kidneys and ureters.

Sodii Chloridum. Chloride of Sodium. *Common Salt. Sea Salt. Muriate of Soda.*

This important compound is contained in enormous quantity in the water of the ocean, and in many springs (*brine springs*), it also occurs as a mineral product (*rock salt*) in the transition and newer rocks; England, especially, in the new red sand-stone. From the latter sources (the brine-springs and salt rock of Cheshire, Worcestershire, and Staffordshire), the demands of that country are chiefly supplied; large quantities of salt are also procured by the evaporation of sea-water. In western Virginia and New York the supply of a similar nature is very large.

Chloride of sodium crystallises in cubes, which are anhydrous, of a pure saline taste, and not deliquescent; thrown upon the fire, it crackles or decrepitates, partly in consequence of the expansive action of heat upon its exterior, and sometimes from the presence of interstitial moisture. At bright red heat it fuses, and slowly sublimes. It requires nearly three parts of water, at 40°, for solution, and is scarcely more soluble in hot than in cold water. According to Gay Lussac, 100 parts of water, at 58°, dissolve 36 parts of

salt; at 140° 37 parts; and at 225°, which is the boiling point of a saturated solution, 100 parts of water hold 40·38 of salt in solution. At 32° water dissolves as much, or rather more than at 60°. Salt consists of—

	Atoms.	Equivalents.	Per Cent.
Sodium	1	24	40
Chlorine	1	36	60
Chloride of Sodium	1	60	100

The manner in which chloride of sodium is decomposed by the action of hydrated sulphuric acid, and the theory of the production of hydrochloric acid, and of soda, has been already explained (*see* Hydrochloric Acid, page 256).

Salt is a universal favourite with man and many other animals, and is in constant use as a condiment and seasoner of our food. The part which it performs in the animal economy is not distinctly understood, but is, no doubt, highly important, if not essential, to its healthy functions; it is true, there are persons who care little for salt, and seldom eat it at their meals; but there is scarcely any dish brought to table, of which salt does not already form an ingredient, or to which it has not been intentionally added. Its presence in the blood and the secretions is extremely characteristic, and it is said that persons who habitually abstain from salt are subject to glandular affections, and more especially to intestinal worms. Dr. Stevens's discoveries regarding the influence of salt upon the colour of the blood, and his speculations respecting the physiological influence of the saline qualities of the blood, together with the experiments which have been made upon the injection of solutions of salt into the veins, have of late years added much to the interest with which salt may be regarded as a therapeutic agent.

When salt is used in moderate quantity, it not only gratifies the palate, but promotes digestion; in larger proportion it excites thirst, increasing at the same time the secretions from the skin, bowels, and kidneys. With many persons it manifestly contributes to the regular action of the bowels, and prevents flatulency and eructation. From the constant presence of hydrochloric acid in the gastric secretion, and of soda in the blood, it has been presumed that salt is in some way decomposed so as to supply the acid and the alkali, but of this we have no direct proof.

When persons are continuously fed upon highly salted provisions, they gradually become unhealthy, and a variety of morbid symptoms ensue, constituting the disease called *scurvy*, a disease formerly prevalent in the navy, but which has of late years greatly diminished in consequence of improvements in the art of preserving food, and in regulating the whole of the diet of seamen. The disease probably arises partly from the continued stimulation of the excess of salt, and partly, if not principally, from the changes which the salted articles undergo in consequence of the long-continued action of the brine.

When two or three table-spoonsful of salt are dissolved in half a pint or a pint of warm water, and swallowed at a draught, it excites nausea, and, generally, vomiting, and promotes the action of the bowels. In malignant cholera, this has been recommended in preference to other emetics, and it has been found useful in cases of narcotic and other poisoning, as a remedy easily procurable. Its efficacy is increased by the addition of a tea-spoonful of flour of mustard.

In what has been termed the *saline treatment* of cholera, common salt forms an essential feature; in that disease the blood is black, and deficient in saline contents, and as the property of neutral salts is to render the blood florid, their use, thus theoretically indicated, has been found practically beneficial. The following are the *saline formulæ* recommended in these cases by Dr. Stevens and Dr. O'Shaughnessy:—

Take of Carbonate of Soda, half a drachm; Chloride of Sodium, a scruple; Chlorate of Potassa, seven grains. To be dissolved in four or five ounces of water, and taken at intervals of from fifteen minutes to an hour, being given more or less frequently, according to the circumstances of the case, and continued till the circulation is fairly restored.

Take of Phosphate of Soda, Chloride of Sodium, Sulphate of Soda, of each, ten grains; Carbonate of Soda, five grains. Dissolved in six ounces of water, and taken every two hours.

With this treament, saline enemata and salt baths are occasionally conjoined, and some have been bold enough to resort also to the injection of saline solutions into the veins, and this to a most daring extent: with what success, or how far such extraordinary means are justifiable, will appear from the following statement, as given by Mr. Pereira (*Elements of Materia Medica*, part I., 313). "This plan was, I believe, first practised by Dr. Latta (*Med. Gaz.*, X., 257). The quantity of saline solution which has been in some cases injected, is enormous, and almost incredible. In one case, 120 ounces were injected at once, and repeated to the amount of 330 ounces in twelve hours. In another, 376 ounces were thrown into the veins between eleven o'clock A.M., and Tuesday, at four P.M.; that is, in the course of fifty-three hours, upwards of 31 pounds. The solution used consisted of two drachms of muriate, and two scruples of carbonate of soda to sixty ounces of water. It was at the temperature of 108°, or 110° Fahr. In another series of cases, 40 pounds were injected in twenty hours; 132 ounces in the first two hours; 8 pounds in half an hour! The *immediate* effects of these injections, in a large majority of cases, were most astonishing; restoration of pulse, improvement in the respiration, voice, and general appearance, return of consciousness, and a feeling of comfort. *In many instances, however, these effects were only temporary, and were followed by collapse and death.*"

The reports as to the ultimate benefit of this treatment in cholera, are so contradictory, that it is difficult to form a correct estimate of it. "That it failed in a large proportion of cases after an extensive trial, and greatly disappointed some of its stanchest supporters,

cannot be doubted. Dr. Griffin states that all the published cases of injection which he can find recorded, amount to 282, of which 221 died, while 61 only recovered; but he thinks that the average recoveries from collapse by this method of treatment, far exceeded the amount of any other treatment in the same district and under the same circumstances."—(*Med. Gaz.*, XXII., 319.)

Salt has recently been used with alleged success in the cure of scrofula, and in phthisis by M. Latour, in the quantity of half a drachm to a drachm daily, in beef tea or some pectoral infusion.

A draught of salt water taken in the morning fasting has been successfully resorted to as a remedy for worms: even the tape-worm has been thus expelled; practitioners, however, generally resort to more effective anthelmintics.

As an *external application*, salt and water will sometimes disperse indolent grandular tumours and wens; a piece of flannel moistened with brine, should, in such cases, be kept continually on the part.

Sea water contains between three and four *per cent.* of saline matter, two-thirds of which is common salt. The specific gravity of sea water varies from 1026 to 1030. Its principal contents are chloride of sodium, chloride of magnesium, sulphate of magnesia, and sulphate of lime; these, at least, are the chief results of its evaporation, but how the respective elements are actually combined in the original water, seems somewhat doubtful, except, perhaps, as regards the chloride of sodium. The other saline substances present are traces of chloride of potassium, of double sulphate of magnesia and potassa, and of iodine and bromine (iodide and bromide of magnesium?) Sea water is a good external stimulant, and when used as a bath, is more agreeable in its reaction than plain water. Much of the benefit derived from sea-bathing, and especially from hot salt-water baths, is to be ascribed to its action as a cuticular stimulant.

Solution of Chlorinated (hypochlorite of) Soda. Chloride of Soda. When this solution is properly prepared, no carbonic acid is expelled from the carbonate of soda; it has a yellow colour, a sharp saline and astringent taste, and a chlorine odour. By careful evaporation it yields crystals, which produce the original liquid when re-dissolved, and which consist of hydrate of chlorine in combination with carbonate of soda. When the solution is exposed to air, and allowed to evaporate spontaneously, it gives out chlorine, and yields crystals of carbonate of soda (FARADAY. *Quart. Journ.*, N. S., II., 84). It is sometimes called a *hypochlorite of soda*, but there is no evidence of the existence of hypochlorous acid in it. From its inventor, and the purposes to which it is usually applied, it has generally been termed *Labarracque's* disinfecting liquid.

The solution of chlorinated soda is used as an internal and external remedy. From ten drops to a drachm, or even more, according to the extent of its dilution, may be given for a dose (and repeated according to its effects) in from two to three ounces of plain or rose-water, sweetened with a small addition of syrup. In

its general therapeutic powers, it resembles chlorine, but the presence of carbonate of soda of course modifies its effects. It is employed in typhous and typhoid fevers, in putrid sore throat, and in the malignant forms of other disorders, as an antiseptic; it is also considered astringent and tonic. Its beneficial effects are sometimes very marked, improving the secretions, lessening the fetor of the breath and intestinal evacuations, promoting the quantity and correcting the quality of the urine, producing a moist skin, and alleviating the restless weariness, faintness, and prostration of strength. "In fever, I have seen dampness of the skin follow its use. Increased secretion of urine is a common effect of it. In fever, it improves the qualities of the evacuations. Under the continued employment of it, glandular enlargements and chronic mucous discharges have disappeared, from which circumstance chloride of soda has been denominated alterative and resolvent. All these effects depend, probably, on the alteration which the chloride gives rise to in the condition of the blood, and the change thereby produced in the action of the different organs. We must not overlook the important fact that the solution of chloride of soda used in medicine, contains bicarbonate (carbonate?) of soda, to which perhaps in many cases its beneficial effects are, in part at least, to be referred." — (Pereira.)

Dr. A. T. Thomson states that he has administered chloride of soda, "largely diluted, in typhous and other low fevers, to counteract the sedative influence of the sulphuretted hydrogen which accumulates in the intestines in these fevers. I have found it, also, most valuable as an injection into the nostrils, for correcting the acrid offensive discharge which takes place from the nostrils in malignant scarlatina." (*Lond. Disp.*) This remedy has been recommended by Lalesque and Gouzée in intermittents, as a substitute for the disulphate of quinia; in secondary syphilis by Dr. Scott; in chronic skin diseases by Cazenave; in bilious disorders, as a substitute for chlorine, by Dr. Darling; in scrofula by Godia; and in plague by Neljoubin. — *Pereira.*

Chloride of soda is also used in the form of gargle, to cleanse the mouth and fauces in ulcerated sore throat, and in mercurial ptyalism; and as a lotion to ill-conditioned ulcers, to check fetid discharges, such as ozæna, arrest the progress of sloughing and gangrene, and promote the separation of the dead and living parts. There are some cutaneous disorders, also, in which chlorinated soda is used as a local remedy with marked success.

Chloride of lime (*see* Calx Chlorinata) may in many cases be used as a substitute for chloride of soda, especially as an external application; for internal use, chloride of soda is to be preferred.

The general therapeutic effects of *chlorine*, when given in solution, also correspond with those of chloride of soda, except such as depend upon the presence of the carbonated alkali. As a lotion, and in gargles, it is an effective antiseptic, and is sometimes used, when very largely diluted with water, as a common drink in fevers of a typhoid character or tendency.

As *disinfectants*, chlorine, and the chlorides of lime and soda, supersede all others. Gaseous chlorine may be diffused through infected atmospheres, as it is evolved from a heated mixture of chloride of sodium, binoxide of manganese, and sulphuric acid diluted with two parts of water; or it may be more simply obtained from a mixture of the binoxide of manganese and hydrochloric acid. In consequence, however, of its mischievous effects when respired, it requires to be resorted to with much caution in inhabited rooms, and especially in the chambers of the sick; hence, in such cases, the advantage of the chlorides of lime, and soda, which gradually, but yet effectively, evolve chlorine when merely exposed to the air, or when cloths dipped in their solutions are suspended in the infected apartments.

Sulphate of Soda. — Sulphate of soda, or *Glauber's Salt*, forms large transparent prismatic crystals, generally striated upon the surface, and resulting from a primary oblique rhomboid prism: they are efflorescent, and lose, by exposure to a dry and warm atmosphere, between fifty and sixty *per cent.* of water of crystallisation; they have a nauseously saline taste, and are soluble in rather less than three parts of water at 60°; the solubility then increases to the temperature of 92°, when it is at its maximum; and diminishes to 215°, at which point the salt is nearly of the same solubility as at 87°. When heated, the crystals of sulphate of soda undergo watery fusion, and when the whole of the water has been driven off at a red heat, the residuary anhydrous salt has an acrid, hot taste, and reabsorbs water with great avidity.

The ordinary crystals consist of—

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	19·75
Sulphuric Acid	1	40	24·69
Water	10	90	55·56
Crystallised Sulphate of Soda	1	162	100·00

Sulphate of soda is a mild purgative in the dose of six or eight drachms, dissolved in four or six ounces of water; it is often conjoined with manna and with senna, but of late years it has been little used, and is almost entirely superseded by sulphate of magnesia, which is, upon the whole, less unpleasant to the palate, and produces less thirst. The dried salt is of course effective in less than half the dose of the crystallised. Sulphate of soda is contained in many mineral waters.

Sodæ Phosphas. *Phosphate of Soda.*—This salt is usually prepared by saturating the impure phosphoric acid obtained by the action of dilute sulphuric acid upon bone-earth, (*see* Phosphorus,) with soda, filtering and evaporating to crystallisation; it forms oblique rhombic prisms, soluble in about four parts of cold, and two of hot water, efflorescent and having an alkaline reaction on test paper. It consists of—

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	18·2
Phosphoric Acid	1	36	20·5
Water	12	108	61·3
Crystallised Phosphate of Soda	1	176	100·0

In the dose of four to eight or ten draehms, this salt is sometimes used as a saline aperient; it is not quite so disagreeable as sulphate of magnesia or sulphate of soda, but it by no means deserves the name which some have eonferred upon it, of *tasteless purging salt:* it is usually given in broth or gruel, but is not very certain in its operation. It has been used as an alterative, that is, in small doses frequently repeated and long persevered in, in certain diseases supposed to be conneeted with a deficieney of phosphoric aeid in the system. It has also been used, but without apparent suceess, in the treatment of diabetes.

Potassio-Tartrate of Soda, called also *Sodio-Tartrate of Potassa*, or *Tartarised Soda*, was long known under the name of *Rochelle Salt.*—In the proeess for making it, one of the two atoms of tartaric aeid in the bitartrate of potassa, is saturated by the soda of the carbonate, and the carbonie acid is evolved, so that a neutral double salt results. It forms large and beautiful crystals, derived from a primary right rhombie prism, variously and often singularly modified, and generally produeed as it were in halves, as if formed on planes passing through the centre of the entire erystals. It is soluble in about five parts of water at 60°, and in about two parts at 212°. It has a bitterish and saline flavour, and is slightly efflo-reseent in a dry atmosphere. When heated, it undergoes watery fusion, and the aeid is first modified into a pyro-aeid, and then decomposed. It consists of—

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	10·6
Potassa	1	48	15·9
Tartaric Acid	2	132	43·7
Water	10	90	29·8
Crystallised Potassio-Tartrate of Soda	1	302	100·00

This salt, called also *Rochelle* and *Seignette's salt*, from having been first introduced by M. de Seignette, a surgeon at Roehelle, is given in the dose of four to eight or ten draehms; what has been said elsewhere of the use of saline purgatives, applies to this; it is less disagreeable, but also less effeetive than sulphate of magnesia, and may be administered in any of the usual vehieles; not, however, without a partial decomposition in those containing the free mineral aeids, as infusion of roses, &c. It may be prescribed, not inelegantly, in almond emulsion.

