PART III.

PREPARATIONS AND COMPOSITIONS.

CHAP. I.—SULPHUR.

SULPHUR SUBLIMATUM LOTUM. *Edin.*
Washed Sublimed Sulphur.

Take of
Sublimed sulphur, one pound;
Water, four pounds.
Boil the sulphur for a little in the water, then pour off this water, and wash away all the acid by affusions of cold water: and, lastly, dry the sulphur.

Dub.

Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water, when poured off, is impregnated with acid, which is known by means of lithmus. Dry the sulphur on bibulous paper.

SULPHUR LOTUM. *Lond.*
Washed Sulphur.

Take of
Sublimed Sulphur, a pound.
Pour on it boiling water, so that the acid, if there be any, may be entirely washed away; then dry.

As it is impossible to sublime sulphur in vessels perfectly void of air, a small portion of it is always acidified and converted into sulphurous or sulphuric acid. The presence of acid in sulphur is always to be considered as an impurity, and must be removed by careful ablution. Sulphur is directed to be kept in closed vessels; and Dr Powell says, that in an open drawer, its superior surface becomes manifestly acid on long

keeping; but when thoroughly washed, sublimed sulphur is not acted upon by the atmosphere; there is therefore no particular reason for preserving it from the action of the air; for if, on keeping, it become moist, it is because the sulphuric acid has not been entirely washed away.

Sulphur præcipitatum. *Lond.*
Precipitated Sulphur.

Take of
Sublimed sulphur, one pound;
Fresh lime, two pounds.
Water, four gallons.
Boil the sulphur and lime together in the water, then filter the liquor through paper, and drop into it as much muriatic acid as may be necessary to precipitate the sulphur. Lastly, wash this by repeatedly pouring upon it water till it becomes insipid.

This process is a considerable improvement upon that in the preceding Pharmacopœia, being more economical, in the proportion of 3 to 1. A solution of sulphuret of lime is first prepared; it is then decomposed by muriatic acid, which unites with the lime, expels sulphuretted hydrogen gas, and precipitates the sulphur, which is easily purified by ablution from the very soluble muriate of lime. The quantity of lime, used in forming the sulphuret, though reduced in the edition 1815 from three pounds to two, is still somewhat too large. Mr Phillips found that 10 parts of sulphur dissolve only about 4.5 of lime.

Precipitated sulphur, though much more expensive, does not differ in its medical properties from well-washed sublimed sulphur. Its paler colour is owing to its more minute division, or, according to Dr Thomson, to the presence of a little water; but from either circumstance it derives no superiority to compensate for the trouble and disagreeableness of its preparation, unless its whiter colour be considered as an advantage in the preparation of ointments.

Sulphuretum potassæ. *Edin.*
Sulphuret of Potass.

Take of
Carbonate of potass,
Sublimed sulphur, each eight ounces.
Triturate them well together, put them into a large coated crucible, fit a cover to it, and having applied live coals

cautiously around it, bring them at length to a state of fusion.

Break the crucible as soon as it has grown cold, take out the sulphuret, and keep it in a well-closed phial.

Lond.

Take of

Washed sulphur, one ounce;

Sub-carbonate of potass, two ounces.

Triturate them together, and place them in a covered crucible over the fire until they unite.

SULPHURETUM KALI. *Dub.*

Sulphuret of Kali.

Take of

Sub-carbonate of kali,

Sublimed sulphur, each two ounces.

Mix and put them into a crucible. Fit a cover to it, and expose them to a heat, gradually increased, until they unite.

There exists a very strong affinity between sulphur and potass, but they must be united in a state of perfect dryness; because, if any moisture be present, it is decomposed, and alters the nature of the product. If potass be employed, it will unite with the sulphur by simple trituration, and will render one-third of its weight of sulphur soluble in water. If sub-carbonate of potass be used, as directed by the colleges, it is necessary to bring the sulphur into a state of fusion; it then acts upon the sub-carbonate, and expels the carbonic acid. It is evident, that to saturate the same quantity of sulphur, a larger proportion of carbonate of potass than of potass is necessary. The London college now agrees with the Dublin in using two parts of sub-carbonate; the Edinburgh uses only one. Gottling directs only one part of carbonate of potass to two of sulphur: and to save the crucible, he directs the mixture, as soon as it melts, to be poured into a heated mould, anointed with oil. If the fusion be not very cautiously performed, the sudden extrication of so large a quantity of carbonic acid gas is apt to throw the melted matter out of the crucible, and may be attended with unpleasant consequences. La Grange projects one part of sulphur upon one and a half of potass in fusion, and keeps the compound melted half an hour before he pours it out. If the heat be too great, and the crucible uncovered, the sulphureous vapour is apt to inflame; but it is easily extinguished by covering it up. For the preparation of precipitated sulphur, Hermbstadt proposes

to obtain the sulphuret of potass, by heating together in a crucible four parts of sulphate of potass with one of charcoal powder. The charcoal is converted into carbonic acid gas, and the sulphate into sulphuret.

Sulphuret of potass, properly prepared, is of a liver brown colour, and was hence formerly called *Hepar sulphuris.* It should be hard, brittle, and have a vitreous fracture. It has an acrid bitter taste, and the smell of sulphur. It is exceedingly prone to decomposition. It is deliquescent in the air, and is decomposed. It is very fusible, but a strong heat separates the sulphur by sublimation. The moment it comes in contact with water, there is a mutual decomposition. Part of the sulphur becomes acidified, deriving oxygen from the water, and forms sulphate of potass. Part of the hydrogen of the water decomposed, combines with another portion of the sulphur, and escapes in the form of sulphuretted hydrogen gas: another portion of the hydrogen combines with a third portion of the sulphur, and remains in solution, united with the alkali, in the state of hydroguretted sulphuret of potass. By acids, sulphuret of potass is immediately decomposed; the acid combines with the potass, sulphuretted hydrogen gas is expelled, and the sulphur is precipitated.

Aqua sulphureti kali. *Dub.*
Water of Sulphuret of Kali.

Take of
Sublimed sulphur, half an ounce;
Water of caustic kali, nine ounces, by measure.
Boil for ten minutes, and strain through paper. Keep the liquor in phials well corked.
The specific gravity of this liquor is 1120.

The Dublin college have thus, besides the sulphuret of potass, a preparation which is exactly similar to a solution of it in water. When sulphur is boiled in a solution of caustic alkali, a portion of the water is decomposed; the oxygen forms, with some of the sulphur and potass, sulphate of potass, and the hydrogen, with the remainder, hydro-sulphuret of potass. The former being difficultly soluble, is precipitated and separated by filtration. The solution must be well preserved from the action of the air, which gradually decomposes it, forming sulphate of potass.

Medical use.—Hydro-sulphuret of potass is an exceedingly nauseous remedy; but it is used internally as an antidote to metallic poisons, to check excessive salivations from mercury, and in cutaneous affections. Externally, it is used against tinea capitis, and in psora. I have long been in the

habit of using with success in the psora and psoriosis of infants, a bath prepared by dissolving sulphuret of potass in water.

HYDRO-SULPHURETUM AMMONIÆ. *Ed.*
Hydro-Sulphuret of Ammonia.

Take of
Water of ammonia, four ounces;
Subject it, in a chemical apparatus, to a stream of the gas which arises from
Sulphuret of iron, four ounces,
Muriatic acid, eight ounces, previously diluted with two pounds and a half of water.

SULPHURET OF IRON is conveniently prepared for this purpose from
Purified filings of iron, three parts,
Sublimed sulphur, one part,
Mixed and exposed to a moderate degree of heat, in a covered crucible, until they unite into a mass.

SULPHURETUM FERRI. *Dub.*
Sulphuret of Iron.

Take of
Filings of iron, six ounces;
Sublimed sulphur, two ounces.
Mix and expose them in a covered crucible to a gentle heat until they unite.