℞ Sodæ Potassio-Tartratis ℥vj.; Misturæ Amygdalæ f℥vss.; Spiritûs Myristicæ f℥ss. M. sumat tertiam partem secundâ quâque horâ.

It enters into the composition of the effervescent aperient commonly sold under the name of *Seidlitz powders*. They consist of two different powders; the one (in white paper) consists of ʒij. of *potassio-tartrate of soda* and ℈ij. of *carbonate of soda*; the other, (in blue paper) of xxxv. grains of *tartaric acid*. The contents of the white paper are to be dissolved in half a pint of spring water, to which those of the blue paper are to be added: the draught is to be taken in a state of effervescence. The acid being in excess, renders it more grateful, and no less efficacious as a purgative. It should be recollected that, like the other neutral saline compounds of the vegetable acids, it is apt to exert an alkaline reaction on the urine.

Sodæ Acetas. *Acetate of Soda.* This salt is prepared, as a source of acetic acid, by the manufactures of pyroligenous acid. It forms crystals derived from an oblique rhombic prism, soluble in about three parts of water at 60°, of a pungent and slightly bitter, but not disagreeable flavour, and composed of: —

	Atoms.	Equivalents.	Per Cent.
Soda	1	32	23·3
Acetic Acid	1	51	37·3
Water	6	54	39·4
Crystallised Acetate of Soda .	1	137	100·0

Acetate of soda is mildly aperient, diuretic, and diaphoretic, and may be administered in the same cases as acetate of potassa; but it requires to be given in at least twice the quantity.

SODÆ BIBORAS, *see* Borax.

SPIGELIA. *Radix.* Carolina pink, or worm grass. The Root of *Spigelia Marilandica. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Gentianaceæ.

This is a perennial plant which flowers in July and August, and is a native of the warmer parts of North America; the root is fibrous, and grows in a horizontal direction.

In *doses* of from *ten to twenty grains* for a child three years old, and from *one to two drachms* for an adult, the powder of the root of this plant has been administered as an anthelmintic; it should be given morning and evening successively for some days, and then followed by an active purge. It appears to be possessed also of narcotic powers, occasionally producing vertigo, dilated pupil, and convulsions. It is most active when fresh, and becomes uncertain and sometimes inefficacious when dried. It is more commonly used in the form of infusion combined with senna. The proportions for infusion are, one ounce of Spigelia root to one pint of boiling water; after two hours, strain. Dose, for a child three years old, half an ounce to an ounce; for an adult, from four to eight ounces, to be repeated morning and evening. With us, in this quarter, there is a preparation called 'worm tea,' which is often

prescribed. It consists of an infusion of a mixture of medicinal substances, which are commonly made up in small parcels, viz., of senna, manna, and savine. The proportions are varied in accommodation with the views of the prescriber, and sometimes the notions of the purchaser.

SPIRITUS RECTIFICATUS. *Hujus pondus specificum est* ·838.

SPIRITUS TENUIOR. *Hujus pondus specificum est* ·920.

Rectified Spirit, of the specific gravity of ·838. *Weaker* or *Proof Spirit*, of the specific gravity of ·920.

These are mixtures of alcohol and water, the rectified spirit contains about 18 *per cent.* (by weight), and the weaker spirit, or proof spirit, about 53 *per cent.* of water; so that the weight of absolute alcohol (of the specific gravity of ·796 at 60°), amounts to 82 *per cent.* in the former, and to 47 *per cent.* in the latter. (*See* Alcohol.)

STALAGMITES, *see* Cambogia.

STANNUM. Tin. (Germ. *Zinn.*) Tin filings, and powdered tin, have been used as anthelmintics, but no metallic filings can be taken with impunity, and at present neither tin, nor any preparation of it is used by the prudent practitioner, so that it might have been properly omitted in the list of Materia Medica.

STAPHISAGRIA (σταφις αγρια, *wild vine*, from the resemblance of its leaves to those of the vine.) *Semina.* Stavesacre. The seeds of *Delphinium Staphisagria. Cl.* 13. *Ord.* 3. Polyandria Triginia. *Nat. Ord.* Ranunculaceæ. (Delphinium, from δελφινος, *a dolphin*, the flower of the larkspur being supposed to look like a dolphin's head.)

This plant is a native of waste places in the South of Europe, and the Levant.

Stavesacre seeds are cathartic and emetic. Their use is confined to external application, especially mixed with hair-powder, for the destruction of lice; they might, therefore, be omitted in our present Materia Medica. They contain a salifiable base, called *delphinia*, which may be procured by boiling magnesia in the decoction of the seed, filtering, and treating the residue upon the filter with alcohol; upon evaporating the latter, delphinia remains in the form of very minute crystals, eminently poisonous.

STARCH, *see* Amylum.

STRAMONII FOLIA ET SEMINA. (From *stramen*, straw; so called from its fibrous roots). Thorn-apple. James-Town Weed. The leaves and seeds of *Datura Stramonium. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ.

This plant, said to be a native of America, is common over the whole of Europe, and found upon road-sides and rubbish heaps.

The whole herb is stimulating and narcotic, but less certain in its action as a sedative than several other articles of the Materia

Medica, which are therefore substituted for it. It contains a salifiable base, discovered by Brandes, to which its active powers are referrible, which has been called *daturia*. Smoked, in the manner of tobacco, the dried plant is effectual in the relief of cases of spasmodic asthma. It has been used in mania and epilepsy, but without any marked benefit. An ointment composed of the extract, ʒi. to ʒij., and lard, ℥i., relieves often greatly the pain and irritation of hemorrhoids.

Dr. Bree asserts that its indiscriminate use in this way has occasioned dangerous or hurtful effects in frequent instances. In some cases of aged or apoplectic subjects, death has been the consequence. No considerate physician, he observes, can countenance the latitude of its application, or advise its use without well knowing the nature of the case of asthma on which he is consulted.

According to Dr. Marcet, the extract of the seeds is more active than that prepared from the whole plant; but in other respects the virtues of the two are analogous: he recommends it in cases of chronic disease attended with acute pain, in doses of from one-eighth of a grain to one grain: it appears to have been eminently successful in sciatica.

I know of no remedy which so frequently and readily gives relief in asthma as the extract in doses of two grains repeated every three hours until a decided impression is made on the nervous system.

The *extract of the seed* is the only officinal preparation, but a tincture has also been recommended, and it is probable that daturia, when more accurately examined, may prove a valuable therapeutic agent.

Extract of Stramonium. — Take of Stramonium Seed, fifteen ounces; Boiling distilled Water, a gallon. Macerate for four hours in a lightly-covered vessel; then take out the seeds and bruise them in a stone mortar; return them, when bruised, into the liquor. Then boil down to four pints, and strain the liquor whilst hot. Lastly, evaporate to a proper consistency. The dose is from half a grain to two or three grains.

Tincture of the seeds is useful in rheumatism when restricted to one or two joints, and in neuralgia, externally applied by friction.

Cases of accidental poisoning by stramonium occasionally occur: the leading symptoms which it produces are stupor, dilated pupil, and delirium, and occasionally spasms and palsy. Several instances are quoted by Dr. Christison, and among them the following: "In an instance communicated to me by my colleague, Dr. Traill, where eighteen or twenty grains of extract of stramonium were taken by mistake for extract of sarsaparilla, the symptoms were dryness of the throat immediately afterwards, then giddiness, dilated pupils, flushed face, glancing of the eyes, and incoherence, so that he seemed to his friends to be intoxicated; and subsequently there was incessant incoherent talking like that of demency. Eme-

tics were given without effect, and there was little amendment obtained from blood-letting, leeches to the temples, cold to the head, or purgatives. But after a glass of strong lemonade, vomiting took place, the symptoms began to recede, in ten hours he recognised those around him, and next day he was pretty well."

In a case related in *Rust's Magazine*, caused by a decoction of the fruit, which was mistaken for thistle heads, the leading symptoms were spasmodic closing of the eyelids and jaws, spasms also of the back, complete coma, and excessive dilatation and insensibility of the pupil. "This case, which seems to have been a very dangerous one, was rapidly cured by free blood-letting. Blood-letting, indeed, seems peculiarly called for in poisoning with the thorn-apple, on account of the strong signs of determination of blood to the head."

The following fatal case is given by Mr. Duffin (*Med. Gaz.* xv. 320). A child of his own, two years old, swallowed about a hundred seeds without chewing them: soon after she became fretful and like a person intoxicated; in the course of an hour efforts to vomit ensued, together with flushed face, dilated pupils, incoherent talking, and afterwards wild spectral illusions and furious delirium. In two hours and a half she lost her voice and the power of swallowing, evidently owing to spasms of the throat. Then croupy breathing and complete coma set in, with violent spasmodic agitation of the limbs, occasional tetanic convulsions, warm perspiration, and yet an imperceptible pulse. Subsequently the pulse became rapid, the abdomen tympanitic, and the bladder paralysed, but with frequent involuntary stools, probably owing to the administration of cathartics, and death took place in twenty-four hours. At an early period, twenty seeds were discharged by an emetic, the stools contained eighty, and none were found in the alimentary canal after death. There was never any marked sign of congestion of blood in the head, except flushed face at the beginning. On examination after death the brain was healthy, no morbid appearance was presented by the stomach and intestines, and the only unusual appearances were a slight blush over the pharynx, larynx, and upper part of the gullet, thickening and swelling of the rima glottidis, and a semi-coagulated state of the blood.

Dr. Christison observes that dangerous effects may result from the application of thorn-apple to the skin when deprived of the cuticle: he cites from the *Journ. de Chim. et Méd.* (VI. 722.) an instance of alarming narcotism from the application of the leaves to an extensive burn.

STRYCHNIA (from στρωνυμι, *I overthrow?*) *see* NUX VOMICA.

STYRAX (from στυραξ, *a reed*, in which it was collected and preserved). *Balsamum.* The balsam of *Styrax officinale.* *Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Styraceæ.

This tree is a native of the south of Europe and the Levant, and is common over Greece and the Peloponnesus.

Styrax is among the stimulating expectorants of the older writers. When pure it is in drops, of a pale and dark-brown colour, or in mottled masses composed of their mixture, extremely fragrant, and consisting of resin, volatile oil, and benzoic acid.

The substance known under the name of *Styrax calamita* (reed storax) originally consisted of beech saw-dust, mixed with a strong spirituous solution of genuine styrax, and pressed into cakes; but what is now usually sold is dirty saw-dust, mixed with balsam of Peru, and sometimes smelling of naphthalin, or other products of coal-tar. It is useless, and should not be retained.

Compound Pills of Styrax. — Take of Styrax, strained, three drachms; Hard Opium, powdered, Saffron, of each a drachm. Pound them together till incorporated.

These pills afford a convenient form of opium; but the trash which goes under the name of *styrax* is a bad vehicle for it, and saffron is a useless addition. Five grains contain one grain of opium. Like the *Pilulæ Saponis Compositæ*, they furnish a means of prescribing *opium* without the appearance of that word in the prescription.

SUCCINUM. (*Succus*, juice, because supposed to exude from a tree.) *See* Amber.

SULPHUR. *Sulphur sublimatum.* Sublimed sulphur.

Sulphur occurs *native*, associated with gypsum, limestone, and sulphate of strontia. It is also abundant among volcanic products, and in union with various metals forms some of the most abundant and important metallic ores; such are the sulphurets of copper, of lead, of mercury, &c.

Native sulphur is imported into England from Sicily and Naples, and largely consumed by the manufacturers of sulphuric acid and of gun-powder, and by the bleachers of cotton goods.

Roll sulphur is chiefly obtained by roasting sulphuret of copper: it is collected in a chamber of brick-work, through which the fumes of the heated ore are made to pass, and afterwards purified by fusion and cast into sticks.

Sublimed sulphur or *flowers of sulphur*, is obtained by heating sulphur up to 500° or 600°, when it rapidly rises in vapour, and is condensed in sufficiently capacious receptacles, in the form of a fine powder; the residue is called *sulphur vivum* in old Pharmacopœiæ.

Sulphur is subject to various contaminations; roll sulphur especially is said frequently to afford traces of sulphuret of arsenic.

Sublimed sulphur, or finely-powdered native sulphur, is most commonly used as a gentle laxative and diaphoretic. *Lac sulphuris*, or *precipitated sulphur*, is preferable to other preparations. It is made by mixing one part of sulphur, two parts of slacked lime, and eight parts of water, and adding to the filtered solution hydrochloric acid to precipitate the sulphur, which wash and dry. It is best administered in the form of electuary, and may be taken in the dose of a drachm or two twice or thrice a day, so as gently

to act upon the bowels. In this way it relieves hemorrhoidal affections of the rectum. Its purgative effect is increased by the addition of magnesia, or cream of tartar. When its use is continued for some time its odour is often very manifest upon the skin, especially when aided in that direction by other diaphoretics, or when administered in warm weather.

Sulphur is sometimes used as an emmenagogue, and has also proved useful in various gouty and rheumatic affections. The celebrated remedy for chronic rheumatism called the *Chelsea Pensioner*, is an electuary composed of a drachm of guaiacum, two drachms of powdered rhubarb, an ounce of cream of tartar, two ounces of flowers of sulphur, one nutmeg in powder, and a sufficient proportion of clarified honey: two large tea-spoonsful to be taken night and morning.

Sulphur is also given as an alterative, in chronic cutaneous diseases, and it has proved useful as a vermifuge.

It is a valuble external application in many cutaneous affections, and more especially in *scabies*, for which purpose the simple ointment is to be preferred; it should be applied night and morning. The compound ointment is sometimes used, but it is apt to irritate; it is, however, a good pomatum for the destruction of lice.

Ointment of Sulphur. — Take of Sulphur, three ounces; Lard, half a pound; Oil of Bergamot, twenty minims. Mix.

Compound Sulphur Ointment. — Take of Sulphur, half a pound; White Hellebore, powdered, two ounces; Nitrate of potassa, a drachm; Soft soap, half a pound; Lard, a pound and a half; Oil of Bergamot, thirty minims. Mix.

SULPHURIS IODIDUM. Iodide of Sulphur. See IODINUM.

SULPHURIC HYDROGEN GAS. *See* HYDROSULPHURIC ACID.

SULPHURIC ACID. *Acidum Sulphuricum.*

NOTE. — *Sulphuric Acid.* It is free from colour. Its specific gravity is 1·845. What remains after the acid has been distilled to dryness does not exceed the four-hundredth part of its weight. Diluted sulphuric acid is scarcely coloured by hydrosulphuric acid.

Sulphuric acid was formerly called *oil of vitriol*, and prepared by the distillation of *green vitriol*, or sulphate of iron, at a very high temperature. It is now obtained by burning a mixture of sulphur and nitre in a furnace so constructed that the resulting fumes may pass into a capacious leaden chamber, the floor of which is covered with water, or into which steam is admitted. The water gradually acquires an intense acidity, and when it has become sufficiently sour, or of an adequate density, it is let off into shallow leaden boilers, where it is evaporated till it acquires a specific gravity of about 1·70; it is then transferred into platinum stills, in which it is further boiled down till it acquires the specific gravity of 1·84 at 60°: it then is drawn by a siphon out of the still into a cistern lined with platinum, where it is suffered to cool, and ultimately ladled out into *carboys*, or large globular bottles of green glass protected by wicker-work, in which it is supplied to the public.

The fumes which are produced by the combustion of the mixture of sulphur and nitre, consist of sulphurous and nitrous acid; when condensed in the water of the chamber, the nitrous acid imparts oxygen to sulphurous acid, and converts it into sulphuric acid; the nitrous acid, by this loss of oxygen, reverts to the state of nitric oxide gas, which, mixing with the air of the chamber, resumes oxygen, and again becomes nitrous (or hyponitrous) acid, and this is again ready to convert another portion of sulphurous into sulphuric acid. The minute details of this manufacture would be misplaced here, but they will be found in chemical works, and are extremely curious and interesting.

Sulphuric acid, as it usually occurs, is a transparent, colourless and inodorous liquid, of the specific gravity of 1·84. It is extremely fixed, and requires a temperature approaching a red heat (about 620°) for its vaporisation. It congeals at — 15°. It is extremely caustic and corrosive, and feels soapy in consequence of its chemical action upon the cuticle; it is intensely sour when largely diluted with water: it is especially characterised by its strong affinity for water, so that when exposed to the atmosphere it dilutes itself by absorbing aërial vapour, and when mixed with water, great heat is evolved, four parts of acid and one of water producing a temperature of 300°: it is a very powerful chemical agent, and displaces the greater number of other acids from their combinations; it is also very energetic in its action upon most organic bodies, especially when aided by heat; it chars them, abstracts water, and is itself often decomposed. When heated with charcoal, many of the metals, and other combustibles, it imparts a portion of its oxygen to them, and is converted into *sulphurous* acid.

Sulphuric acid of the above specific gravity is a compound of 1 atom of anhydrous acid and 1 atom of water; the anhydrous acid, as it probably exists in the dry *sulphates*, and as it is obtained by distilling certain sulphates at a high heat, is a white crystalline solid, composed of—

	Atoms.	Equivalents.	Per Cent.
Sulphur	1	16	40
Oxygen	3	24	60
Anhydrous Sulphuric Acid .	1	40	100

The hydrated, or common sulphuric acid is a sulphate of water, and consists of—

	Atoms.	Equivalents.	Per Cent.
Anhydrous Acid . . .	1	40	81·6
Water	1	9	18·4
Liquid Acid, or Oil of Vitriol .	1	49	100·0

The strength or value of sulphuric acid may be ascertained by its saturating power (as in the operation of alkalimetry), or, if pure, by its density; and several valuable tables are given in chemical works, showing the density of the various mixtures of the pure

acid and water, and the relative quantities of real or anhydrous acid which they contain.

Sulphuric acid is a most important chemical agent in the pharmaceutical laboratory: in its concentrated state it is sometimes used as a caustic, but the difficulty of confining the limits of its action renders it applicable in a few cases only. Like nitric acid, it would probably be effectual as an application to the bites of rabid animals. An *ointment* containing sulphuric acid has been prescribed as rubefacient in some cases of diseased joints, and in paralysis, and occasionally as a styptic; but it is an inconvenient application. It is made by carefully triturating a drachm of the acid with an ounce of lard.

Diluted Sulphuric Acid. — Take of Sulphuric Acid, a fluid ounce and a half; Distilled Water, fourteen fluid ounces and a half. Add the Acid gradually to the water, and mix them.

When sulphuric acid is diluted with water, the mixture becomes slightly turbid, in consequence of the precipitation of a minute quantity of sulphate of lead contained in the concentrated acid of commerce; this should be allowed to subside, and the clear dilute acid may then be poured off for use. A fluidrachm of the dilute acid contains about ten grains of the strong acid, and will saturate twenty-eight grains of crystallised carbonate of soda.

The dose of the diluted sulphuric acid of the *London Pharmacopœia* is from five to thirty or forty minims, in an ounce and a half to two ounces of liquid, but the extent to which it may be given will much depend upon the quantity of the diluent or vehicle. It is a tonic, and to a certain extent astringent and refrigerant, and is therefore selected in all those cases where acids are indicated, and where it is desirable to avoid diarrhœa. It is an excellent remedy in all those diseases of debility attended by profuse perspiration, more especially in low and hectic fever, and as a tonic for convalescents. It is often prescribed in hemorrhages, more especially in pulmonary hemorrhage, and hematemesis. "In malignant erysipelas, with a tendency to hemorrhage, it has been given to the amount of a fluid ounce in twenty-four hours; and we have administered it with evident advantage, to the same amount, in violent uterine hemorrhage, and in obstinate scabies." (*Lond. Disp.*) When the urine has a tendency to phosphatic depositions, attended by loss of appetite, impaired digestion, listlessness, and a dirty tongue, this acid, in conjunction with small doses of saline aperients, is of great efficacy.

Dilute sulphuric acid may be administered in any of the simpler bitter infusions; the infusion of cascarilla, of calumba, and of cinchona, are among the preferable vehicles or adjuncts. Where it has a tendency to gripe or purge, it may be conjoined with aromatics, or with small doses of tincture of opium. It is frequently employed in gargles, and is especially useful in cases of relaxed uvula. The following are a few of the innumerable formulæ for its administration:—

℞ Infusi Rosæ comp., Infus. Gentianæ comp. āā f℥iijss.; Syrup. Aurant., Acid. Sulph. dilut. f℥iss. Misce. Cochl. iij. vel iv. bis die.

℞ Infus. Cascarillæ f℥iss.; Magnesiæ Sulphatis ℥j.; Acid. Sulph. dil. ♏xv. Misce. Bis vel ter die sumendus.

℞ Infusi Lupuli f℥x.; Acid. Sulp. dil. ♏x.; Syrup. Zingiberis f℥ss. Misce pro haustu, meridie et ante prandium sumendo.

℞ Syrupi Mori f℥j.; Acid Sulp. dilut. f℥ij.; Aquæ Rosæ f℥vjss.; Spirit Myrist. f℥ss. M. fiat gargarisma.

As an adjunct to the preparations of cinchona and quinia, sulphuric acid has already been noticed. Where it is frequently or continuously used, it should be swallowed quickly and the mouth washed with water afterwards, to prevent its deleterious action upon the teeth; the same precaution applies to all other acid remedies.

Cases of *poisoning by sulphuric acid* are not unfrequent; the principal symptoms which it occasions are intense pain of the throat and stomach, attended by tumefaction of the throat, and more or less disorganisation arising from the caustic action of the acid upon the parts over which it passes. There is also incessant vomiting, and large quantities of mucus often streaked with blood are thrown up. The pulse sinks, faintness and cold sweats follow, and the patient suffers under constitutional symptoms resembling those of a wound or rupture of the stomach. The mental faculties are generally unimpaired. The best antidote is chalk or whiting and water, which should be taken in sufficient quantity to neutralize the acid; soap and water may also be resorted to; as diluents, in such cases, milk, and the whites of eggs with water may be used. Instances have occurred in which the concentrated acid has remained for some time in the stomach, and has been ultimately entirely ejected by vomiting, the patient having recovered. In these cases a very copious glairy or mucous secretion seems to have defended the parts from the action of the acid.

SYRUPI. Syrups. (*Serab*, a potion. *Arab.*)

Syrups are, with few exceptions, unimportant preparations; they are objectionable, from their tendency to ferment and decompose, and should, as far as possible, be excluded from Pharmacopœiæ. The only general directions given respecting them, in the *London Pharmacopœia*, are the following:—

Let Syrups be kept in a place the temperature of which never exceeds 55°.

This is probably with a view to prevent their fermentation; but, with every precaution as to temperature, syrups which abound in vegetable mucilage become ropy and acescent, and others deposit crystals of sugar.

TABACUM. *Folia Exsiccata.* Tobacco. The dried leaves of *Nicotiana Tabacum.* *Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ.

The generic name of this plant is from that of M. Nicot, an agent of Francis II., who sent the seed from Portugal to Catherine de Medecis. It was called *tobacco* from having been brought from

the island of Tobago; or, according to others, from Tobaco, a province of Mexico. It is a native of the hotter parts of America, but is cultivated in many parts of Europe.

The fresh leaves are comparatively inodorous and insipid, but, when dried, they acquire a peculiar odour, and a bitter narcotic flavour, which is readily yielded to hot water. It has been repeatedly analysed; among others by Vauquelin (*Ann. de Chim.*, LXXI.), who found, in the expressed juice of the leaves, a considerable quantity of albumino-glutinous matter, together with a peculiar volatile principle, which he termed *nicotin*, a peculiar red extractive matter, a green fecula, acetic acid, supermalate of lime, chloride of potassium, hydrochlorate of ammonia, and nitrate of potassa. More recently Posselt and Reinmann have published an analysis of tobacco leaves (*Mag. Pharm.* XXIV. & XXV.), who found in them *nicotina*, *nicotianin*, *bitter extractive*, &c. It yields on distillation a *concrete volatile oil* (nicotianin) of Hermstadt, the *Tabacco camphor* of Gmelin.

Nicotina has a syrupy consistence, brown colour, and acrid taste; it may be purified by distillation in an oil-bath at 284°. According to Henry and Boutron-Charlard, it is crystallisable (*Journ. de Pharm.*, XXII). They obtained it by distilling sixteen ounces of tobacco with a solution of 6·4 ounces of caustic soda, in 332 cubic inches of water.

Nicotina is inodorous when cold, but when heated, smells acrid and disagreeable, like tobacco. It has an alkaline reaction on reddened litmus, and on turmeric. It is soluble in water and in ether. Its specific gravity is 1·048. It is a virulent poison; a single drop killed a large dog. The salts of nicotina are acrid, very soluble, and difficultly crystallisable. The average quantity of nicotina, yielded by 1000 parts of different kinds of tobacco, varied from 3·86 to 11·2. Virginia tobacco yielded one *per cent.*

The substance called by Posselt and Reinmann *nicotianin*, they obtained as follows:—Distil a mixture of six pounds of tobacco leaves and twelve pounds of water, till one-half of the liquid has passed over. Add to the liquor six pounds of water, and distil a second time. Repeat this a third time. On the surface of the liquid which has distilled over, about eleven grains of a fatty substance floats, which is nicotianin. It smells like tobacco smoke, and has an aromatic bitter taste; it is volatile, insoluble in water and in dilute acids, but soluble in alcohol and ether, and in caustic potash.

An abstract of what is known respecting the toxicological history of tobacco will be found in Dr. Christison's treatise. Sir Benjamin Brodie observed a considerable difference in the poisonous effects of the infusion of tobacco, and of the empyreumatic essential oil. Four ounces of the infusion, injected into the rectum of a dog, killed it in ten minutes, by paralysing the heart, for after death the blood in the aortal cavities was arterial. The oil, on the contrary, produces convulsions and coma, but does not affect the heart (*Phil.*

Trans., 1811). Orfila found that five drachms and a half of rappee, introduced into a dog's stomach, and retained by ligatures, produced nausea, giddiness, stupor, twitches in the muscles of the neck, and death in nine hours.

Dr. Christison observes "that the effects in man are allied to those produced in dogs by the infusion. In a slight degree, they are frequently witnessed in young men while making their first efforts to acquire the absurd practice of smoking. The first symptoms are acceleration and strengthening of the pulse, with very transient excitement, then sudden giddiness, fainting, and great sickness, accompanied with a weak, quivering pulse. These effects are for the most part transient and trifling, but not always. Some degree of somnolency is not uncommon. Dr. Marshall Hall has given an interesting account of a young man who smoked two pipes for his first debauch, and, in consequence, was seized with nausea, vomiting, and syncope, then stupor, stertorous breathing, general spasms, and insensible pupil. Next day the tendency to faint continued, and in the evening, the stupor, stertor, and spasms returned, but, from that time he recovered steadily. Gmelin has quoted two cases of death from excessive smoking."

Dr. S. Jackson has directed a person with hernia to swallow the smoke of a segar, and in this way nausea and general relaxation were brought on, so as to allow of the reduction of the hernia.

Death has, also, ensued from the incautious use of tobacco injections. In one case, related by Dr. Graef, of Hamburg, an ounce was boiled for fifteen minutes in water; the individual was seized in two minutes with vomiting, convulsions, and stupor, and died in three-quarters of an hour. In another case, two ounces of tobacco were inadvertently substituted for two drachms; the person became, as it were, intoxicated, and died almost immediately. Even two drachms, however, is not a safe dose. An anonymous writer in the *Medical and Surgical Journal* (IX., 150) says, a patient of his died in convulsions, an hour or two after receiving a clyster, composed of two drachms, infused in eight ounces. In the *Acta Helvetica* there is the case of a woman who expired a few hours after the use of an injection made with one drachm only. Sir Astley Cooper mentions an analogous case; and Dr. Copland has seen even half a drachm in solution prove fatal.

Snuff, in its genuine form, is powdered tobacco, but a variety of additions are generally made, such as perfumes and volatile oils, carbonate of ammonia, sal ammoniac and common salt, powdered glass, urine, rotten wood, and other things, which are kept secret; some kinds of snuff are moistened with sugar-cane juice or molasses and water, and acquire a peculiar flavour from fermentation, such as the *Macabau* of Martinique. To persons who are not habituated to it, snuff is sometimes productive of deleterious effects. Morgagni relates a case in which sneezing produced a fatal attack of apoplexy; and "Van Swieten has satisfactorily shown," says Dr. Paris, "that continued paroxysms of sneezing tend to load the

vessels of the head with blood; for the violent contraction of the chest impedes for a time the passage of blood through the lungs, and therefore, obstructs the return of venous blood from the brain, the vessels of which are, in consequence, greatly distended; the face therefore reddens, and becomes turgid, the eyes are suffused with water, and appear full and distended. Its occasional dangerous violence is said to have given origin to the benediction so universally bestowed on those who sneeze." — (*Pharmacologia.*)

Upon the unseemliness of snuff-taking, as relates to the dirty discharge from the nose, and the quantity which is spilt about the dress, there can be but one opinion; but how far it may prove beneficial or injurious when the habit is fully established, admits of doubt. In these cases, although its more violent effects as an errhine soon diminish, and, indeed, cease altogether, it still operates as a local stimulant, and tends to keep up an unnatural excitement; it generally occasions a stuffiness, as it is called, in the nose, and, as is the case with dram-drinking and opium-eating, the quantity required to produce a given effect is always in an increasing ratio; so that some professed snuff-takers have the box constantly in hand, and are absolutely miserable without it. It is, however, difficult to get any direct evidence of its supposed pernicious effects. Dr. Cullen states, that "whenever the nasal discharge has been considerable, the laying aside the custom of taking snuff has been productive of evil;" yet I have known more than one instance where it has been indulged in for a long series of years, and abruptly discontinued, without any bad consequence. Nasal obstructions, morbid secretion of viscid mucus, irritation of the larynx and trachea, and dyspeptic symptoms, may sometimes be referred to it. Dr. Christison observes, that writers on the diseases of artisans have made many vague statements on the supposed baneful effect of the manufacture of snuff on the workmen, but very minute and accurate inquiry into the real state of the case, has not verified such opinions; it appearing that the workmen very easily become habituated to the atmosphere of the manufactory, that they are not particularly subject either to special diseases or to disease generally, and that they live on an average quite as long as other tradesmen. This statement is founded upon reports relative to the tobacco manufactories of France; but it is said that in England, and in London more especially, the result is less favourable, and that pulmonary complaints, including asthma, are often fatal to the workmen in snuff-mills; but such affections also prevail among drug-grinders in general, so that we cannot think any special inference bearing particularly on tobacco, can be drawn from the fact.

As a therapeutic agent, tobacco is a powerful and apparently direct sedative, when administered internally in the form of infusion or tincture; it is also diuretic: at present, its use is almost limited to injection, as an enema, in cases of spasmodic constipation, of hernia, of retention of urine, and tetanus: its good effects, however, are unfortunately almost always very problematical, and the fainting

fits, and other effects above adverted to, which it occasionally induces, are of a dangerous and alarming nature. On the whole it is doubtful whether it should ever be prescribed, excepting in very urgent cases, and then with the utmost caution. Tetanus may be instanced as one of the urgent cases. Curling (*Treatise on Tetanus, in Bell's Select Med. Lib.*, 1837, p. 91,) says "more has now been advanced in favour of tobacco than can be adduced in favour of any other remedy yet resorted to." Still it is right to say with Pereira, that, "as an anodyne, diuretic, or emetic, it is much inferior to many other articles of the Materia Medica." Even the external use of tobacco washes, which are sometimes employed to cure the itch, is dangerous, and should be prohibited. The *Infusum Tabaci* of the Pharmacopœia is the usual form for clysters, but the preceding statements show that, although it is a weak infusion, it cannot be prescribed with impunity. Sometimes an injection of the smoke of tobacco is used as a substitute for the infusion; it is said to be a more penetrating and equally powerful and dangerous sedative.