HYDRO-SULPHURETUM AMMONIÆ. *Dub.*
Hydro-Sulphuret of Ammonia.

Take of
Sulphuret of iron in coarse powder, four ounces;
Muriatic acid, seven ounces, by measure;
Water, two pints;
Water of caustic ammonia, four ounces.
Put the sulphuret into a matrass, then gradually pour on the acid diluted with the water, and in a proper apparatus transmit the gas evolved, through the water of ammonia. Towards the end of the operation apply a gentle heat to the matrass.

SULPHURETTED hydrogen is capable of combining with different bases in the manner of an acid. In the present preparation, it is combined with ammonia, and is obtained by decomposing sulphuret of iron by muriatic acid. As soon as the acid, by its superior affinity, separates the iron from the

sulphur, the latter immediately re-acts on the water, the oxygen of which forms, with one portion of it, sulphuric acid, while the hydrogen dissolves another portion, and forms sulphuretted hydrogen gas. The combination of this with ammonia is facilitated by reduction of temperature, and by making it pass through a column of the water of ammonia, by means of an apparatus, such as Woulfe's, or Nooth's. The ammonia very readily assumes a greenish-yellow colour, from the absorption of the sulphuretted hydrogen.

Trommsdorff has proposed, that the sulphuretted hydrogen gas should be obtained by the decomposition of sulphuret of potass; but in this way its formation is too rapid to be easily managed. Gottling says, that the acid should be added gradually, and that the whole must be constantly agitated. But these precautions are rendered less necessary, by diluting the acid to the degree directed by the Pharmacopœia. Mr Cruickshank, who first suggested the use of hydro-sulphuret of ammonia in medicine, directs the sulphuret of iron to be prepared by heating a bar of iron to a white heat in a smith's forge, and rubbing against the end of it a roll of sulphur. The iron, at this temperature, immediately combines with the sulphur, and forms globules of sulphuretted iron, which should be received in a vessel filled with water. It is, however, more conveniently obtained in the manner directed by the college. Proust has proved that iron is capable of combining with two proportions of sulphur. At a high temperature, 100 parts of iron combine with 60 of sulphur, and form a compound of a dull blackish colour. In this state, it is fit for the production of sulphuretted hydrogen gas. At a lower temperature, the same quantity of iron takes up 90 of sulphur, acquires a greenish-yellow colour, and in every respect resembles native pyrites. This cannot be decomposed by acids, and is therefore unfit for the production of gas; but it may be reduced to the state of iron sulphuretted to the minimum, by exposing it to a sufficiently high temperature, or by melting it with half its weight of iron-filings. It was probably from not attending to the different states of sulphuretted iron, that some of the German chemists failed in their attempts to procure from it sulphuretted hydrogen gas, and had recourse to sulphuret of potass.

Medical use.—Hydro-sulphuret of ammonia, or, more correctly, sulphuretted hydroguret of ammonia, acts powerfully on the living system. It induces vertigo, drowsiness, nausea, and vomiting, and lessens the action of the heart and arteries. It therefore seems to be a direct sedative. According to the doctrine of the chemical physiologists, it is a powerful disoxy-

genizing remedy. It has only been used in diabetes, by Dr Rollo and others, under the name of Hepatized ammonia, in doses of five or ten drops twice or thrice a-day.

AQUA SULPHURETI AMMONIÆ. *Dub.*
Water of Sulphuret of Ammonia.

Take of
Fresh burnt lime,
Muriate of ammonia in powder, each four ounces;
Sublimed sulphur,
Warm water, each two ounces, by weight.

Sprinkle the water upon the lime, placed in an earthen vessel, and cover it up until the lime falls to powder, which, as soon as it is cold, is to be mixed by trituration with the sulphur and muriate of ammonia. Put the mixture into a retort, and distil with a sudden and sufficiently strong degree of heat. Keep the liquor thus obtained in a phial, accurately closed with a glass stopper.

The second process of the Dublin college is totally different. The ammonia and sulphuretted hydrogen are presented to each other in a nascent state, and with the undecomposed part of the water pass over into the receiver, while, in the retort, the lime remains combined with sulphuric and muriatic acid.

The hydro-sulphuret of ammonia was formerly called the *fuming liquor of Boyle*. It is of a dark red colour, and is extremely fetid. It differs from the hydro-sulphuret of ammonia, prepared by the preceding process, in containing a portion of uncombined alkali, to which, according to Berthollet, its property of emitting fumes is owing, and in the last portions which come over being in the state of a hydroguretted sulphuret. It soon, however, is converted into a hydro sulphuret, by losing its excess of ammonia and sulphur. It is decomposed by all acids, and almost all metallic solutions.

CHAP. II.—ACIDS.

ACIDUM SULPHURICUM DILUTUM. *Ed.*
Diluted Sulphuric Acid.

Take of
Sulphuric acid, one part;

Water, seven parts.
Mix them.

Dub.

Take of
Sulphuric acid, two ounces, by weight;
Distilled water, fourteen ounces, by weight.
Having gradually mixed them, set the mixture aside to cool, and then pour off the clear liquor.
The specific gravity of this acid is 1090.

Lond.

Take of
Sulphuric acid, one fluidounce and a half;
Distilled water, fourteen fluidounces and a half.
Add the acid by degrees to the water, and mix.

THE most simple form in which sulphuric acid can be advantageously employed internally, is that in which it is merely diluted with water: and it is highly proper that there should be some fixed standard, in which the acid in this state should be kept. It is, however, much to be regretted, that the same standard with respect to strength has not been uniformly adopted; and especially that the London college should have deviated so very remarkably, both from their own former editions and from the other colleges. In the Edinburgh and Dublin Pharmacopœias, the strong acid is one-eighth by weight of the mixture, which gives one drachm in the ounce, which has at least the merit of convenience. Dr Powell, whose translation may be considered as official, states, in defence of the change, that the new mixture will be more conveniently made, and that its proportionate dose is easily administered, especially as minute attention thereto is not of any great practical importance. An ounce of sulphuric acid, by measure, is equal to 14 dr. and eight-tenths of a grain. Dr Powell says, that the diluted acid of this edition is stronger as about 5 to 4, but in another place as 3 to 2, and that it contains $\frac{1}{10}$ of acid. The comparative strengths of equal bulks and of equal weights of the diluted acids in the different Pharmacopœias, are nearly in the following proportions:

	Bulks.	Weights.	Sp. gr.
Former London,	1000	1000	1.070
Dublin, -		1118	1.090
Edinburgh, -		1125	
New London,	1480	1445	1.111 Ph.

Dr Powell says, that one ounce of the last will saturate about 107 grains of dried sub-carbonate of soda, which is confirmed by Mr Phillips. The dilution by means of distilled water is preferable to spring water; which, even in its purest state, is not free from impregnations affecting the acid. Even when distilled water is used, there is often a small quantity of a white precipitate, arising from lead dissolved in the acid.

Sulphuric acid has a very strong attraction for water: and their bulk, when combined, is less than that of the water and acid separately. At the same time, there is a very considerable increase of temperature produced, which is apt to crack glass vessels, unless the combination be very cautiously made; and, for the same reason, the acid must be poured into the water, not the water into the acid. Sulphuric acid, according to Powell, diluted with an equal measure of water, and allowed to cool, rose 21° on the addition of another measure, and 7° after cooling again on the addition of a third.