Enema of Tobacco. — Take of Tobacco, a drachm; Boiling Water, a pint. Macerate for an hour, and strain.

"Much caution," says Dr. Thomson, "is required in using this powerful sedative enema; if it depress too much, solution of ammonia and brandy should be freely administered." It is strange that tobacco clysters were at one time commonly recommended in cases of suspended animation from drowning.

TAMARINDUS (Arab. *Tamar*). *Leguminis pulpa.* The pulp of the pods of Tamarind. *Tamarindus Indica. Cl.* 16. *Ord.* 1. Monadelphia Triandria. *Nat. Ord.* Leguminosæ.

This tree is a native of the East and West Indies, America, Egypt, and Arabia.

The West Indian tamarinds are generally preserved in casks of syrup; the East Indian are darker, dry, and without sugar; the former are an agreeable sweetmeat, and the latter chiefly used for culinary purposes.

Tamarinds allay thirst in febrile affections, and, if largely eaten, operate upon the bowels, and generally gripe. In preparing *pulp of tamarinds*, or in preserving them with sugar, copper vessels should be avoided.

TARAXACUM (ταραττειν, *to disturb*, or *alter*). Dandelion. *Radix.* The root of *Leontodon Taraxacum. Cl.* 19. *Ord.* 1. Syngenesia Æqualis. *Nat. Ord.* Cichoraceæ. (*Taraxacum Dens Leonis.* Lindley. *Flora Medica.*)

Root tap-shaped, very milky, externally black, difficult of extirpation.

The only officinal formula of this is the following: —

Extract of Taraxacum. — Take of Taraxacum Root, two pounds and a half; Boiling distilled Water, two gallons. Macerate for twenty-four hours, then boil down to a gallon, and strain the liquor whilst hot; lastly, evaporate to a proper consistence.

A decoction of dandelion has long been used as a diet-drink, in liver complaints and some other chronic visceral affections: it is diuretic, diaphoretic, and slightly aperient. In certain cases of dyspepsia, benefit is said to result from the use of this medicine in large doses. Dr. W. Philip says, "it is best adapted to those cases in which the bile is deficient or much disordered, while the power of the stomach is still considerable." — (*On Indigestion.*)

In the treatment of chronic inflammation of the liver, the late Dr. Pemberton speaks highly of taraxacum, and recommends its trial in incipient scirrhus, and several chronic derangements of the stomach. — (*On Diseases of the Abdominal Viscera.*)

It is also employed as an alterative in cutaneous eruptions; but in such cases its medical efficacy is equivocal. It often happens, however, that during the use of diet-drinks, and analogous remedies, more attention is paid to the state of the stomach and bowels, and food is abstained from which is rich and greasy, or otherwise disagreeing with the stomach, in order that the alterative plan may not be interfered with; hence it is that the mere putting the patient upon a system which makes him more attentive to the state of the *primæ viæ* is useful in the removal of many complaints.

Extract of Taraxacum generally has a sweet taste, and is readily soluble in water: but Mr. Squire, who has paid much attention to this and other extracts, informs me that, when cautiously prepared, and not unnecessarily exposed to the action of air, the extract is bitter, and that, when sweet, the medical efficacy of the remedy is impaired. It may be given in doses of half a drachm, or more, four or six times a day, dissolved in some aromatic water, a form preferable to that of pill. It may safely be prescribed as an alterative in cutaneous affections, and in those derangements of general health which are accompanied by obscure hepatic symptoms, and in which the usual treatment is ineffectual. Taraxacum is thought well of by various writers and practitioners of eminence, and is by them generally recommended in the form of liquid extract, or as it is sometimes termed, *Mellago Taraxaci;* the expressed juice of the fresh root is also used in the dose of two fluid ounces every morning, with an equal quantity of milk.

According to Jahn, the juice of taraxacum contains bitter extractive, caoutchouc, traces of resin, sugar, gum, a free acid, and sulphate, muriate, and phosphate of potassa and lime.

At different seasons of the year, *one pound* of extract is afforded by the following proportions of the expressed juice, namely,

January and February 4 to 5lbs. of juice = 1lb. of extract.
March . . . . . 6 to 7lbs. of juice = 1lb. of extract.
April, May . . . . 8 to 9lbs. of juice = 1lb. of extract, and during these months, the juice is so aqueous, that it does not coagulate spontaneously, as it does during the preceding months.
June, July, August . 6 to 7lbs. of juice = 1lb. of extract, and now it again coagulates; the roots are spongy, and the new ones very slender.
In September and October 4 to 5lbs. of juice = 1lb. of extract.
In November and December 4lbs. of juice = 1lb. of extract.

During November and December the root is in the most vigorous condition, and most abundant in those ingredients upon which its medicinal powers depend. Frost has a singular effect upon the growing roots, causing the bitterness to decrease, and sweetness to take its place; it is also observable that, on the disappearance of the frost, the bitter returns in a stronger degree, and the sweetness disappears.

The *dark* extract of the shops owes its sweetness to a curious change in the juice during evaporation; and if this process be much protracted, acetic acid is formed, which imparts to the extract a sensible acidity. When carefully prepared, extract of taraxacum is of a brown colour, has a sensibly bitter taste, and a peculiar aroma, but it is not sweet.

From the chemical examination which Mr. Squire has made of the expressed juice of the root of taraxacum, it appears to contain gum, albumen and gluten, an odorous principle, extractive, and a peculiar crystallisable bitter principle, soluble in alcohol and water.

TARTARIC ACID. *Acidum Tartaricum.*

In the process for preparing this acid, the tartaric acid of the bitartrate is converted by two operations into tartrate of lime, and the tartrate of lime is afterwards decomposed by the dilute sulphuric acid.

The solution of tartaric acid is then evaporated till it crystallises, and the crystals are perfected and purified by repeated solutions and evaporations. Unless, however, the acid is made upon a large scale, and whitened by filtration through pure animal charcoal, the crystals are small, imperfect, and discoloured.

According to Hermbstadt, tartaric acid may be economically manufactured from the juice of sour grapes, thirty-six ounces of which afford about two and a-half ounces of the acid.

Tartaric acid may be used in the formation of refrigerant drinks; and, as it does not deliquesce by exposure to air, it is generally employed in the preparation of the effervescent powders used as substitutes for soda water. For this purpose the tartaric acid should be powdered, and dried in a gentle heat; it should then be mixed in proper proportions with powdered bicarbonate of potassa, sesquicarbonate of soda, and kept in well-corked vials: a tea-spoonful stirred into a small tumbler of cold water, affords a pleasant effervescent draught, and is a good vehicle for some of the saline aperients. These effervescing draughts, when they contain excess of acid, are often effectual in removing a tendency in the urine to deposit the ammonio-magnesian phosphate, especially where water saturated with carbonic acid cannot be procured; if merely neutral, they have, when persevered in, a contrary or alkaline effect on the urine.

TEREBINTHINA VULGARIS. *Common Turpentine.* The liquid resin of the *Pinus Silvestris.* Scotch Fir. (See Pix Liquida and P. Nigra.)

Common turpentine is obtained by incision; it is a viscid sub

stance, of a grayish-yellow colour, a slight terebinthinate odour, and a warm and bitterish flavour. When distilled with water, the volatile oil called *essence*, or *oil of turpentine*, passes over, and *yellow resin* remains (See Resina).

Oil of Turpentine has a peculiar odour, and a warm and somewhat aromatic, but not agreeable flavour. In its ordinary state it contains impurities, from which it may be freed by agitation with quicklime and digestion over chloride of calcium; its specific gravity is then 0·860, and its boiling point 312°; the density of its vapour 4·740.

The relation of this oil to camphor has been already stated (*see* Camphora). It is highly inflammable, and when long exposed to air, absorbs oxygen, and becomes changed in its properties; it absorbs chlorine and hydrochloric acid, and forms, with the latter, the curious compound called *artificial camphor*.

The following are the only officinal formulæ of the present London Pharmacopœia in which oil of turpentine is used:—

Enema of Turpentine. — Take of Oil of Turpentine, a fluid ounce; Yolk of Egg, as much as may be sufficient; rub them together, and add Decoction of Barley, nineteen fluid ounces. Mix.

Liniment of Turpentine. — Take of Soft Soap, two ounces; Camphor, an ounce; Oil of Turpentine, sixteen fluid ounces. Agitate them together till they are mixed.

In small doses, oil of turpentine is a stimulating diuretic, and as such is prescribed in gleets and similar cases in which copaiba is used; sometimes it is useful in urinary sand, but in general it irritates the kidneys and disorders the stomach, when exhibited in such cases. In chronic rheumatism it is occasionally an effective stimulant, and deserves trial in obstinate cases. It is the most certain of the anthelmintics, especially in the expulsion of tapeworm; in such cases it requires to be given in large doses, repeated night and morning till the bowels are evacuated and the worm dislodged; and should the second dose not operate, some castor oil should be given to aid its purgative powers. It is remarkable that, in these large doses, oil of turpentine rarely proves to any extent diuretic, though it communicates to the urine the violet odour peculiar to the turpentines. It usually nauseates and excites eructations from the stomach, headache, giddiness, and sometimes vomiting. Dr. Paris advises large doses of oil of turpentine in certain cases of obstinate constipation, depending upon affections of the brain; Dr. Latham found it useful in epilepsy; and I have myself used it with marked benefit in this disease, especially in half-ounce doses combined with the same quantity or an ounce of castor oil. Its prolonged use caused irritation in the bladder, which reacted injuriously, it seemed to me, on the brain. A singular case of locked jaw in an hysterical young woman, cured by a clyster of oil of turpentine, is related in the *Medico-Chirurgical Transactions*, by Dr. E. Philips, vol. vi., p. 65. In some cases of constipation it has been used as an enema, in the proportion of an ounce, rubbed with the yolks of two eggs, and diffused through a pint of

thin starch, or according to the above officinal formula. Thus administered it is one of the most effectual remedies for ischuria. As a stimulant, oil of turpentine is applied in liniments, blended with camphor, ammonia, and other rubefacients; applied to bleeding vessels, it often operates as an effectual styptic. The stimulating application sold under the name of *Whitehead's Essence of Mustard*, is composed of camphor and oil of rosemary, dissolved in oil of turpentine, with a little flour of mustard added to it. Dropped into the ear, diluted, if requisite, with a little olive oil, it relieves deafness from deficient ceruminous secretion.

When the object is to employ oil of turpentine as a diuretic and diaphoretic in gleets and chronic rheumatism, the *dose* is from *ten to thirty or forty minims;* it may be rubbed with a little mucilage of gum arabic, honey, or yolk of egg, and diffused through ten drachms or an ounce and a half of any aromatic water. When administered for the expulsion of the tape-worm, from *half an ounce to an ounce* is the usual dose. It may be swallowed without inconvenience, merely floating upon an ounce or two of water. In these cases, two, three, or even four ounces have been given without further inconvenience than headache and exhilaration, succeeded by more or less nausea, and in some persons by an erythematic eruption. The worm is generally, but not always, voided dead. Even when no worm is discharged, or perhaps existed in the intestinal canal of the patient, great relief from verminose symptoms is procured by a full dose conjoined with castor oil.

In low fevers, and in puerperal fever and peritonitis; in neuralgia, and particularly sciatica, and chronic dysentery and dropsy, and in iritis, oil of turpentine is a remedial agent of considerable power.

The *Linimentum Terebinthinæ* is a valuable application to extensive burns and scalds; it was first employed by Dr. Kentish, (*Essay on Burns*) and subsequent experience has amply proved its utility. He recommends the parts to be immediately bathed with warm oil of turpentine, and then covered with plaster thickly spread with the above liniment. Wine, opium, and cordials are at the same time administered: the subsequent treatment consisted in the use of aperients, and the application of mild emollient dressings.

Oil of turpentine has been long employed as a rubefacient. St. John Long's liniment consists of oil of turpentine and acetic acid, held in suspension by yolk of egg.

Whenever oil of turpentine is used, it must be cautiously employed in the neighbourhood of flame or fire, in consequence of its great and ready inflammability.

TIGLII OLEUM. *Oleum e seminibus expressum.* The expressed oil of the seeds of *Croton Tiglium. Cl.* 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Euphorbiaceæ.

This species of Croton is a native of the continent of India, and Ceylon.

According to Brandes (*Journ. de Pharm.* XI.) Croton seeds con-

tain the following proximate principles; a volatile oil, crotonic acid, an alkaloid, colouring matter, stearin, wax, resin, inulin, gum, gluten, tragacanthin, albumen, starch, and phosphate of magnesia. We are indebted to Dr. Nimmo of Glasgow for some valuable facts respecting the composition and uses of these seeds and their oil. (*Quart. Journ.* XIII.) He found 100 parts of the seeds to consist of sixty-four of kernel, and thirty-six of shell; the latter yielded a brown, but inert tincture with alcohol; the former, or the kernel of the seed, yielded sixty parts of expressed oily matter, and forty of insoluble and farinaceous matter; the oil contained forty-five parts of acrid purgative principle, soluble in spirit of wine, and fifty-five of fixed oil. The active principle of Croton seeds appears to be of crotonic acid and crotonin, and is soluble in alcohol, ether, and oils; the residuary fixed oil is medicinally inert. As it is probable that Croton oil is often adulterated with common fixed oils, Dr. Nimmo suggests the following test of its purity: "Let a very light vial be counterpoised in an accurate balance; pour into it fifty grains, or more, of the Croton oil, add alcohol which has been digested upon olive-oil, of which it dissolves so little as not to injure, in the smallest degree, the alcoholic solution for subsequent use; agitate well, pour off the solution, and add more alcohol in the same manner, until the dissolved portion is diffused in such a proportion of alcohol that each half-drachm measure shall contain equal to one dose of the Croton oil for an adult: by placing the vial near a fire to evaporate what remains of the alcohol in the bottle, if the remainder be to that which has been abstracted by the alcohol, as fifty-five to forty-five, the oil is genuine; if olive, or any other oil, little soluble in alcohol, has been added, the residuum will be larger in proportion. But if Castor oil has been employed, the proportion of the residue will be smaller than in the genuine medicine." This test is founded upon the insolubility of the inert portion of genuine Croton oil in alcohol already saturated by olive oil; such alcohol, however, readily dissolves that portion of the genuine Croton oil, in which its activity resides.

Every part of the Croton plant is purgative, but the seeds especially so, and they were formerly employed under the name of *Molucca grains*. The expressed oil has been re-introduced as a powerful carthartic, in cases of obstinate and protracted constipation, and in lead colic, or where a violent evacuator is required, as in some cases of apoplexy and injury of the brain, and in certain convulsive, hypochondriac, and maniacal affections.

At the last meeting of the *British Association* for the *Advancement of Science* (Sept. 1840), Dr. Newbiggen read a paper on the Therapeutical effects of Croton Oil in certain Affections of the Nerves. Sir Charles Bell had already pointed out its good effects (internally administered) in neuralgia, especially where the disease was seated in the face, or elsewhere, if accompanied by some indication of cerebral affection. Dr. Newbiggen detailed a number of cases which had satisfied him that croton oil possessed a specific power over the

nervous system, independently of its general action as a purgative. The diseases in which the power was exhibited were severe sciatica, which had baffled every other treatment; convulsions in children, and epilepsy, many cases of which it cured: and even in those depending on organic affections of the brain, it rendered the paroxysms less frequent and more moderate. In a case of severe laryngysmus stridulus, occurring in a child nine months old, M. Andral exhibited it in minute doses with complete success. This opinion of the great power of the oil of croton over the nervous system was confirmed by Dr. Abercrombie, who said he had long used it extensively in affections of the head.

The average dose for an adult is one or at the utmost two drops; and perhaps the best, or at least the most active, form for exhibiting it, is in a pill with bread crumb; it may also be rubbed with mucilage, and so diffused in half an ounce or an ounce of any aromatic water; the violence of its operation is somewhat diminished by this dilution.

℞ Mucil. Acaciæ ʒi.; Ol. Tiglii gutta una; tere simul et adde Aquæ Menthæ viridis fʒvj. M. fiat haustus purgans.

This quantity sometimes proves violently operative, emptying the bowels completely of their contents, and exciting a copious watery secretion from them. Larger doses have been given without effect, but this remedy should always be administered with the utmost caution. It should also be remembered that different samples of the oil differ extremely in activity.

Dr. Nimmo prefers the alcoholic tincture of the oil, of such strength that the half drachm is equivalent to a drop of the oil; the following is the formula which he directs:—

℞ Tincturæ (Croton) Olei Tiglii fʒss.; Syrup., Misturæ Acaciæ, āā fʒij.; Aquæ destillatæ fʒss. fiat haustus. After swallowing a little milk, take the draught very quickly, and wash it down with the same diluent.

Having administered it in more than a hundred cases, Dr. Nimmo states that in not more than four was vomiting produced, and that, not violent; in not many more was nausea felt; in all, purging was induced in from half an hour to three hours; the purgative effects were generally moderate, and rarely accompanied with griping. It is recommended by Dr. Nimmo as a hydragogue cathartic in ascites, and as a powerful auxiliary to opium in delirium tremens; he also gave it with success in some cases of jaundice, in an obstinate case of tympanitis, and in excessive corpulence." In India, where it has long been used, ghee or butter, with orange or rice water, or cold butter-milk, and the external affusion of cold water, are employed to counteract its too violent effects, when these occur. It is also used in India as an emmenagogue with excellent effects; and as an external application in rheumatic affections. Diluted with two parts of olive oil, it produces an eruption of small pustules on the skin, and thence operates as a counter-irritant. In some instances the undiluted oil is

used for this purpose. It is said that forty of the seeds will kill a horse in seven hours, and Rumphius states that they are a common poison among the natives of Amboyna.

When rubbed on the abdomen, it sometimes, but not invariably, purges. Rayer mentions a case in which thirty-two drops rubbed on this part produced purging, large vesicles upon the abdomen, swelling and redness of the face, with small, prominent, white, crowded vesicles on the cheeks, lips, chin, and nose. For inflammation of the mucous membrane of the larynx and trachea and its ramifications, also in peripneumony, glandular swellings, gout, and neuralgia, whether of the nerves of the face or limbs, or of the spine and intercostal spaces, its use, externally, is beneficial.

TIN, *see* STANNUM.

TINCTURÆ. *Tinctures.*

All tinctures should be prepared in stopped glass vessels, and frequently shaken during maceration.

With the exception of those which contain very active ingredients, tinctures are not important preparations; and though extensively employed, are not indispensable; so that in hospitals and situations where economy is an object, their place may be supplied by cheaper and more simple formulæ. For another and more important reason, they should in general be dispensed with. I refer to the taste for ardent spirits which the frequent use of purgative and tonic tinctures are apt to give rise to; besides, there is often enough of alcohol taken to excite in a manner at variance with the excitement desired from the article itself, and contraindicated by the nature and stage of the disease.

TONICS (τονος, *tone*, from τεινω, *I stretch*, or *tighten*). Medicines which restore or strengthen the impaired powers of the muscular fibre, giving what is called tone to the system. Bitter and astringent vegetable substances, the salts of iron, and those of a few other metals, and some of the acids, come under the denomination of *tonic remedies.*

TORMENTILLA. *Radix.* The root of *Potentilla Tormentilla. Cl.* 12. *Ord.* 5. Icosandria Polygynia. *Nat. Ord.* Rosaceæ.

This plant is common in dry pastures, and on heaths in England; it flowers about June. The root is perennial, thick, roundish, irregularly conical, and covered with dark brown bark: the interior is dense and reddish; it sends forth many stems, which grow a few inches high; they are round, slender, firm, hairy, and branched towards the top.

Tormentil root is a powerful astringent, and may be substituted for many other analogous remedies: with the exception of galls and catechu it is more abundant in tannin than any article of the Materia Medica. It may be given in substance in doses of *thirty* or *forty grains*, or it may be used in infusion or decoction. It is effectual in the treatment of simple chronic diarrhœa, and may be prescribed in all cases where a pure astringent is required; it may also be employed as a gargle in ulcerations of the mouth, and as an astringent lotion or injection.

Decoction of Tormentilla. — Take of Tormentilla root, bruised, two ounces; Distilled Water, a pint and a half. Boil down to a pint, and strain.

TOXICODENDRON (τοξικον, *poison*, δενδρον, *tree*). Poison Ivy. Poison Oak. Poison Sumach. *Folia.* The leaves of *Rhus Toxicodendron.* *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Anacardiaceæ.

There are three indigenous species of this plant; the one which heads this article, is the *Rhus Radicans;* 2, the *Rhus Vernix*, or *Swamp Sumach;* and 3, *Rhus Pamilum*, which has a more southern locality than the preceding ones.

This plant abounds in a milky juice, which blackens by exposure to air, and may be used as an indelible marking-ink upon linen. It is acrid and poisonous, and is said to emit a highly deleterious vapour. Dr. Lindley says that its exhalations are extremely poisonous to many persons, but not to all. "They bring on itching, redness, and tumefaction of the affected parts, particularly of the face, succeeded by blisters, suppuration, aggravated swelling, heat, pain, and fever. Symptoms, which, though often highly distressing, are rarely fatal. It is employed in powder, infusion, and extract, internally in certain diseases. Dr. Horsfield administered it with success in the dose of a tea-cup of the infusion to consumptive and anasarcous patients; it has been employed with supposed benefit in consumption, and is well spoken of in cases of herpetic eruption, palsy, mania, and paralysis."—(*Flora Medica.*)

The statements respecting the virtues of this plant are eminently contradictory, and we believe no correct analysis has hitherto been made of it. According to Van Mons it contains tannin, gallic acid, resin, gum, green fecula, and "abundance of an inflammable hydrocarbon." (*Ann. de Chim.* xxxv. 106.) The dried leaves, and the extract prepared from them, are stated by Merat and Lens (*Dictionnaire de Mat. Méd.*) to be inert, and the extract prepared in Carolina not to be depended on. "The leaves are inodorous and have a mawkish subacrid taste. Their virtues are completely extracted by water, and partially by alcohol. The aqueous infusion reddens litmus paper, precipitates the solution of sulphate of iron black, that of nitrate of silver brown, and throws down a precipitate with gelatin. Hence it contains gum, resin, gallic acid, and tannin; but a narcotic principle is also present, on which its effects principally depend."—(*Dr. A. T. Thomson.*)

Dr. Alderson of Hull treated cases of paralysis successfully with this remedy; he gave an infusion of the fresh leaves, in the proportion of half an ounce to a pint of water; he recommends it in all diseases of debility. Some have preferred the powder in the dose of from one to four or five grains every six hours; but almost all authorities agree in representing the virtues as much impaired by drying. The leaves are scarcely ever to be had in the shops, and when found, are generally old and dusty, and certainly not to be depended on.

TRAGACANTHA (τραγος, *goat*, ακανθος, *thorn:* its pods are supposed to resemble a goat's beard?) *Succus concretus.* The con-

crete juice of *Astragalus verus*. *Cl.* 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Fabaceæ or Leguminosæ.

The gum is chiefly produced in Persia, and exported from Aleppo. The best is in the form of white, semitransparent, contorted, and vermiform pieces, not readily soluble in water, but softening and swelling like cherry-tree gum. The yellow, brown, and dirty varieties, should be rejected. As an article of the Materia Medica, its virtues nearly resemble those of gum Arabic, to which it is preferred for many pharmaceutical purposes, as forming a more tenacious mucilage. When carefully dried, it admits of reduction to powder.

Compound Powder of Tragacanth. — Take of Tragacanth, in powder, Gum Acacia, in powder, Starch, of each an ounce and a half; Sugar, three ounces. Rub the sugar and the starch together into powder, then, the tragacanth and acacia being added, mix all together.

This inert mucilaginous powder is a good vehicle for more active remedies, and for their administration in small and divided doses; in this way it is a useful accompaniment to calomel. In the dose of half a drachm to a drachm and a half it is sometimes prescribed to allay the tickling of common coughs. With the addition of five grains of nitre it is supposed to diminish the irritation of gonorrhœa.

TURMERIC, *see* Curcuma.

TURNSOLE, *see* Lacmus.

TURPENTINE (*Terpentine*), *see* Terebinthina.

TUSSILAGO (from *tussis*, a cough: in reference to its pectoral powers. It is the βηχιον, [from βηξ, *tussis*,] of Dioscorides). Common Coltsfoot. *Tussilago Farfara*. *Cl.* 19. *Ord.* 2. Syngenesia Superflua. *Nat. Ord.* Compositæ. (Asteraceæ. *Lindley.*)

Coltsfoot is a native of various parts of Europe, the Crimea, Persia, Siberia, the East Indies, from the sea-shore to elevations of nearly 8000 feet.

When this plant is used, the leaves are the part preferred; they yield a mucilaginous, and slightly aromatic bitterish decoction, which is taken and sweetened with honey. Cullen recommended the use of the leaves as an alterative in scrofula, but little reliance is placed at present in any of the supposed virtues of coltsfoot. It was formerly smoked through a reed, or as tobacco, for the relief of asthma, and those affections which have been termed obstructions of the chest. "A vile stimulant nostrum consisting, according to Dr. Paris (*Pharmacologia*), of *equal parts of balsam of tolu, compound tincture of benzoin, and double the quantity of rectified spirit of wine*, is sold under the name of *Essence of Coltsfoot*, as a remedy for cough."—(*Lond Disp.*)

VALERIANA (from *Valerius*, who first described it). *Radix*. The root of *Valeriana officinalis*. *Cl.* 3. *Ord.* 1. Triandria Monogynia. *Nat. Ord.* Valerianaceæ.

Common valerian is found in wet places over the whole of Europe; that which grows in dry pastures is preferred for medical use. The root is tuberous and creeping.

Infusion of Valerian. — Take of Valerian (root), half an ounce; Boiling distilled Water, a pint. Macerate for half an hour in a lightly-closed vessel, and strain.

Compound Tincture of Valerian. — Take of Valerian (root), bruised, five ounces; Aromatic Spirit of Ammonia, two pints. Materate for fourteen days, and filter.

Valerian was first brought into estimation by Fabius Colonna, about the year 1592, having relieved, but not cured himself of epilepsy by it. Its singular and fetid odour, so enticing to cats, has given it celebrity in some nervous and hysterical affections. Its taste is warm and bitter, and it imparts its virtues to water, so that it may be administered in infusion or decoction; but its flavour is impaired by long boiling. As an antispasmodic and tonic, in some nervous affections and morbid irritability, valerian is certainly useful: upon the same principle, it is a good adjunct to cinchona in those stages of the typhoid and nervous fevers where that remedy is indicated: it has also been recommended in hypochondriasis.

Speaking of the use of valerian as a nervous tonic, Dr. Heberden says, "It has often been given without much apparent effect; but yet I have met with some whom it threw into such agitations and hurries of spirits, as plainly showed that it is by no means powerless. Most cats are fond of gnawing it, and seem to be almost intoxicated by it into outrageous playfulness; and the nerves of cats afford a very tender test of the powers which any substances possess of affecting the nerves. The poisoned darts of the Indians, tobacco, opium, brandy, and all the inebriating nervous poisons, are far more sensibly felt by this animal than by any other that I know of an equal size."

"The aromatic, or rather fetid roots, are stimulant, not only acting upon the secretions, but producing a specific influence over the cerebro-spinal system, bringing on, as is well known, a kind of intoxication in cats, and in large doses occasioning in man, scintillations, agitation, and even convulsions. It is chiefly employed in asthenic fevers, epilepsy, chorea, hysteria, and as an anthelmintic."—(*Lindley*).

The *infusion* is the best form for its administration, which may be given in ounce-and-a-half or two-ounce doses, conjoined with peppermint, mint, or pennyroyal water; it may be used with camphor, ammonia, and other nervine stimulants. It contains so large a proportion of inert woody fibre that the powdered root cannot be regarded as an eligible form for its administration, though it has been occasionally preferred by those who have had much experience of its efficacy. (*See* Merat et Lens. *Dictionnaire.*)

VEGETABILIA. *Vegetables.*

Vegetables are to be collected in dry weather, when they are neither wet from showers nor dew; they are to be collected annually, and those which have been kept longer than a year are to be rejected.

Most roots are to be dug up before the stalks or leaves shoot forth.

Barks ought to be collected at that season when they can be most easily separated from the wood.

Leaves are to be gathered after the flowers are blown; and before the seeds ripen.

Flowers are to be gathered recently blown.

Seeds are to be collected as soon as they are ripe, and should be kept in their own seed-vessels.

Preparation of Vegetables. — Vegetables, shortly after they are gathered, excepting those which ought to be used fresh, should be lightly spread, and dried as quickly as possible, with a gentle heat: they should then be kept in convenient vessels, excluded from access of light and moisture.

Lay up those roots, which we have directed to be kept fresh, in dry sand. Cut the Cormus of Meadow Saffron, and the bulb of Squill, before drying, into thin transverse slices, previously peeling off the dry layers.

Put pulpy fruits, if unripe, or if ripe and dry, in a moist place to soften; then press the pulp through a hair-sieve; boil them afterwards over a slow fire, frequently stirring; lastly, evaporate the water in a water-bath until the pulps become of a proper consistency.

Pour boiling water upon the bruised pods of Cassia, so that the pulp may be washed out; press this first through a coarse sieve, and afterwards through a hair-sieve; then evaporate the water on a water-bath, until the pulp has a proper consistency.

Of fruits that are ripe and fresh, press the pulp or juice through a sieve without boiling.

Gum-Resins. — Separate Opium very carefully from extraneous substances, especially from those which are external. Let Opium be kept *soft*, fit to form pills; and *hard*, which has been so dried in a water-bath, that it may be reduced to powder.

Those Gum-Resins are to be preferred, which can be selected so clean as to require no purification. But those which appear to be less pure, are to be boiled in water until they soften, and squeezed in a press through a hempen cloth; then to be set by, that the resinous part may subside. The supernatant liquor being poured off, evaporate it in a water-bath, the resinous part being added towards the end, that it may unite with the gummy parts, and towards the end of the evaporation mix the resinous part intimately with the gummy.

The easily-fusible Gum-Resins may be purified by putting them into an ox-bladder, and keeping them in boiling water until they become soft enough to be separated from their impurities by pressing through a hempen cloth.

Dissolve Styrax in rectified Spirit, and strain; then let the Spirit distil over by a gentle heat until it has acquired a proper consistence.

Such are the general instructions given in the Pharmacopœia, respecting the collection, preservation, and purification of vegetable products. The directions in the first paragraph are essentially the same as, though less concise than, the following, which were long ago laid down by Linnæus (see *Pharmacopœia Batava*). They involve some important considerations connected with the growth and functions of plants, or with *vegetable physiology*, a branch of study too much neglected by, but of great interest and value to, the medical student.