Table of the Quantity of Real Acid in 100 *parts of Liquid Sulphuric Acid, at the temperature* 60°. *Dalton.*

Atoms.		*Acid per cent. by weight.*	*Acid per cent. by measure.*	*Specific gravity.*	*Boiling point.*
Acid.	*Water.*				
1 +	0	100	unknown.	unknown.	
1 +	1	81	150	1.850	620°
		80	148	1.849	605
		79	146	1.848	590
		78	144	1.847	575
		77	142	1.845	560
		76	140	1.842	545
		75	138	1.838	530
		74	135	1.833	515
		73	133	1.827	501
		72	131	1.819	487
		71	129	1.810	473
		70	126	1.801	460
		69	124	1.791	447
1 +	2	68	121	1.780	435
		67	118	1.769	422
		66	116	1.757	410
		65	113	1.744	400
		64	111	1.730	391
		63	108	1.715	382
		62	105	1.699	374
		61	103	1.684	367
		60	100	1.670	360
1 +	3	58.6	97	1.650	350
		50	76	1.520	290
		40	56	1.408	260
1 +	10	30	39	1.30+	240
1 +	17	20	24	1.200	224
1 +	38	10	11	1.10—	218

Med. use.—Diluted sulphuric acid is an excellent tonic, checking fermentation, exciting appetite, promoting digestion, and quenching thirst, and it is therefore used with success in morbid acidity, weakness, and relaxation of the stomach. As an astringent, it is used in hæmorrhagies; and from its refrigerant and antiseptic properties, it is a valuable medicine, in many febrile diseases, especially those called putrid. If taken in any considerable quantity, or for some time, it seems to pass off undecomposed by the kidneys or skin; and it is perhaps by its stimulant action on the latter, that it is advantageously employed internally, in psora, and other cutaneous affections. The best mode of prescribing it, is to order the quantity of acid to be used, and to direct it to be mixed with as much water as will render it palatable, to which some syrup or mucilage may be added. To prevent it from attacking the teeth, it may be conveniently sucked through a quill, and the mouth should be carefully washed after each dose.

Externally it is used as a gargle, particularly in putrid sore throats, and in aphthous mouths, and as a wash in cutaneous eruptions, and ill-conditioned ulcers. Made into an ointment with sixteen times its weight of axunge, it has been used to cure psora.

Acidum nitrosum. *Ed.*
Nitrous Acid.

Take of
Nitrate of potass, bruised, two pounds;
Sulphuric acid, sixteen ounces.
Having put the nitrate of potass into a glass retort, pour upon it the sulphuric acid, and distil in a sand-bath with a heat gradually increased, until the iron-pot begins to be red hot.
The specific gravity of this acid is to that of distilled water as 1550 to 1000.

Dub.

Take of
Nitrate of kali, six pounds;
Sulphuric acid, four pounds.
Mix and distil, until the residuum becomes dry.
The specific gravity of this acid is 1500.

Acidum nitricum. *Ed.*
Nitric Acid.

Take of
Nitrous acid, any quantity.

Pour it into a retort, and having adapted a receiver, apply a very gentle heat, until the reddest portion shall have passed over, and the acid which remains in the retort shall have become nitric acid.

Lond.

Take of
Nitrate of potass dried,
Sulphuric acid, each two pounds by weight.
Mix in a glass retort, and by means of a sand-bath distil off the nitric acid until red fumes appear. Then re-distil the acid in the same manner, having previously added another ounce of dried nitrate of potass.
The specific gravity of nitric acid is 1.5. If a piece of limestone be put into a fluidounce of it, diluted with water, one ounce should be dissolved.

In this process, the sulphuric acid, by its superior affinity, combines with the potass of the nitre, to form sulphate of potass, while the nitric acid is separated, and is converted into vapour, by the application of the heat to the retort, and is condensed in the receiver.

In performing this process, we must take care, in pouring in the sulphuric acid, not to soil the neck of the retort. Instead of a common receiver, it is of advantage to use some modification of Woulfe's apparatus; and as the vapours are extremely corrosive, the fat lute must be used to connect the retort with it. The London college, intending that the product should be *nitric* acid, direct us to continue the process only until red fumes appear; but there are red fumes from the very first. Mr Stocker says, that by careful distillation, the London process affords nine ounces of straw-coloured nitric acid, sp. gr. 1.5404; after which the fumes become deeper red, and the product darker, inclining to orange; but the total product is but slightly coloured, amounts to ten or eleven ounces, and has the sp. gr. required. The London college formerly used no more sulphuric acid than what was necessary to expel all the nitric acid, and the residuum was a neutral sulphate of potass, so insoluble, that it could not be got out without breaking the retort. The Edinburgh and Dublin colleges order as much sulphuric acid as renders the residuum an acidulous sulphate of potass, easily soluble in water, and the London college now employ a still larger quantity. We are informed by Dr Powell, that the reason for the adoption of these proportions for nitric acid is expressed in the following report to the college.

Dried nitre.	Sulph. acid.	Colour of product.	Sp. Gr.	Weight of product.	Marble dissolv.	Relative value.
6	6	White.	1.50	4	0.73	29
6	3	Red.	1.53	3	0.70	21
60	29	Red.	1.456	30+	0.62	19+

When the proportions were, 6 nitric and 3 sulphuric acid, there remained no redundant acid." This report cannot be correct. It was incredible, that there should be so great a difference between the second and third of the results stated in the report, when the difference in the materials used is so trifling; that the specific gravity of the first product, consisting of nitric acid, should be less than that of the second, red nitrous acid; and that of these two, the one whose specific gravity is least should dissolve most marble Accordingly Mr Phillips obtained, by the first and third processes, acids of a pale greenish-yellow colour, and the specific gravity in the last instance was 1.51 instead of 1.456. Nitric acid, from Apothecaries Hall, is greenish-yellow, and weighs specific gravity 1.424. The former impression of this edition of the London Pharmacopœia stated, that a fluidounce of this diluted acid dissolved 420 grains of marble. The quantity is increased in the present to 480. Mr Phillips found a fluidounce sp. gr. 1.5 to dissolve 476 grains. It is also to be regretted, that, in the report, there is no statement of the results of the process of the Edinburgh and Dublin colleges, for although the old London proportion of one half acid was manifestly too little, equal parts may be too much, and the intermediate proportions of 6 to 4 may be preferable to either. The manufacturers of nitrous acid use *rough nitre* with one half its weight of sulphuric acid.

Nitrous acid is frequently impure. The presence of sulphuric acid is detected by nitrate of barytes; but before applying this test, the acid must be diluted, as otherwise the salt itself is precipitated in consequence of the acid attracting the water in which it is dissolved. Sulphuric acid is easily got rid of by re-distilling the nitrous acid from a small quantity of nitrate of potass, and this rectification forms part of the new London process; as, from the large proportion of sulphuric acid used by them, they seem to have anticipated this contamination, which however does not take place, not even, according to Mr Stocker, when the distillation is continued, until the saline mass is brought into a state of fusion.

Muriatic acid is detected by the precipitate formed with nitrate of silver, and may be separated by dropping into the ni-

trous acid a solution of nitrate of silver, as long as it forms any precipitate, and drawing off the nitrous acid by distillation.

Sir H. Davy has shewn, that nitrous acid is a compound of nitric acid and nitric oxide; and that, by additional doses of the last constituent, its colour is successively changed from yellow to orange, olive green, and blue green, and its specific gravity is diminished. As commonly prepared, the acid is more or less high coloured, and emits red fumes; whereas pure nitric acid emits only white fumes. Hence the Edinburgh college have given a process for converting nitrous into nitric acid, which Dr Powell thinks uneconomical, as not only nitrous gas, but a large proportion of the acid itself, passes to waste.

By the application of a gentle heat, the whole of the nitric oxide is vaporized, and pure colourless nitric acid remains in the retort. The nitric oxide, however, carries over with it a portion of the acid, and condenses with it in the receiver, in the form of a very high-coloured nitrous acid.

Richter has given the following process for preparing nitric acid.

Take of
Purified nitrate of potass, seven pounds;
Black oxide of manganese, one pound, two ounces;
Sulphuric acid, four pounds, four ounces, and six drachms.
Into a retort capable of containing twenty four-pounds, introduce the nitre and manganese, powdered and mixed, and pour upon them gradually, through a retort funnel, the sulphuric acid. Lute on the receiver with flour and water, and conduct the distillation with a gradually increased heat.