1. Radices sub veris initium antequam folia prorumpunt effodiendæ.
2. Herbæ decerpendæ cùm flores formantur.
3. Flores prius legendi quam pollen antherarum demittunt.
4. Stipites autumno, quo potiori vi animantur, desumendæ.
5. Turiones colligendi, antequam eorum folia se explicuerint.
6. Cortices ex fructibus autumnali tempore, ex arboribus autem vernali separandi.
7. Ligna potissimùm tempore hyemali abscindenda.
8. Fructus plerumque colligendi postquam maturuere.

Quod radicum collectionem attinet, semper attendamus ad vegetationem plantæ propriam, atque ex hâc dijudicemus tempus eas eruendi. Earum bonitas in primis

dignoscitur ex cortice et parenchymate. Radices plantarum annuarum maximè evellantur, stirpe jam adultâ, antequam flores ferunt, biennium autumno ejus anni quo seminatæ sunt, decrescente, vel vere proximo. Ceteroquin plantis quibus vivax per plures annos radix inhæret, hanc auferamus, quùm primo vere gemmæ turgere, vel folia, si hæc hyeme decidunt, se explicare videntur. Nec obliviscamur, plures plantas culturâ inefficaciores fieri, ut conium maculatum, quasdam contrà tempore virtute augeri. — (*Pharmacopœia Batava, editore J. F. Niemann*, vol. i. p. 347).

The propriety of rejecting the generality of vegetables collected in the preceding year, is too often unattended to by the wholesale venders to whom apothecaries generally resort for their supplies. In many articles, odour and acrimony are greatly impaired by age, and their virtue is diminished or lost; hence dangerous uncertainties result from their employment: as in regard to hemlock, henbane, foxglove, &c.

Roots are ordered to be dug up when their proper juices are most perfect, and before they are consumed in the changes which ensue during the growth of the stem and leaves. They may often, with equal propriety, be collected early in the winter, before the stems have entirely withered away.

Barks are directed to be taken at that season when they most easily separate from the wood; that is, with few exceptions, late in the spring or early in summer; at that time they abound most in the secretions of the individual tree: at a later period the *liber* or inner layer of bark becomes converted into wood, the properties of the bark are impaired, and it is with difficulty removed from the tree.

Leaves are in perfection at the time of the flowering of the plant; at that period they are found to contain their characteristic products in the greatest abundance; they should be perfectly formed, and not beginning to wither, which they often do, when the seeds are about to ripen.

Flowers should, for the same reason, be gathered soon after they expand, and before the pollen falls from their anthers.

Seeds may often be preserved in their pods, but this is sometimes inconvenient, from the bulk or liability to moulder of the seed-vessel. Some seeds may be long kept without deterioration, especially those which abound in volatile oil; they even retain their vegetative powers for years: others become rancid, often in a few months, especially those in which fixed oils predominate. Seeds that are abundant in mucilage are liable to the attacks of insects and to decay from moisture.

There appears to be no general connexion in the virtues of different parts of plants. In trees, the active principles are commonly most abundant in the bark, for it is there that the perfect sap, after it has been exposed to light and air in the leaves, chiefly deposits the peculiar secretions of the vegetable. This deposition principally goes on in the spring and early part of the summer; hence the propriety of collecting barks at that time of year. The astringency of the oak, the aroma and bitterness of cascarilla, the salifiable

principles of the various species of cinchona, and the bitterness of cusparia, are all found in their respective barks, which, therefore, are the parts directed for use.

In herbaceous plants the most active principles are frequently concentrated in the roots, as in gentian, jalap, liquorice, hellebore, rhubarb, &c. In other cases the roots are inactive, and the virtue resides in the leaves, as of hemlock, digitalis, senna, savine, &c. In others the seeds partake of some activity, as those of colchicum; while the seeds of the poppy are inert. The aroma of these plants is usually associated with the essential oil of the leaves, flowers, or fruit and seeds, as in mint, lavender and chamomile, in the orange and lemon, and in caraways, cardamoms, &c.

Medicinal virtue or activity seldom pervades every part of the plant: that part, therefore, in which it is chiefly found, and from which it is most easily obtained, should be selected as officinal; and the Materia Medica should not be encumbered with inert, uncertain, and redundant articles.

There are several important points respecting the preparation of vegetable bodies, which are either unnoticed, or too briefly adverted to in the above-quoted directions of the Pharmacopœia.

The temperature at which vegetable substances are dried for pharmaceutical use should rarely fall short of 100°, nor should it exceed 212°. The heat of steam is preferable to any other, as, under common pressure, it can rarely injure the vegetable; whereas drying stoves heated by flues, are liable to become so hot as to parch and decompose substances that are merely intended to be dried. In constructing drying stoves, great attention should be be paid to their *ventilation:* currents of fresh and warmed air should be abundantly admitted from below, and there should be apertures above to carry off the heated air and the vapour from the articles that are drying. In some few instances, drying in the open air and sunshine is to be preferred: but light bleaches and probably affects the efficacy of some plants.

If roots are to be preserved fresh, moist, and not dry, sand is the best material to bury them in. The cormus of colchicum should be cut into *thin slices*, and carefully dried. Squills should be cut transversely into very thin slices, and rapidly but cautiously dried until they become brittle. The dried bulb should be kept in a dry and warm place, for in a damp air it becomes tough and mouldy, and loses much of its acrimony; this also happens to powdered squill, which should be used freshly pulverised, and should be prepared in small quantities at a time; or, if in larger, should be excluded from air and moisture.

The pulps of fruits retained in the Pharmacopœia, are those of the tamarind and cassia-pod, of the dog-rose, and of prunes; to none of these, nor indeed to any others, can the directions of the Pharmacopœia be applied. The usual mode of obtaining the pulps of such fruits as have become dry, consists in softening them by exposure to steam, or by a small quantity of boiling water, until

they admit of being rubbed through a proper sieve; in short, they are to be treated nearly in the same way as is directed for the extraction of the pulp of cassia-pods.

Opium, and some other substances not strictly belonging to the gum-resins, are included under that head. When opium has been cleansed from adhering substances, it should be dried in a temperature below 212°, until it no longer loses weight; it then becomes sufficiently *hard* to admit of being powdered and sifted, in which state *only* it should be used for pharmaceutical preparations and medical prescriptions. In the *soft* state, the quantity of water is very variable, and affects the dose of an article of so much activity. In prescribing opium in pills, therefore, it is better to use it in powder, than to rely upon the *opium molle*.

The Gum-resins, directed for medical use in the present Pharmacopœia are *Ammoniacum*, *Assafœtida*, *Gamboge*, *Euphorbium*, *Galbanum*, *Myrrh*, *Olibanum*, *Opoponax*, *Sagapenum*, and *Scammony;* these may generally be procured sufficiently free from impurities for medical use; but as the virtues of several of them depend principally upon the volatile oil which they contain, the process of softening them in boiling water until they admit of being pressed through hempen cloth would obviously injure them; while upon others such a process cannot be performed, as they are hardened by the above temperature. Under this head, however, the directions of the Pharmacopœia are not sufficiently explicit. The best mode of cleansing ammoniacum, assafœtida, and galbanum, is to pulverise and sift them in cold weather; the powder afterwards agglutinates, which is of no consequence. The *boiling in the bladder* should above all things be disallowed.

Styrax is rarely to be found, except in the cabinets of the curious: when pure, it requires no purification; and when impure the process above directed is inefficient.

VERATRUM. *Radix.* The root of White Hellebore, *Veratrum album. Cl.* 23. *Ord.* 1. Polygamia Monœcia. *Nat Ord.* Melanthaceæ.

This plant is found in meadows in the south of Europe, from Spain to the Caucasus. The root is perennial, fleshy, and fusiform, beset with strong fibres gathered into a head.

The proximate principles of the root of white hellebore are stated by Pelletier and Caventou to be elain, stearin, gallate of veratria, yellow colouring matter, starch, gum, and lignin. The properties of *Veratria* have been already described (*see* Sabadilla).

The fresh root has a peculiar nauseous odour, and a bitter pungent taste. The dried root is inodorous and less acrid. The following are the officinal preparations:—

Decoction of White Hellebore. — Take of White Hellebore, bruised, ten drachms Distilled Water, two pints; Rectified Spirit, three fluid ounces. Boil the hellebore in the water down to a pint, and when it has cooled, add the spirit, then press and strain.

Ointment of White Hellebore.— Take of White hellebore, powdered, two ounces; Lard, eight ounces; Oil of Lemons, twenty minims. Mix.

Wine of White Hellebore. — Take of White Hellebore, sliced, eight ounces; Sherry Wine, two pints. Macerate for fourteen days, and filter.

When white hellebore is administered internally, its operation is extremely violent; it purges and vomits even in small doses, and in larger ones excites fainting, convulsions, and excessive and dangerous debility.

In its action on the system, veratrum album is more closely related to Sabadilla and meadow saffron, than to any other medicinal agents. It is more acrid and less stupifying than Helleborus niger, with which it has been so frequently compared, both by ancients and moderns. Orfila (*Toxicol. Gen.*) ascertained by experiments on animals, that it is more active as a poison than the last-mentioned substance. It is rarely employed on account of the alleged uncertainty of its operation. Mr. Pereira thinks, however, that from the few trials which he has made with it, its uncertainty is much exaggerated, and is principally referrible to the varying length of time in which the rhizome has been kept after its removal from the earth, for, like colchicum, it deteriorates by keeping. Although it has been prescribed in some cases of mania, of epilepsy, and paralysis, the uncertainty of its effect has induced most practitioners to reject it. The dose of the *Vinum Veratri* is ten minims, gradually increased if required. It may be given in any aromatic water. Powdered white hellebore is sometimes used, diluted with inert powders, as a sternutatory in paralytic affections, and especially in gutta serena; but it is not preferable to other safer remedies. The *decoction* is occasionally prescribed as a lotion in scabies and other eruptive disorders; and it is a favourite ingredient in the washes used by cattle-doctors. It often proves, however, even in this way, dangerously active.

The *ointment* has been recommended for the cure of scabies, when the odour of sulphur is objected to; it requires caution in its use.

The best account of the *poisonous effects* of veratrum is contained in a thesis by Dr. Schabel, published at Tübingen, in 1817. "Collecting together the experiments previously made by Wepfer, Courten, Viborg, and Orfila, and adding a number of excellent experiments of his own, he infers that it is poisonous to animals of all classes; horses, dogs, cats, rabbits, jackdaws, starlings, frogs, snails, and flies; that it acts in whatever way it is introduced into the system; by the stomach, rectum, windpipe, nostrils, pleural membrane of the chest, an external wound, or the veins; that it produces in every instance symptoms of irritation in the alimentray canal, and injury of the nervous system; and that it is very active, three grains applied to the nostrils of a cat having killed it in sixteen hours."—(*Christison*).

There is an account in *Rust's Magazine* (xiv., 547) of a family of eight persons poisoned by eating bread for a whole week, in

which the powder of white hellebore had been accidentally introduced. They were severally attacked with pains in the abdomen, a sensation as if the intestines were wound up into a clue, giddiness, and soreness of the mouth. They all recovered by the use of laxatives. The following cases are also quoted by Dr. Christison. Three people took the root by mistake. The symptoms that ensued were very characteristic of its double action. In an hour they had burning in the throat and stomach, followed by nausea, dysuria, and vomiting; weakness and stiffness of the limbs, giddiness, blindness, and dilated pupil; great faintness, convulsive breathing, and small pulse. One of them, an elderly woman, who took the largest share, had an imperceptible pulse, stertorous breathing, and total insensibility even to ammonia held under the nose. Next day she continued lethargic, complained of headache, and had an eruption like flea-bites. These persons recovered (Horn's *Archiven*). Bernt quotes a fatal case from *Schuster's Medical Journal*. "A man took twice as much as could be held on the point of a knife, was attacked with violent and incessant vomiting, and lived only from the morning till night. The gullet, stomach, and colon, were here and there inflamed." One of the best antidotes for this poisoning is said to be a strong infusion of galls.

VINA. *Wines.*

Medicated wines should be prepared in stopped glass vessels, and frequently shaken during maceration.

The following are the *Medicated Wines*, or *Vinous Tinctures* of the present London Pharmacopœia, omitting that of aloes: they are all directed to be prepared with *Sherry*, and to be macerated for fourteen days: —

Vinum Colchici . .	Wine of Colchicum, *see* Colchicum.
Vinum Ipecacuanhæ .	Wine of Ipecacuanha, *see* Ipecacuanha.
Vinum Opii . . .	Wine of Opium, *see* Opium.
Vinum Veratri . .	Wine of White Hellebore, *see* Veratrum.

VINUM XERICUM. *Sherry Wine.*

This is the only wine which is retained in the present London Pharmacopœia, and is one of the best for the preparation of vinous tinctures, being what is usually termed a strong dry wine. It is not, however, to be presumed, that genuine sherry will ever be wasted upon these formulæ; the article usually sold under the name of *sherry* being a mixture of Marsala, Cape, and other cheap white wines, either pale, golden, or brown, according to the proportion of burned sugar with which it is tinted. Sherry is, however, generally, what is called in the trade a *sound wine*, not readily susceptible of acetous fermentation, and of a quality not ill adapted for medication.

The medicinal and therapeutic uses of wine correspond more or less with those of spirituous liquors generally (see page 27). Their relative *strength* may be judged of from the following table; but as their employment as medicines is also dependent upon their

relative *acidity*, and occasionally upon other peculiarities, I shall subjoin a few remarks upon the principal varieties.

TABLE, SHOWING THE QUANTITY OF ALCOHOL (of the SPECIFIC GRAVITY of 0·825 at 60°) contained in the principal varieties of WINE, BEER, and SPIRITS. (See *Philosophical Trans.*, 1811).

	Proportion of Spirit per cent. by measure.
1. Lissa	26·47
Ditto	24·35
Average	25·41
2. Raisin wine	26·40
Ditto	25·77
Ditto	23·20
Average	25·12
3. Marsala	26·03
Ditto	25·05
Average	25 09
4. Port	25·83
Ditto	24·29
Ditto	23·71
Ditto	23·39
Ditto	22·30
Ditto	21·40
Ditto	19·00
Average	22·96
5. Madeira	24·42
Ditto	23·93
Ditto (Sercial)	21·40
Ditto	19·24
Average	22·27
6. Currant wine	20·55
7. Sherry	19·81
Ditto	19·83
Ditto	18·79
Ditto	18·25
Average	19·17
8. Teneriffe	19·79
9. Colares	19·75
10. Lachryma Christi	19·70
11. Constantia, white	19·75
12. Constantia, red	18·92
13. Lisbon	18·94
14. Malaga (1666)	18·94
15. Bucellas	18·49
16. Red Madeira	22·30
Ditto	18·40
Average	20·35
17. Cape Muscat	18·25
18. Cape Madeira	22·94
Ditto	20·50
Ditto	18·11
Average	20·51
19. Grape wine	18·11
20. Calcavella	19·20
Ditto	18·10
Average	18·65
21. Vidonia	19·25
22. Alba Flora	17·26
23. Malaga	17·26
24. White Hermitage	17·43
25. Roussillon	19·00
Ditto	17·26
Average	18·13
26. Claret	17·11
Ditto	16·32
Ditto	14·08
Ditto	12·91
Average	15·10
27. Zante	17·05
28. Malmsey Madeira	16·40
29. Lunel	15·52
30. Sheraz	15·52
31. Syracuse	15·28
32. Sauterne	14·22
33. Burgundy	16·60
Ditto	15·22
Ditto	14·53
Ditto	11·95
Average	14·57
34. Hock	14·37
Ditto	13·00
Ditto (old in cask)	8·88
Average	12·08
35. Nice	14·63
36. Barsac	13·86
37. Tent	13·30
38. Champagne (still)	13·80
Ditto (sparkling)	12·80
Ditto (red)	12·56
Ditto (ditto)	11·30
Average	12.61
39. Red Hermitage	12·32
40. Vin de Grave	13·94
Ditto	12·80
Average	13·37
41. Frontignac	12·79
42. Côte Rôtie	12·32
43. Gooseberry wine	11·84
44. Orange wine, — average of six samples made by a London manufacturer	11·26
45. Tokay	9·88
46. Elder wine	8.79
47. Cider, highest average	9·87
Ditto	5·21
48. Perry, average of four samples	7·26
49. Mead	7·32

	Proportion of Spirit per cent. by measure.
50. Ale (Burton)	8·88
Ditto (Edinburgh)	6·20
Ditto (Dorchester)	5·56
Average	6·87
51. Brown stout	6·80
52. London porter (average)	4·20
53. Ditto small beer (average)	1·28
54. Brandy	53·39
55. Rum	53·68
56. Gin	51·60
57. Scotch Whiskey	54·32
58. Irish ditto	53·90

—*Brande.*

In regard to *porter*, *ale*, and other varieties of *beer*, considering them as occasional remedies in the cure of disease, it may be remarked that they rarely agree with the stomach, except among the robust labourers and workmen, who are in the habit of copious indulgence in those coarser products of fermentation. Hence it is that, under such circumstances, beer may be administered to convalescents with more advantage than wine; it is a less stimulating but more nutritive and soporific beverage; it induces more fulness of the system, and habitual excess in it generally fattens, creates a plethoric state of habit, and induces apoplexy or some of the minor symptoms of vascular turgidity. *See* Fermentation.

ULMUS. *Cortex.* Elm Bark. The bark of *Ulmus campestris.* *Cl.* 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Ulmaceæ.

This is a common indigenous tree in England; the bark is rough on the trunk, but smoother and fibrous on the branches; the leaves are rough, serrate, and dark-green; the flowers are clustered, numerous, and small, of a reddish-brown colour, and agreeable odour; the capsules are oblong.

Decoction of Elm-Bark has been recommended in herpetic eruptions as an internal remedy, and is said to be demulcent and diuretic. Dr. Sigmond speaks in the warmest terms of its efficacy in a great number and variety of cutaneous diseases, including tinea capitis. In this last its external application aided the cure. It should be continued for some time. The urine after awhile becomes acid under its use. Dr. A. T. Thomson recommends it as a substitute for sarsaparilla: the dose is from four to six ounces of the decoction, twice or three times a day.

Decoction of Elm Bark.—Take of fresh Elm Bark, bruised, two ounces and a half; Distilled Water, two pints. Boil down to a pint, and strain.

ULMUS FULVA. *Liber.* The inner bark of the Slippery Elm.

This species of elm is indigenous, growing in all parts of the United States, north of Carolina, but most abundantly west of the Alleghany mountains. From the white elm it is distinguished by its rough branches, its larger, thicker, and rougher leaves, its downy buds, and the character of its flowers and seeds. The inner bark is the part used in medicine: it is brought to the shops separated from the epidermis. By grinding, it is reduced to a light, grayish, fawn-coloured powder. It abounds in mucilaginous matter, which it readily yields to water.

The slippery elm bark is peculiarly well adapted to all those diseases, such as angina, catarrh, diarrhœa, dysentery, nephritis, and irritation of the bladder, in which demulcents are called for. Externally it has been used, in mucilage, to various cutaneous diseases; and often with good effect during the first or irritative stage, and at any time when they are accompanied by much heat and itching. It is represented to be nutrimental, and to have sustained life for many days. As a drink it is usually employed in infusion. The powder or strips of the bark, stirred in hot water, soon forms a mucilage, which may be made of any required thickness. The infusion is made by adding an ounce of the bark to a pint of boiling water: after twelve hours of maceration in a covered vessel, strain. Less time will suffice for obtaining the requisite amount of mucilage. The infusion may be drunk freely like any other simple mucilaginous drink.

UNGUENTA. *Ointments.*

These are greasy applications, either soothing and astringent or absorbent, or stimulating and irritating; they are usually applied spread upon lint, and should therefore be of a fit consistence for that purpose; some of them, especially in cold weather, are too hard, and require the addition of oil. They are all liable to become rancid, and should therefore be kept in small quantities: as far as possible it is well to leave them to extemporaneous prescription.

UVA. *Baccæ exsiccatæ demptis acinis.* Raisins. The dried berries, with the stones taken out, of the common vine: *Vitis vinifera. Cl.* 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Vitaceæ.

The vine is found wild in the South of Asia and in Greece.

Grapes, when fully ripe and of good quality, are among the most refreshing and wholesome of fruits; they are gently laxative, and in large quantity somewhat diuretic. In Syria the inspissated juice of ripe grapes is used in febrile and inflammatory complaints. They have been recommended as an article of diet in phthisis. Raisins are more aperient than the fresh fruit, but are apt to create flatulency, and the husks and stones sometimes irritate the lower bowels. The juice of ripe white grapes contains sugar, mucilage, gluten, malic acid, and malate of lime, tartrate of lime, tartaric acid, and tartrate of potassa. The juice of unripe white grapes contains, according to Geiger, tartaric acid (about 1 *per cent.*), malic acid (about 2 *per cent.*), bitartrate of potassa, malate, sulphate, and phosphate of lime, a trace of chloride of calcium, tan, and gallic acid, saccharine and extractive matter, green resin, wax, and fibre. According to Scheele and Braconnot there is no other acid in the grape than the tartaric. The colour, and much of the astringency of the grape resides, with very few exceptions, entirely in the husks.

UVA URSI. *Folia.* Bearberry. Trailing Arbutus. Whortleberry? The leaves of *Arctostaphylos Uva Ursi. Cl.* 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Ericaceæ.

This plant grows in dry sandy woods, and on gravelly hills, in the North of Europe and America.

It should be procured in autumn, and the green leaves alone selected and picked from the twigs, and dried by a moderate exposure to heat. The leaves are sometimes adulterated with those of *Vaccinium Vitis Idæa* (red whortleberry), which, however, are easily detected by wanting the reticulated surface of the *Uva Ursi* leaves, by their edges being revolute, sparsely and finely serrated, and dotted beneath, and by their infusion not yielding either tannin on the addition of a solution of isinglass, nor displaying the presence of gallic acid on the addition of sulphate of iron.—(*Dr. A. T. Thomson.*)

The leaves of the uva ursi when chewed are astringent and bitterish sweet, and when carefully dried and powdered, smell like tea. They should be selected of a bright olive-green; when of a dingy brownish tint, they are often nearly tasteless: the powder should be of a pale olive colour. The dry leaves contain, according to Meissner, 36 *per cent.* of tannin, and 1·20 of gallic acid; with resin, chlorophylle, and lignin; gum constitutes 33 *per cent.*

Uva ursi is administered in the form of powder, in the dose of from ten to thirty grains two or three times a day, or from half an ounce to two ounces of the *Decoction.*

Decoction of Uva Ursi.—Take of Uva Ursi (leaves), bruised, half an ounce; Distilled Water, a pint and a half. Boil down to a pint, and strain.

Very different opinions are entertained respecting the medicinal efficacy of uva ursi; by some it is considered as a mere astringent; by others as having a specific alterative and diuretic action, and as exerting a peculiar influence on the kidneys and the secretion of urine. It is used as a tonic, in ulceration of the urinary passages and in nephritic and calculous cases: in dysuria, catarrhus vesicæ, gonorrhœa, and leucorrhœa. Mr. Pereira observes that its action is slow, and it therefore requires to be given for a considerable period; although the effects are uncertain, it sometimes gives astonishing relief. It may be detected in the urine within half an hour after taking it.

YEAST, *see* Cerevisiæ Fermentum.

ZINCUM. *Zinc. Spelter.*

This metal is first mentioned by Albertus Magnus in 1280, but the ancients were acquainted with its ores, and with their property of converting copper into brass. The principal ores of zinc are the *sulphuret*, known to miners under the name of *blende*, and the *carbonate* and *silicate*, constituting the varieties of *calamine* (*see* Calamina). To obtain the metal, the ore is picked, broken, and roasted, to expel sulphur and carbonic acid; it is then washed, ground, mixed with about an eighth part of charcoal, and put into earthen pots placed in a circular furnace, each having an iron tube passing from its lower part through the floor of the furnace, and dipping into water; they are everywhere else closely luted; upon

the application of a bright-red heat, the metal distils through the tube, and is collected in the water beneath; it is fused and cast into cakes. A large proportion of the zinc used in England is imported through Hamburgh from Upper Silesia; there were formerly several zinc works near Bristol and Swansea; at present all except one have been abandoned, in consequence of the reduction of the duty upon the foreign article, and its superior quality. The duty upon cake and rolled zinc is 2*l.* per ton, and the average price is stated by Macculloch (*Dictionary*) to be 12*l.* per ton, exclusive of duty.

The zinc of commerce contains several impurities, the chief of which remain in the form of a black powder, when the metal is dissolved in dilute sulphuric acid.

Pure zinc is a blueish, brilliant metal, crystalline in its texture; its specific gravity is 6·8 to 7. It is tough at common temperatures, brittle at a heat approaching to redness, but malleable and ductile between 212° and 300°; so that it may even be rolled out into very thin sheets and drawn into wire. Exposed to air its surface becomes coated by a thin film of oxide, which protects it from further action. It is highly combustible, and when melted, and afterwards heated in a crucible to bright redness, it burns with an intensely bright flame, and emits abundance of white oxide; when in thin leaves, it may be set fire to in the flame of a candle, and if a coil of leaf zinc be ignited and plunged into a jar of oxygen gas, its combustion is extremely rapid and brilliant.

Zinc is dissolved by the greater number of the acids, and when its oxide is thrown down from these solutions by the alkalis, in the form of hydrated oxide, it is readily dissolved in caustic potassa and soda, and in pure and carbonated ammonia. This oxide, when dried, corresponds in composition with that obtained by combustion, and is the only salifiable oxide of zinc; it is a white, tasteless powder, composed of—

	Atoms.	Equivalents.	Per Cent.
Zinc	1	32	80
Oxygen	1	8	20
Oxide of Zinc	1	40	100

The following is the formula of the Pharmacopœia for the preparation of this oxide:—

Oxide of Zinc. — Take of Sulphate of Zinc, a pound; Sesquicarbonate of Ammonia, six ounces and a half; Distilled Water, three gallons. Dissolve the sulphate of zinc and the sesquicarbonate of ammonia separately in twelve pints of distilled water, and filter the solutions; then mix them. Wash the precipitate frequently with water, and, lastly, burn it for two hours in a strong fire.

In the process of preparing the *oxide of zinc* by sulphate of zinc, susquicarbonate of ammonia and water, sulphate of ammonia and carbonate and hydrate of zinc are formed, and some carbonic acid evolved; the former is soluble and washed away, the latter remains upon the strainer; its water and carbonic acid are expelled by the subsequent ignition.

This oxide, under the name of *flowers of zinc*, has long had a place in Pharmacopœiæ, and was prepared by exposing the metal to a temperature sufficient to cause its inflammation and rapid oxidizement. Old authors describe it under the name of *pomphol-ix*, *nihil album*, and *philosopher's wool*. In Holland its preparation was kept secret, and it was sold under the name of *arcanum Ludemanni* or *luna fixata*, the composition of which was originally divulged by Gaubius. When procured by combustion it is apt to contain small particles of the unburnt metal; the above process is therefore preferable.

The therapeutic effects of oxide of zinc are stated to be tonic and antispasmodic, but, to say the least, it is very equivocal in its action. It has been prescribed with supposed advantage in some obstinate and painful dyspeptic and neuralgic affections; in hysteria and epilepsy; and in hooping-cough. The dose for an adult is from two to eight or ten grains two or three times a day, and in stomach-cases it may be conjoined with bitters. In large doses it nauseates and purges. By long-continued use, it acts as a slow poison, and produces *tabes sicca*. A gentleman, for the cure of epilepsy, took daily, at an average, twenty grains of oxide till he consumed 3246 grains, which must have taken him about five months. At the end of this time he was found of a pale earthy hue; his tongue was thickly coated, the bowels were constipated, the inferior extremities cold and œdematous, the abdomen tumid, the superior extremities cold and shrivelled, and their skin dry like parchment; the pulse was about sixty, thready and scarcely perceptible. Under the use of purgatives, a light nutritive diet, with tonic and diuretic medicines he rapidly recovered, but he remained subject to the epileptic attacks.—(*Brit. and For. Med. Rev.*, July 1838.)

Ointment of Zinc. — Take of Oxide of Zinc, an ounce, Lard, six ounces. M.

This ointment is useful in the same cases as the *Ceratum Calaminæ* (p. 102), it represses profuse discharges, and soothes irritable sores and surfaces.

Carbonate of Zinc.—From the impure or native carbonate of zinc, commonly called *calamine*, or *lapis caliminaris*, the *prepared* carbonate, or that which is used in medicine, is prepared. The formula directed by the U. S. Dispensatory, is, to take of carbonate of zinc any quantity; heat it to redness, and afterwards pulverise it; then reduce it to a very fine powder, in the manner directed for the preparation of the carbonate of lime.

Prepared carbonate of zinc exhibits an earthy appearance and a pinkish colour. When pure it is dissolved in mineral acids without effervescence. It is employed externally in ulcers and as a stimulant to chronically inflamed conjunctivæ and opaque cornea; also in chronic eruptions and sores on the skin. It is more commonly employed as a cerate (*Ceratum Zinci Carbonatis*), which is adapted to most of the purposes for which *Turner's cerate* has been so long employed. See *Cerat. Calam.*, p. 102. In the

United States Pharmacopœia, Lard, two pound, is directed in place of the Olive Oil, one pint, as in the London Pharmocopœia.

Sulphate of Zinc.—In the process of preparing this salt, the zinc is oxidized at the expense of the oxygen of the water, the hydrogen of which is evolved, and the resulting oxide of zinc unites with the sulphuric acid to form the *sulphate of zinc* which crystallises in right rhombic prisms. The crystals are slightly efflorescent, soluble in 2·5 parts of water at 60°, fusible, and at a high red-heat, decomposed, leaving oxide of zinc. A very impure form of this salt is prepared from the native sulphuret, and is known in commerce under the name of white vitriol; it should by no means be substituted for the pure sulphate, the crystals of which consist of

	Atoms.	Equivalents.	Per Cent.
Oxide of Zinc	1	40	28
Sulphuric Acid	1	40	28
Water	7	63	44
Crystallised Sulphate of Zinc	1	143	100

As an internal remedy, sulphate of zinc is chiefly used as a tonic and emetic; a quarter of a grain, for instance, twice or thrice a day, in dyspepsia, and the dose has been gradually increased to twelve and fourteen grains thrice a day; in epilepsy one or two grains have been given every four or six hours; and in all diseases of debility connected with inflammatory action, it has been preferred to other mineral tonics, as being less apt to excite thirst, arterial action, and other febrile symptoms; but it is doubtful whether there are good grounds for this preference.

In dyspeptic affections, sulphate of zinc and other similar remedies generally require to be given in very small doses, and to be long persevered in, if we wish to derive the utmost benefit from their powers. Dr. W. Philip says of this remedy—"in the opinion of many, the sulphate of zinc, given in very small doses, holds a distinguished place among the astringents suited to indigestion, and it is sometimes successful where other tonics fail. It may be given at later periods than iron, but it requires caution, and if its good effects do not soon appear, it should be laid aside. It is one of those powerful agents which must always be employed with some degree of suspicion."