From these proportions, Richter got three pounds nine ounces of very slightly coloured nitric acid. The operation will be conducted with less hazard in a Woulfe's apparatus, or by interposing between the retort and receiver a tubulated adopter, furnished with a bent tube, of which the further extremity is immersed in a vessel containing a small quantity of water.

The specific gravity of nitrous acid is probably stated too high by the Edinburgh college; for, although Rouelle makes that of the strongest nitric acid 1.583, yet Kirwan could produce it no stronger at 60 than 1.5543. Sir H. Davy makes it only 1.504, and when saturated with nitric oxide, only 1.475; and Mr Phillips says it varies from 1.509 to 1.519.

ACIDUM NITROSUM DILUTUM. *Ed.*
Diluted Nitrous Acid.

Take of
Nitrous acid,
Water, equal weights.
Mix them, taking care to avoid the noxious vapours.

Dub.

Take of
Nitrous acid,
Distilled water, each one pound.
Mix.
The specific gravity is 1280.

ACIDUM NITRICUM DILUTUM. *Lond.*
Diluted Nitric Acid.

Take of
Nitric acid, one fluidounce;
Distilled water, nine fluidounces.
Mix.

NITROUS ACID has a great affinity for water, and attracts it from the atmosphere. During their combination there is an increase of temperature, part of the nitric oxide is dissipated in the form of noxious vapours, and the colour changes successively from orange to green, and to blue, according as the proportion of water is increased. A mixture of equal parts of Kirwan's standard acid of 1.5543 and water, has the specific gravity 1.1911. The diluted acid of the London pharmacopœia is about 1.08.

In fact, one ounce of nitric acid, by measure, is equal to one ounce, three drachms, 21.75 grains, by weight; and one liquidounce saturates about 48 grains of white marble. The strength of the diluted nitric acid of the former London Pharmacopœia is to that of the present as 4 to 1.

Table of the Quantity of Real Acid in 100 *parts of Liquid Nitric Acid at* 60°. *Dalton.*

Atoms.		*Acid per cent. by weight.*	*Acid per cent. by measure.*	*Specific gravity.*	*Boiling pint.*
Acid.	*Water.*				
1 +	0	100	175?	1.75?	30°?
2 +	1	82.7	134	1.62	100?
1 +	1	72.5	112	1.54	175
		68	102	1.50	210
		58.4	84.7	1.45	240
1 +	2	54.4	77.2	1.42	248
		51.2	71.7	1.40	247
1 +	3	44.3	59.8	1.35	242
1 +	4	37.4	48.6	1.30	236
1 +	5	32.3	40.7	1.26	232
1 +	6	28.5	34.8	1.22	229
1 +	7	25.4	30.5	1.20	226
1 +	8	23	27.1	1.18	223
1 +	9	21	24.6	1.17	221
1 +	10	19.3	22.4	1.16	220
1 +	11	17.8	20.5	1.15	219
1 +	12	16.6	18.9	1.14	219

These acids, the nitrous and nitric, have been long employed as powerful pharmaceutic agents. Their application in this way I shall have many opportunities of illustrating.

Medical use.—Lately, however, their use in medicine has been considerably extended. In the state of vapour they have been used to destroy contagion in gaols, hospitals, ships, and other places where the accumulation of animal effluvia is not easily avoided. The fumigating such places with the vapour of nitrous acid has certainly been attended with success; but we have heard that success ascribed entirely to the ventilation employed at the same time. Ventilation may unquestionably be carried so far, that the contagious miasmata may be diluted to such a degree that they shall not act on the body; but to us it appears no less certain, that these miasmata cannot come in contact with nitric acid or oxymuriatic acid vapour, without being entirely decomposed and completely destroyed. Fumigation is, besides, applicable in situations which do not admit of sufficient ventilation; and where it is, the previous diffusion of acid vapours is an excellent check upon the indolence and inattention of servants and nurses, as by the smell we are enabled to judge whether they have been sufficiently attentive to the succeeding ventilation. Nitric acid vapour, also, is not deleterious to life, and may be diffused in the apartments of the sick, without occasioning to them any material inconvenience. The means of diffusing it are easy. Half

an ounce of powdered nitre is put into a saucer, which is placed in a pipkin of heated sand. On the nitre two drachms of sulphuric acid are then poured. The fumes of nitric acid immediately begin to rise. This quantity will fill with vapour a cube of ten feet; and by employing a sufficient number of pipkins, the fumes may be easily made to fill a ward of any extent. For introducing this practice, Dr Carmichael Smyth received from the British Parliament a reward of five thousand pounds.

The internal use of these acids has also been lately much extended. In febrile diseases, water acidulated with them forms one of the best antiphlogistic and antiseptic drinks we are acquainted with. Hoffman and Eberhard long ago employed it with very great success in malignant and petechial fevers; and in the low typhus, which frequently rages among the poor in the suburbs of Edinburgh, I have repeatedly given it with unequivocable advantage. In the liver complaint of the East Indies, and in syphilis, nitric acid has also been extolled as a valuable remedy by Dr Scott, and the evident benefits resulting from its use in these complaints has given rise to a theory, that mercury only acts by oxygenizing the system. It is certain that both the primary and secondary symptoms of syphilis have been removed by the use of these acids, and that the former symptoms have not returned, or been followed by any secondary symptoms. But in many instances they have failed; and it is doubtful if ever they effected a permanent cure, after the secondary symptoms appeared. Upon the whole, the opinions of Mr Pearson on this subject, lately agitated with so much keenness, appear to us so candid and judicious, that we shall insert them here. He does not think it eligible to rely on the nitrous acid in the treatment of any one form of the lues venerea: at the same time, he by no means wishes to see it exploded as a medicine altogether useless in that disease. When an impaired state of the constitution renders the introduction of mercury into the system inconvenient, or evidently improper, the nitrous acid will be found, he thinks, capable of restraining the progress of the disease, while, at the same time, it will improve the health and strength of the patient. On some occasions, this acid may be given in conjunction with a mercurial course, and it will be found to support the tone of the stomach, to determine powerfully to the kidneys, and to counteract, in no inconsiderable degree, the effects of mercury on the mouth and fauces.

ACIDUM MURIATICUM. *Ed.*
Muriatic Acid.

Take of
Muriate of soda, two pounds;
Sulphuric acid, sixteen ounces;
Water, one pound.
Heat the muriate of soda for some time red-hot in a pot, and after it has cooled, put it into a retort. Then pour upon the muriate of soda the acid mixed with the water and allowed to cool. Lastly, distil in a sand-bath, with a moderate fire, as long as any acid comes over.
The specific gravity of this acid is to that of distilled water as 1170 to 1000.

Lond.

Take of
Dried muriate of soda, two pounds;
Sulphuric acid, by weight, twenty ounces;
Distilled water, a pint and a half.
First mix the acid with half a pint of the water in a glass retort, and add to the mixture, after it has cooled, the muriate of soda. Pour the rest of the water into the receiver; then having fitted on the retort, distil the muriatic acid over into this water, with the heat of a sand-bath gradually increased until the retort become red.
The specific gravity of this acid is to that of distilled water as 1160 to 1000.
If a piece of limestone be put into a fluidounce of this acid diluted with water, 220 grains should be dissolved.

Dub.

Take of
Muriate of soda, dried,
Sulphuric acid,
Water, each six pounds.
Add the acid, diluted with the water, after the mixture has cooled, gradually to the salt, in a glass retort, and then distil the liquor, until the residuum becomes dry.
The specific gravity of this acid is 1170.

IN this process the muriate of soda is decomposed, and the muriatic acid disengaged by the superior affinity of the sulphuric acid. But as muriatic acid is a permanently elastic fluid, the addition of the water is absolutely necessary for its

existence in a fluid form. The London college put a portion of water into the receiver, for the purpose of absorbing the muriatic acid gas, which is first disengaged, and which would otherwise be lost for want of water to condense it: the other colleges, however, order the whole of the water to be previously mixed with the sulphuric acid; and it is indispensably necessary that the mixture of acid and water be allowed to cool before it be added to the salt; for the heat produced is so great, that it would not only endanger the breaking of the retort, but occasion considerable loss and inconvenience, by the sudden disengagement of muriatic acid gas. Dr Powell thinks it is an improvement to add the salt to the diluted acid, but it is less convenient.

Mr Phillips has given us a tabular view of the results of the processes of the London pharmacopœias, 1809 and 1787, and of a modification of the latter.

	Mur. soda.	Sulph. acid.	Water.	Cost.	Product.	Sp. gr.	Marble decomp.
1787	35	21	17.5	56	29.75	1.188	15.09
Modif.	35	21	22.	56	35.	1.174	16.43
1809	32	24	39.4	56	43.68	1.142	17.16

It may be observed, that according to these experiments, the new process does not produce an acid nearly of the strength ordered by the college, its specific gravity being 1.142 instead of 1.160, and the fluidounce decomposing only 204 instead of 220 grains of marble, while muriatic acid from Apothecaries Hall is of specific gravity 1.158. The difference of strength from the statement in the edition 1809 was greater, as the sp. gr. was said to be 1.170, and the solvent power 240; it may now be accounted for by some variation in the manipulation, especially as Dr Powell quotes the present statement as the result of experiment. At any rate, the new process is more economical, as at a given expence it produces a greater solvent power.

The muriate of soda, which should be of the kind called Bay Salt, is directed by Dublin and Edinburgh to be heated to redness, before it be introduced into the retort, that the whole of the water of crystallization may be expelled, which being variable in quantity, would otherwise affect the strength of the acid produced; and besides, without this precaution, the acid obtained is too high coloured. The London college use the salt dried, but not decrepitated.

The charge should not occupy more than half the body of

the retort; and if a common retort and receiver be employed for this distillation, they must not be luted perfectly closely; for if any portion of the gas should not be absorbed by the water employed, it must be allowed to escape; but the process will be performed with greater economy, and perfect safety, in a Woulfe's, or some similar apparatus. The muriatic acid gas, on its condensation, gives out, according to Dr Powell, a considerable heat, so that it is necessary to keep the receiver cooled during the process.

The residuum in the retort consists principally of sulphate of soda, which may be purified by solution and crystallization; and to save the retort, Dr Powell directs it to be filled with boiling water, after the process is over, and it has cooled down to 212°.

If properly prepared, the muriatic acid is perfectly colourless, and possesses the other properties already enumerated; but in the shops it is very seldom found pure. It almost always contains iron, and very frequently sulphuric acid or copper. The copper is detected by the blue colour produced by super-saturating the acid with ammonia, the iron by the black or blue precipitate formed with tincture of galls or prussiate of potass. The sulphuric acid may be easily got rid of by redistilling the acid from a small quantity of dried muriate of soda. But Mr Hume discovered, that muriate of baryta is precipitated when poured into pure muriatic acid, from the acid attracting the water of the salt.

Medical use.—In its effects on the animal economy, and the mode of its employment, it coincides with the acids already mentioned, which almost proves, that they do not act by oxygenizing the system. On the contrary, according to Sir H. Davy's view of its constitution, it contains no oxygen, and can only act *chemically* by imparting chlorine or hydrogen to the system, or withdrawing from it oxygen or some other principle which has an affinity for chlorine or hydrogen.

Acidum muriaticum dilutum. *Dub.*
Diluted Muriatic Acid.

Take of
Muriatic acid,
Distilled water, each one pound. Mix.
The specific gravity is 1080.

This diluted acid of a fixed strength, is convenient for apportioning its dose; and as it is now introduced by the Dublin college, it is to be hoped that the same proportions will be adhered to by the others.

Table of the quantity of real Acid in 100 parts of Liquid Muriatic Acid, at the Temperature of 60°. Dalton.

Atoms. Acid.	Atoms. Water.	Acid per cent. by weight.	Acid per cent. by measure.	Specific Gravity.	Boiling Point. 60°
1	1	73.3			
1	2	57.9			
1	3	47.8	71.7?	1.500?	
1	4	40.7			
1	5	35.5			
1	6	31.4			
1	7	28.2			
1	8	25.6	30.5	1.199	120
1	9	23.4	27.5	1.181	145
1	10	21.6	25.2	1.166	170
1	11	20.0	23.1	1.154	190
1	12	18.7	21.4	1.144	212
1	13	17.5	19.9	1.136	217
1	14	16.4	18.5	1.127	222
1	15	15.5	17.4	1.121	228
1	20	12.1	13.2	1.094	232
1	25	9.91	10.65	1.075	228
1	30	8.40	8.93	1.064	225
1	40	6.49	6.78	1.047	222
1	50	5.21	5.39	1.035	219
1	100	2.65	2.70	1.018	216
1	200	1.36	1.37	1.009	214

Table of the quantity of Muriatic Acid Gas in solutions of different Specific Gravities. Sir H. Davy.

At temperature 45° Fahrenheit. Barometer 30.		At temperature 45° Fahrenheit. Barometer 30.	
100 parts of solution of muriatic acid gas in water, of spec. gravity	Contain of muriatic acid gas, parts	100 parts of solution of muriatic acid gas in water, of spec. gravity	Contain of muriatic acid gas, parts
1.21	42.43	1.10	20.20
1.20 *	40.80	1.09	18.18
1.19	38.38	1.08	16.16
1.18	36.36	1.07	14.14
1.17	34.34	1.06	12.12
1.16 *	32.32	1.05	10.10
1.15	30.30	1.04	8.08
1.14	28.28	1.03	6.06
1.13	26.26	1.02	4.04
1.12	24.24	1.01	2.02
1.11 *	22.3		

AQUA ALCALINA OXYMURIATICA. *Dub.*
Oxymuriatic Alkaline Water.

Take of
Dried muriate of soda, two pounds;
Manganese, in powder, one pound;
Water,
Sulphuric acid, each two pounds.

Mix the muriate of soda and manganese; put them into a matrass, and pour on the water. Then, by means of a proper apparatus, add the sulphuric acid gradually, and at different times, and pass the gas thus extricated through a solution of four ounces of carbonate of kali, in twenty-nine ounces, by measure, of water. Towards the end of the operation, heat the matrass moderately.

The specific gravity is 1087.

THIS is commonly considered as a solution of the oxygenated muriate of potass; the oxymuriatic acid is disengaged in the matrass, by the action of the sulphuric acid on the muriate of soda, and black oxide of manganese, which latter furnishes the additional dose of oxygen to the muriatic acid disengaged from the former; and the oxymuriatic acid gas thus formed, readily combines with the potass of the solution of the alkaline salt, through which it is made to pass while the carbonic acid is expelled.

But, according to Sir Humphry Davy, this is a combination of chlorine with potass: the hydrogen of the muriatic acid in the muriate of soda combining with the oxygen of the black oxide of manganese, the chlorine is set at liberty, and combines with the potass dissolved in the water through which it is made to pass.

Oxymuriate of potass in solution was some years ago strongly recommended as an antisyphilitic remedy, and its use was extended to other cutaneous diseases, and finally to fever and spasmodic diseases, as a general stimulant. It was given in the dose of from three to ten grains, four times a-day, gradually increasing to 25 or 30. At the time, many singular cures performed by means of it were recorded, but it has fallen into disuse, and we do not now hear of its employment; although its introduction so lately into the Dublin Pharmacopœia would lead us to presume that it is still used in Ireland. It sometimes acted as a diuretic, always as a stimulant; and it is singular, that in some cases, in which it produced little or no effect, it passed off undecomposed in the urine.