Sulphate of zinc is one of the numerous remedies resorted to in the treatment of epilepsy, where it is usually given with vegetable bitters, and with the more powerful antispasmodics, as in the following formulæ:—

℞ Zinci Sulphatis gr. x.; Extract lupuli ʒj. Misce optimè et divide in pilulas xxiv. sumantur duæ bis vel ter die.

The following has also been much extolled in epilepsy, by those who confide in the virtues of musk:—

℞ Zinci Sulphatis gr. x.; Moschi ʒj.; Camphoræ ℈j. M. et divide in pilulas viginti, quarum sumantur duæ bis vel ter in die.

In diseases attended by considerable irritability as well as debility,

sulphate of zinc certainly appears preferable to sulphate of iron. Both the oxide and the sulphate of zinc have been given with decided success in chorea. Mr. Beddingfield, at the Bristol Dispensary, has cured thirty-nine cases out of forty with oxide of zinc, in doses of five grains three times a day, gradually increasing the quantity to a scruple. In the advanced period of hooping-cough, from an eighth to a quarter of a grain may be given twice or three times a day, conjoined with small doses of infusion of bark, or of cascarilla; or it may, if requisite, be united in pills with extract of hemlock, or of henbane. In spasmodic coughs, it is administered, according to Dr. Paris, with the best effects, especially when combined with camphor or myrrh.

℞ "Zinci Sulphatis gr. x.; Myrrhæ in pulverem tritæ ℥jss.; Confect. Rosæ q. s. ut fiant pilulæ viginti, è quibus sumantur binæ bis quotidie."

He also recommends it in the form of lozenge, in affections of the chest attended with inordinate secretion.

In the cure of intermittent fevers, sulphate of zinc is a valuable tonic, either with or without Peruvian bark; and in obstinate cases, where the use of arsenic has been suggested, this salt should have a previous trial.

℞ Zinci Sulphatis gr. ij.; Aquæ Cinnamomi, Aquæ destillatæ, āā f℥ijss.; Infusi. Calumbæ f℥j. M. fiat mistura cujus capiat æger cochlearia tria ampla tertiâ vel quartâ quâque horâ.

It has been said that sulphate of zinc, which occasions a precipitation in infusion of Peruvian bark, is therefore incompatible with it; but the combination remains very effective. It may be prescribed in either of the following forms:—

℞ Zinci Sulphatis gr. ss.; Decocti cinchonæ f℥xv.; Aquæ Cinnam. ℥ss. M. fiat haustus ter quaterve die sumendus.

℞ Zinci Sulphatis gr. ¼.; Quiniæ Sulphatis gr. ij.; Infusi Rosæ compos. f℥x.; Aquæ Menthæ, Syrupi Aurantii, āā f℥j. M. fiat haustus quartâ quâque horâ sumendus.

As an emetic, sulphate of zinc is generally rapid and certain in its action, and well suited to cases in which it is desired to empty the stomach of any poisonous contents. The average dose for this purpose is twenty grains.

℞ Zinci Sulphatis ℈j.; Aq. Menthæ viridis f℥iss. Fiat haustus emeticus.

Emetics of sulphate of zinc have been given at first once a week, then every fortnight, and afterwards a still longer period, in cases of chronic epilepsy, with great benefit.

But at the commencement of febrile diseases, and in analogous cases where emetics are administered, tartarised antimony and ipecacuanha, which tend to produce diaphoresis, independent of the mere exertion of vomiting, are to be selected in preference to it.

In ulcerated sore throat a gargle of sulphate of zinc is often of great local service, although inferior to the sulphate of copper: the following is among other forms that may be used:—

℞ Zinci Sulphatis ℈j.; Aquæ Rosæ f℥vij.; Oxymellis Simpl. f℥j. M. fiat gargarisma frequenter utendum.

In the form of a dilute solution in distilled water, sulphate of zinc is a good astringent: as such it is used in ophthalmia, after the vascular congestion and excessive irritability have been removed, and when the inflammation tends to become chronic.

℞ Zinci Sulphatis gr. x.; Aquæ Rosæ f℥viij. M. fiat collyrium.

A similar or somewhat stronger solution may also be employed with advantage in the latter stages of gonorrhœa, and to old ulcers with profuse discharge.

There are a few other preparations of zinc which have been used as remedial agents, and which have places in other Pharmacopœiæ.

Chloride of Zinc (*Muriate of Zinc.—Butter of Zinc*), obtained by evaporating a solution of zinc in hydrochloric acid to dryness and fusing it, has been employed in very small doses as an alterative, and externally as a caustic. It is given in solution, in the dose of half a grain gradually increased. Hufeland recommends the *Æther Zinci*, made by digesting two ounces of fused chloride of zinc in a mixture of two ounces of ether with one ounce of alcohol, and after some days decanting the clear solution; the dose is from four to eight drops twice a day. But except in a few particular cases ethereal solutions are objectionable, and are liable to vary in strength from the facility with which the solvent evaporates. Scrofula, chorea, epilepsy, and neuralgia, are the diseases in which this remedy has principally been prescribed, but not with such success as to give it any peculiar claims to notice. Externally, a dilute solution, composed of about two grains of the chloride to an ounce of water, has been used as a lotion in scrofulous and fistulous sores. It has been applied as a caustic to destroy *nævi materni*, and to parts affected with cancer, *fungus hæmatodes*, and ill-conditioned ulcers. "The benefit is supposed to depend, not merely on the escharotic effect, but on the chloride inducing a new action in the surrounding parts." "Its *local action* upon living tissues is that of a caustic, depending partly on its affinity for albumen and gelatin; so that when placed in contact with living parts into whose composition these organic compounds enter, the chloride exercising its affinity, first destroys the life of the part, and then unites with the albuminous and gelatinous matter present, and thus forms an eschar. Other chemical changes of a comparatively unimportant nature are also effected; thus various salts found in the solids or liquids of the part may be decomposed. For example, when the chloride is applied to a cancerous sore, it decomposes the carbonate and hydrosulphate of ammonia found in the secretion of the sore. The effects produced by the application of chloride of zinc are the following: soon after it has been applied, a sensation of warmth is felt in the part, quickly followed by violent burning pain, which continues for seven or eight hours; that is, until the parts in contact with the chloride are dead. A white eschar is now observed, which separates in from eight to twelve days. Unless used in the neighbourhood of loose

cellular tissue, there is rarely much swelling."—(*Pereira.*) A valuable practical paper on the uses and effects of this chloride in the treatment of cancerous sores has been contributed to the *Medical Gazette* (vol. xvii.) by Dr. Alexander Ure.

Iodide of Zinc.—Gay Lussac first obtained this compound by the method which is still usually followed, viz., boiling together iodine and zinc in atomic proportions, or with rather an excess of zinc, in a flask of water, down to dryness, and subliming the residue. Iodide of zinc was thus procured in beautiful colourless prismatic crystals. The iodide of zinc is a very deliquescent substance, and cannot easily be retained in the solid form. Heated in open vessels, it resolves itself into iodine and oxide of zinc. Digested along with iodine in concentrated solution, it forms a *biniodide* of zinc. It has the property of precipitating milk, and the white of egg. It is very liable to undergo spontaneous decomposition (Cogswell, *Experim. Essay on Iodine and its Compounds*).

The iodide of zinc has an exceedingly caustic taste, and if applied to a broken surface gives rise to considerable smarting. It displayed poisonous effects when administered to animals, in experiments performed for the purpose by Dr. Cogswell.

Respecting the *medical uses* of this compound the details are not considerable. Dr. Ure (*Dict. of Chem.* p. 516, 2d edit.) says, that he has found it a powerful external remedy in scrofulous and goitrous enlargements. He recommends an ointment composed of a drachm of the iodide of zinc to an ounce of lard, in place of an ointment of the iodide of potassium. A grain, or two grains, in an ounce of water, is occasionally used as an astringent injection.

Acetate of Zinc is another preparation of the metal, which has a place in the *Edinburgh* and *Dublin Pharmacopœiæ*. It may be prepared by double decomposition, when equivalents of acetate of lead and sulphate of zinc are mixed together in solution. It crystallises in rhomboidal plates; is very soluble, and slightly efflorescent. It is tonic and astringent, perhaps antispasmodic; in large doses it is emetic; but it is chiefly confined to external use. The Dublin College directs it in alcoholic solution (*Tinctura Acetatis Zinci*), of which one drachm contains about four grains of the crystallised salt.

Zinci Cyanidum. *Cyanide*, sometimes called *hydrocyanide* or *cyanuret, of zinc.* This salt was introduced by the German physicians as a substitute for hydrocyanic acid.

It is prepared by adding recently made oxide of zinc to hydrocyanic acid, or by boiling a solution of sulphate of zinc to a solution of cyanide of potassium. Cyanide of zinc is a white powder, insoluble in water or alcohol. Its composition is as follows:—

	Atoms.	Equivalents.	Per Cent.
Zinc	1	32	55·2
Cyanogen	1	26	44·8
	1	58	100.0

The physiological effects of this cyanide are supposed to be simi lar to those of hydrocyanic acid. It has been used principally in affections of the nervous system, as epilepsy, hysteria, and chorea. It has also been employed in cardialgia and cramps of the stomach, and as an anthelmintic in children.

It is given in doses of from an *eighth* to a *quarter of a grain*, and, by gradual increase, to the extent of a *grain and a half* three times a day. It may be taken in the form of powder mixed with calcined magnesia.—(*Pereira*, Part I., p. 531–2.)

The *ferro-hydrocyanate of zinc* is given for similar purposes, but in somewhat larger doses, as the cyanide.

What is known of the *toxicological effects* of the salts of zinc, will be found in Orfila and Christison, especially in reference to the poisonous powers of the *sulphate*. When administered to dogs, it excites vomiting, and no further bad effects ensue; but if the gullet be tied, a sufficient dose produces death in three days, the intermediate phænomena being chiefly those of local irritation, and the appearances in the dead body those of incipient inflammation of the stomach. Injected into the veins, forty-eight grains produced almost instant death, and half that quantity proved fatal in three minutes. The outlines of several cases in which large doses of sulphate of zinc have proved fatal to man, are given by Dr. Christison, and in which its external application is presumed to have been deleterious.

From the increasing use of zinc in the construction of water cisterns and culinary vessels, its effect upon the system in continuous but small quantities has become of additional interest; and it certainly does not appear that, under such circumstances, any alarming effects are to be apprehended. In regard to the *sulphate*, Dr. Christison says, "I have often given, medicinally, from three to six grains, thrice every twenty-four hours, for eight, twelve, or fourteen days, without observing any particular effect, except in some persons' sickness, when the largest doses were taken." The following is the process recommended by this author for the detection of sulphate of zinc when mixed with animal or vegetable substances. The mixture being strained through gauze, is to be acidulated with acetic acid, and filtered through paper. The acetic acid dissolves any oxide of zinc that may have been thrown down in union with animal matter. The filtered fluid is then to be evaporated to a convenient extent, and treated, when cool, with sulphuretted hydrogen gas, upon which a grayish or white milkiness, or precipitate, will be formed. The excess of gas must now be expelled by boiling, and the precipitate washed by the process of subsidence and affusion, and collected on a filter. It is then to be dried, and heated to redness in a tube. When it has cooled, it is to be acted on by strong (dilute?) nitric acid, which dissolves the zinc and leaves the sulphur. The nitrous solution should next be diluted, and neutralised with carbonate of ammonia, after which the usual tests will act characteristically. These tests are, the

alkaline carbonates, ferrocyanuret of potassium, and sulphuretted hydrogen, all of which give white precipitates. Of the alkaline carbonates, carbonate of ammonia is the most delicate test, and the precipitate is redissolved by excess of that carbonate, and is not again thrown down by boiling.

ZINGIBER. *Rhizoma.* Ginger. The Rhizoma of *Zingiber officinalis. Cl.* 1. *Ord.* 1. Monandria Monogynia. *Nat. Ord.* Zingiberaceæ.

The ginger-plant is said to be a native of the East Indies, and to derive its name from, and abound in, the mountainous district of *Gingi*, to the east of Pondicherry. It is cultivated all over the tropics of Asia and America.

The rhizoma is tuberous and biennial. The herbaceous part of the plant withers in December; the rhizomes are dug up in January; but when it is intended to be preserved in syrup, it is dug up when the shoots do not exceed five to six inches in height. For preparing the dried ginger, the best pieces are selected, scraped, then washed, and dried in the sun with great care. This is called *white ginger;* in contradistinction to which, the rhizomes which are scalded in boiling water before being dried, are denominated *black ginger.*

The confected, or preserved ginger, is prepared by scalding the green rhizomes till they are tender, then peeling them in cold water, and putting them into a thin syrup, from which, in a few days, they are shifted into the jars in which they come home, and a very rich syrup poured over them, which is sometimes three or four times renewed. In Jamaica, the shifted syrup is diluted with water and fermented into a pleasant liquor.—(*Lond. Disp.*)

The finest ginger, usually called *Jamaica ginger*, comes into the market in two states, *white* and *brown.* They both are the scraped rhizomes, prepared as above described; but the *white* is usually washed in whiting and water, or *whitewashed* (as is said, to preserve it from insects), and often has been bleached with chloride of lime; while the latter is of its natural colour, which is grayish buff. The large fleshy and plump pieces are to be preferred; they should not be too damp or moist, or worm-eaten, nor should they have a disagreeable sourish odour.

Ginger imparts its flavour to water, alcohol, and ether; hot water extracts from it a considerable proportion of matter resembling starch. Alcohol and ether take up little else than its volatile oil and resin, in which its flavour and acrimony reside. The alcoholic tincture has the pungency and flavour of ginger in perfection.

Morin obtained from ginger two kinds of resin, a blueish-green volatile oil, free acetic acid, acetate of potassa, osmazome, gum, vegeto-animal matter, sulphur, starch, and lignin.

The officinal formulæ of ginger are a *syrup* and a *tincture,* besides which it enters into the composition of many of the other preparations of the Pharmacopœia:—

Syrup of Ginger. — Take of Ginger, sliced, two ounces and a-half; Boiling Water, a pint; Sugar, two pounds and a half. Macerate the ginger in the water for four hours, and strain; then add the sugar, and dissolve it.

In the form of powder, ginger is an excellent carminative stimulant, assisting and promoting feeble digestion, and of service in the flatulency and dyspepsia of gouty and rheumatic habits; it is a valuable adjunct to several other remedies, and especially effective in diminishing the griping tendency of senna, jalap, and similar purges. Combined with rhubarb, it forms a good stomachic pill, especially where flatulency and rumbling come on before or after meals. Three grains of rhubarb, four of ginger, and a drop of oil of cloves, may be formed into two pills, to be taken before dinner, or when required. When ginger is chewed, it operates as a sialagogue, relieving toothache. Ginger lozenges, and ginger pearls, are convenient and portable forms of ginger; it is also sometimes formed into tablets, which are useful in the relief of hoarseness arising from relaxed uvula and sluggish excretion of mucus. Candied and preserved ginger are chiefly used as sweetmeats; the *syrup* of the Pharmacopœia is scarcely strong enough to be of any use in the small quantity in which it is generally employed, and the *tincture* is much improved by doubling the quantity of ginger; it then constitutes what has been termed *essence of ginger*, and is an elegant and active adjunct to many formulæ. The tincture, made, as formerly, with proof spirit, was never clear, in consequence of the presence of a portion of gum. Rectified spirit dissolves the oil and resins only, in which the pungency and virtues of ginger exclusively reside. A multitude of nervous and dyspeptic symptoms are occasionally relieved by taking *ginger tea*, morning and evening. Another form of ginger, grateful both to the palate and stomach, when it is carefully and cleanly prepared, is *ginger beer*.

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THE END.

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