In these cases Mr Cruickshank proposed to remedy the defect, by giving, after each dose, 10 or 15 drops of muriatic acid.

Aqua oxymuriatica. *Dub.*
Oxymuriatic Water,

Is prepared by transmitting, in a proper apparatus, the superfluous gas of the preceding process through a pint of water.

The specific gravity is 1003.

The oxygenated muriatic acid was also, when the chemical pathology was fashionable, recommended as an antisyphilitic remedy, and it certainly seemed, in some instances, to effect cures; but it has since been laid aside. Mr Braithwaite also recommended it strongly in scarlatina. He gave, according to the age of the patient, from half a drachm to a drachm, in the course of the day, mixed with eight ounces of distilled water; but it is advisable to divide it into doses, in different phials, as it loses every time the phial is opened, and it should be kept in a dark place. Dr Willan confirms its use in cynanche maligna.

The vapours of this powerfully decomposing acid have been recommended by Morveau as the best means of destroying contagion. As, however, they are deleterious to animal life, they cannot be employed in every situation. Where applicable, they are easily disengaged by mixing together ten parts of muriate of soda, and two parts of black oxide of manganese in powder, and pouring upon the mixture, first four parts of water, and then six parts of sulphuric acid. Fumes of oxygenized muriatic acid are immediately disengaged.

Morveau has since contrived what he calls Dis-infecting or Preservative phials. If intended to be portable, 46 grains of black oxide of manganese, in coarse powder, are to be put into a strong glass phial, of about $2\frac{1}{3}$ cubic inches capacity, with an accurately ground stopper, to which must be added about $\frac{45}{100}$ of a cubic inch of nitric acid of 1.4 specific gravity, and an equal bulk of muriatic acid of 1.134; the stopper is then to be replaced, and the whole secured by inclosing the phial in a strong wooden case, with a cap which screws down so as to keep the stopper in its place. They are used by simply opening the phial without approaching it to the nose, and shutting it as soon as the smell of the muriatic gas is perceived. A phial of this kind, if properly prepared, will preserve its power during many years. For small wards, strong bottles,

with ground stoppers an inch in diameter, of about 25 or 27 cubic inches of capacity, may be used, with 372 grains of the oxide, and 3.5 inches of each of the acids, and the stopper kept in its place by leaden weights; or for larger wards, very strong glass jars, about 43 cubic inches in capacity, containing an ounce of the oxide, and 6 inches of each of the acids. These jars are to be covered with a plate of glass, adjusted to them by grinding with emery, and kept in its place by a screw. In no case is the mixture to occupy more than one-third of the vessel.

ACIDUM ACETOSUM DESTILLATUM. *Ed.*
Distilled Acetous Acid.

Let eight pounds of acetous acid be distilled in glass vessels, with a gentle heat. The two first pounds which come over, being too watery, are to be set aside; the next four pounds will be the Distilled acetous acid. The remainder furnishes a still stronger, but empyreumatic acid.

ACETUM DISTILLATUM. *Dub.*
Distilled Vinegar.

Take of
Vinegar, ten pints.
Draw off, with a gentle heat, six pints.
Glass vessels are to be employed in this distillation, and the first pint which comes over is to be rejected.
The specific gravity of this acid is 1006.

ACIDUM ACETICUM. *Lond.*
Acetic Acid.

Take of
Vinegar, a gallon.
Distil off the acetic acid in a sand bath, from a glass retort, into a cooled glass receiver; then, having thrown away the first pint, preserve the next six.

VINEGAR, when prepared from vinous liquors by fermentation, besides acetous acid and water, contains mucilage, extractive, super-tartrate of potass, and often citric or malic acid, alcohol, and a peculiar agreeable aroma. These substances, particularly the extractive and super-tartrate of potass, render it apt to spoil, and unfit for pharmaceutic and chemical purposes. By distillation, however, the acetic acid is easily separated from such of these substances as are not volatile, although it still contains some little extractive matter, as is proved by its assuming a brown colour, when satu-

rated with potass. But by distillation it loses its agreeable flavour, and becomes considerably weaker; for the spirit and water, being rather more volatile than acetic acid, come over first, while the last and strongest portion of the acid cannot be obtained free from empyreuma.

This process may be performed in a common still, but a retort, which should be very large, as the liquor is apt to boil over, is preferable. The best kinds of wine vinegar should be used; and, even with these, if the distillation be carried on to any great length, it is extremely difficult to avoid empyreuma. The best method, however, is, if a retort be used, to place the sand but a little way up its sides, and, when somewhat more than half the liquor has come over, to pour upon the remainder a quantity of fresh vinegar equal to the liquor drawn off. This may be repeated three or four times; the vinegar supplied at each time being previously heated, as the addition of cold liquor would not only prolong the operation, but also endanger the breaking of the retort. Lowitz recommends the addition of half an ounce of recently burnt and powdered charcoal to each pound of vinegar in the still, as the best means of avoiding empyreuma.

If the common still be employed, it should likewise be occasionally supplied with fresh vinegar, in proportion as the acid runs off, and this continued until the process cannot be conveniently carried farther. The distilled acid must be rectified by a second distillation, in a retort or glass alembic; for, although the head and receiver be of glass or stoneware, the acid will contract a metallic taint from the pewter worm.

The residuum of this process is commonly thrown away as useless. If mixed with about three times its weight of fine dry sand, and committed to distillation in a retort, with a well-regulated fire, it yields an exceedingly strong empyreumatic acid. Besides, it is, without any rectification, better for some purposes, as being stronger than the pure acid; particularly for making acetate of potass or soda; for, in the process for preparing these, the empyreumatic oil is burnt out.

Mr Phillips says, that the best malt vinegar has a specific gravity 1.0204; that the first eighth part which it yields on distillation, is of sp. gr. 0.99712, has a decidedly acid taste, and a fluidounce decomposes from 4.5 to 5 grains of precipitated carbonate of lime; while the subsequent six-eighths are of specific gravity 1.0023, and a fluidounce decomposes 8.12 grains of carbonate of lime. Hence he concludes, that it is improvident to reject the first eighth, since it contains about one-twelfth of the acid obtained, and there is no circumstance

rendering it necessary to have distilled vinegar either of very equal or very great strength.

Distilled vinegar should be colourless and transparent, specific gravity from 1.007 to 1.0095, have a pungent smell, and purely acid taste, totally free from acrimony and empyreuma, and should be entirely volatile. One fluidounce should dissolve at least 13 grains of white marble, according to Dr Powell. Distilled vinegar should not form a precipitate on the addition of a solution of baryta, or of water saturated with sulphuretted hydrogen; or change its colour when supersaturated with ammonia. These circumstances shew, that it is adulterated with sulphuric acid, or contains lead, copper, or tin.

Distilled acetous acid, in its effects on the animal economy, does not differ from vinegar; and as it is less pleasant to the taste, it is only used for pharmaceutical preparations.

Acidum aceticum. *Dub.*
Acetic Acid.

Take of
Acetate of kali, six ounces;
Sulphuric acid, three ounces, by weight.
Pour the acid into a tubulated retort, and gradually add the acetated kali in different portions, waiting, after every addition, until the mixture cools; then distil off the acid, with a moderate heat, until the residuum become dry.
The specific gravity of this acid is 1070.

Acidum acetosum forte. *Ed.*
Strong Acetous Acid.

Take of
Sulphate of iron dried, one pound;
Acetate of lead, ten ounces.
Having rubbed them together, put them into a retort, and distil in a sand-bath, with a moderate heat, as long as any acid comes over.

By these processes, the acid we have before noticed, under the title of acetic acid, is prepared. It is now generally believed to differ from distilled vinegar only in strength, and in being perfectly free from all mucilaginous matter; therefore, according to the principles of nomenclature, which gives simple names to simple substances, the strong acid should be acetic acid, and our present acetous acid should be weak or dilute acetic acid.

Many different processes have been proposed for preparing acetic acid, but they may be arranged in three classes. It may be prepared,

1. By decomposing metalline acetates by heat.
2. ——————— acetates by sulphuric acid.
3. ——————— acetates by sulphates.

The process in the former edition of the London college is an example of the first kind; but the heat necessary for decomposing verdigris is so great, that it decomposes part of the acetic acid itself, and gives the product an empyreumatic and unpleasant smell.

By the superior affinity of sulphuric acid, the acid may be easily expelled from every acetate, whether alkaline or metallic; but part of the sulphuric acid seems to be deprived of its oxygen, and to be converted into sulphurous acid, which renders the product impure.

The processes of the last kind are preferable to the others in many respects. They are both more economical, and they furnish a purer acid. Mr Lowitz directs one part of carefully dried acetate of soda to be triturated with three parts of supersulphate of potass, and the distillation to be conducted in a glass retort, with a gentle heat. The Berlin college mix together twelve ounces of sulphate of potass with six of sulphuric acid, diluted with eighteen of water, and evaporate to dryness. With the supersulphate of potass, thus prepared, they decompose nine ounces of acetate of soda, dried with a gentle heat *. The process of the Edinburgh college also belongs to this class, and was first proposed by C. Badollier, apothecary at Chartres.

Medical use.—It is almost solely used as an analeptic remedy in syncope, asphyxia, hysteric affections, and headachs. Applied to the skin, it acts as a stimulant and rubefacient, but it is most frequently snuffed up the nostrils in the state of vapour.

Acidum benzoicum. *Ed.*
Benzoic Acid.

Take of
Benzoin, twenty-four ounces;
Carbonate of soda, eight ounces;
Water, sixteen pounds.
Triturate the benzoin with the carbonate, then boil in the water for half an hour, with constant agitation, and strain.

* The acid residuum of the distillation of nitrous acid would be a very economical substitute.

Repeat the decoction, with other six pounds of water, and strain. Mix these decoctions, and evaporate, until two pounds remain. Filter anew, and drop into the fluid, as long as it produces any precipitation,

Diluted sulphuric acid.

Dissolve the precipitated benzoic acid in boiling water, strain the boiling solution through linen, and set it aside to crystallize. Wash the crystals with cold water, dry and preserve them.

Dub.

Take of

Benzoin, any quantity.

Liquefy it in a retort with a wide throat, having a receiver fitted to it, but not luted, and sublime. Remove the sublimed matter occasionally from the neck of the retort, lest it accumulate in too great a quantity. If it be soiled with oil, press it, folded up in blotting paper, and repeat the sublimation.

Lond.

Take of

Benzoin, one pound and a half;

Fresh lime, four ounces;

Water, a gallon and a half;

Muriatic acid, four fluidounces.

Triturate the benzoin with the lime, then boil for half an hour in a gallon of the water, stirring it assiduously with a spatula, and decant the liquor when cold. Boil the residuum again in four pints of water, and decant the liquor as before: then boil down the liquors mixed together to one half; filter through paper, and gradually drop in the muriatic acid, until there be no more precipitate.

Lastly, having poured off the liquor, dry the powder with a gentle heat, put it in a proper vessel, placed in a sand bath, and sublime the benzoic acid with a gentle heat.

The distinguishing character of balsams is their containing benzoic acid, which may be separated from the resin, their other principal constituent, either by simple solution in water, sublimation, or by combining it with a salifiable base. The Dublin college directs it to be done in the second way. But, even with the greatest care, it is almost impossible to manage the heat so as not to decompose part of the resin, and thus give rise to the formation of an empyreumatic oil, which

contaminates the product. Nor can it be freed completely from the empyreumatic oil by bibulous paper.

The other method of separating benzoic acid from resin, was first practised by Scheele, who employed lime water; Göttling afterwards used carbonate of potass; and, lastly, Gren used carbonate of soda, which has been adopted by the Berlin college, and now by that of Edinburgh. Mr Brande, and he has been followed by the London college, prefers Scheele's process, as the lime dissolves less of the resin of the benzoin than the alkalies do. In experiments which he made for the purpose of ascertaining the comparative value of the different processes, he obtained from one pound of benzoin,

	Grains.
By sublimation, - - - -	960
— Scheele's process, - - -	899
— Gren's and Göttling's process, - -	810
— boiling benzoin in water, - -	490

As the crystallized acid, on account of its lightness and elasticity, is not easily reduced to powder, for most purposes it will be more convenient to keep it in the state of a precipitate.

It may also be extracted from Storax, and all the other balsams, particularly those of Tolu or Peru; and from the urine of children, and of herbivorous animals.

The benzoic acid has an agreeable taste and a fragrant smell, especially when heated. It is soluble in alcohol, and in boiling water, but very sparingly in cold water, although it may be suspended in it, by means of sugar, so as to form an elegant balsamic syrup.

Acidum citricum. *Lond.*
Citric Acid.

Take of

Lemon juice, one pint;

Prepared chalk, one ounce, or as much as may be required to saturate the juice;

Diluted sulphuric acid, nine fluidounces.

To the lemon juice, heated to ebullition, gradually add the chalk, and mix them. Then decant the liquor, and wash the citrate of lime, which remains behind, in repeated waters. Dry it, and then pour upon the dried powder the diluted sulphuric acid; boil for ten minutes, strain it through a cloth with strong expression, and filter through

paper. Evaporate the filtered liquor with a gentle heat, until it form crystals on cooling.

In order to render the crystals pure, they must be dissolved twice, or oftener, in water, filtered each time, evaporated and crystallized.

This process was contrived by Scheele, and was reduced to determinate quantities by Proust, as follows: To 94 parts of lemon juice, 4 parts of carbonate of lime are to be added; the carbonic acid is separated by effervescence, and a quantity of insoluble citrate of lime is precipitated. By evaporating the supernatant liquor, another portion of citrate of lime is obtained. These added together amount to about $7\frac{1}{2}$ parts, and require 20 parts of sulphuric acid, of the specific gravity of 1.15, to decompose them. The sulphate of lime, being nearly *insoluble*, is precipitated, while the citric acid remains in *solution*, and is to be separated by washing, and crystallized by evaporation. If too much sulphuric acid be added, when the liquor is much concentrated, the citric acid is reacted upon, and part of it is charred. In this case a little chalk must be added, to saturate the excess of sulphuric acid. Mr Parker, Tilloch's Journal, vol. xlvi p. 60, on the authority of a manufacturer of citrate of lime in Sicily, has given some curious details on the subject. 74.964 gallons of lemon juice were used, which, with 35.017 pounds of chalk gave 49.902 pounds avoirdupoise of citrate. The quantity of citrate produced by every pound of chalk varied from 19 to 27 ounces, and from every gallon of juice from $8\frac{1}{4}$ to $12\frac{3}{4}$ ounces. This disparity arose from inequality in the acidity of the juice, and from the same quantity of chalk being used with every kind of juice. The chief difficulties of the manufacture consisted in the drying properly the citrate. In some respects this concrete acid is superior, and in others greatly inferior to lemon juice. It has not the flavour; and, what is of more consequence, it has not the freshness or antiscorbutic powers of the fruit; but from its solid form and gradual solution it is convenient, and is excellently adapted for effervescing mixtures. Dr Haygarth found that 26 parts of the solid acid saturates 61 of subcarbonate of potash, 42 subcarbonate of ammonia, and 40 of carbonate of magnesia.

The crystals are permanent, and dissolve in three-fourths of their weight of cold, and half their weight of boiling water. Dissolved in eight waters, it is said to be equal in strength to lemon juice.

Oleum succini et acidum succini. *Ed.*
Oil of Amber and Succinic Acid.

Take of

Amber reduced to powder, and of pure sand, equal parts.

Mix them, and put them into a glass retort, of which the mixture fills one half: then adapt a large receiver, and distil in a sand bath, with a fire gradually increased. At first, a watery liquor will come over, with some yellow oil; then a yellow oil, with an acid salt; and, lastly, a reddish and darkcoloured oil.

Pour the liquor out of the receiver, and separate the oil from the water. Press the acid salt collected from the neck of the retort and sides of the receiver between folds of blotting paper, to free it from the oil adhering to it; then purify it by solution in warm water and crystallization.

Acidum succinicum. *Dub.*
Succinic Acid.

Take of

Amber,

Pure sand, each one pound.

Distil, with a heat gradually increased, an acid liquor, an oil, and a salt discoloured with oil. Let the salt be wrapt up in blotting paper, and compressed, to squeeze out the oil, and be again sublimed.

We are not acquainted with any experiments which determine whether the succinic acid exist as such in the amber, or whether it be a product of the decomposition of the amber by the action of heat; for in the process employed for obtaining succinic acid the amber is completely decomposed.

The sand is added to prevent the amber from running together into masses, and impeding the distillation; but as it renders the residuum unfit for the use of the varnisher, it is not advisable. According to Göttling, this distillation should be performed in a tubulated iron or earthen-ware retort, exposed to the immediate action of the fire; for he says, that in a sand-bath we cannot regulate the heat sufficiently, and that a glass retort is incapable of supporting the necessary temperature.

Besides the succinic acid collected from the neck of the retort, and sides of the receiver, the oil washes down a portion of it into the receiver, and the watery liquor which comes over is saturated with it. But the whole of it may be obtained by agitating the oil with some boiling water, which will dissolve the acid. This solution is then to be added to the

acid liquor, and the acid they contain is easily obtained by evaporation and crystallization. The acid may afterwards be purified by solution in boiling water and crystallization, according to the directions of the colleges.

But even after repeated solutions and crystallizations, a portion of empyreumatic oil still adheres to the acid, and renders it impure. Other methods of purifying it have been therefore attempted. Demachy saturated it with lime, separated the lime by sulphuric acid, and sublimed the succinic acid: Richter saturated succinic acid with potass, decomposed the salt formed with acetate of lead, and disengaged the succinic acid from the lead by means of diluted sulphuric acid: lastly, Morveau asserts that he obtained it in a state of perfect purity, by treating it with nitrous acid. It is often adulterated with muriate of ammonia, sulphuric acid, sulphate of potass, sugar, &c. When pure it is entirely volatile, gives out no ammoniacal fumes when triturated with potass, is not precipitated by solutions of baryta, and is soluble in alcohol.

Succinic acid, although retained in the Edinburgh and Dublin Pharmacopœias, is never used in medicine. It has been rejected from the London.

Chap. III.—ALKALIES, and ALKALINE SALTS.

Aqua potassæ: vulgo Lixivium causticum. *Ed.*
Solution of Potass, commonly called *Caustic Ley.*

Take of
Newly prepared lime, eight ounces;
Carbonate of potass, six ounces.

Put the lime into an iron or earthen vessel, with twenty-eight ounces of warm water. After the ebullition is finished, instantly add the salt; and having thoroughly mixed them, cover the vessel till they cool. When the mixture has cooled, agitate it well, and pour it into a glass funnel, the throat of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel, and insert its tube into another glass vessel, so that the Solution of Potass may gradually drop through the rag into the lower vessel. As soon as it ceases to drop, pour into the funnel some ounces of water, but cautiously, so that it may swim above the matter in the funnel. The Solution of Potass will again

begin to drop, and the affusion of water is to be repeated in the same manner, until three pounds have dropped, which will happen in the space of two or three days; then mix the superior and inferior parts of the liquor together by agitation, and keep it in a well-stopt phial.

Liquor potassæ. *Lond.*
Solution of Potass.

Take of
Sub-carbonate of potass, one pound;
Fresh lime, half a pound;
Distilled water, boiling, a gallon.

Dissolve the potass in two pints of the water; add the rest of the water to the lime. Mix the liquors while hot, set the mixture aside in a covered vessel; and after it has cooled, filter it through cotton cloth.

If any diluted acid, dropt into it, excite effervescence, more lime must be added, and the filtration repeated.

A pint of this liquor should weigh sixteen ounces.

Aqua kali caustici. *Dub.*
Solution of Caustic Kali.

Take of
Fresh burnt lime, eight ounces;
Subcarbonate of kali, six ounces.

Put the lime into an earthen vessel, and sprinkle upon it two pints of boiling water. With the slaked lime mix the salt, and cover the vessel. Pour the mass, as soon as it has cooled, into a glass funnel, whose throat is obstructed with a rag. Having covered the funnel, let the ley drop into a vessel placed below it, and pour water from time to time into the funnel, until three pints have passed through.

Let the liquor be agitated, and kept in a bottle of green glass well closed.

If the ley be rightly prepared, it will have neither colour nor smell, and will scarcely effervesce when mixed with acids. If it effervesce considerably, add a little fresh burnt lime, in very fine powder; digest for twenty-four hours in a close vessel, with occasional agitation; then filter the ley in the manner already directed.

The specific gravity of this liquor is to that of distilled water as 1100 to 1000.

These processes do not differ materially. They are founded upon the affinity of lime being stronger than that of potass

for carbonic acid. Of course, when lime comes in contact with carbonate of potass, the carbonic acid quits the potass to unite with the lime, and the results of the mixture are potass and carbonate of lime. Now, as the carbonate of lime is insoluble in water, and the potass is very soluble, they may be separated by filtration. In doing this, however, we must take care to employ instruments on which the solution of potass does not act, and to prevent the free access of air, from which it would attract carbonic acid, and thus frustrate the whole operation. The latter object is attained by covering the upper or broad end of the funnel with a plate of glass, and inserting the lower end into the neck of a phial, which it fits pretty closely. The former object is attended with greater difficulties, and indeed scarcely to be effected, so powerful and general is the agency of potass. All animal substances are immediately attacked and destroyed by it; therefore, our filters cannot be made of silk, woollen, or paper which contains glue; and although neither vegetable matters nor silica entirely escape its action, linen and sand are, on the whole, the least objectionable. A filter of sand was used by Dr Black: he first dropt a rugged pebble into the tube of the funnel, in some part of which it formed itself a firm bed, while the inequalities on its surface afforded interstices of sufficient size for the passage of the filtering liquor. On the upper surface of this stone he put a thin layer of lint or clean tow; immediately above this, but not in contact with it, he dropped a stone similar to the former, and of a size proportioned to the swell in the upper part of the tube of the funnel. The interstices between this second stone and the funnel were filled up with stones of a less dimension, and the gradation uniformly continued till pretty small sand was employed. Finally, this was covered with a layer of coarser sand, and small stones, to sustain the weight of the fluid. A filter of sand being thus constructed in the funnel, it was washed perfectly clean, by making clean water pass through it, till it dropt from the lower extremity of the funnel perfectly clear and transparent; and before using it, it was allowed to stand for some days, that no water might remain among the interstices of the sand.

From the spongy nature of the residuum which remains upon the filter, and especially if we use that of sand, a considerable quantity of the solution of potass will be retained. It is, however, easily obtained, by pouring gently over it, so as to disturb it as little as possible, a quantity of water; the ley immediately begins again to drop from the funnel, and as,

from the difference of their specific gravity, the water does not mix with it, but swims above it, the whole ley passes through before any of the water. By means of the taste we easily learn when the whole ley has passed.

As it is natural to suppose that the strongest solution will pass first, and the weakest last, we are directed to agitate the whole together, to render their strength uniform.

If the solution of potass be pure, it will be colourless, and it will neither effervesce with acids, nor form a precipitate with carbonate of potass. If it effervesces, carbonic acid is present, and must be separated by again boiling the solution with a little lime, or by dropping it into lime-water, as long as it produces any precipitate. But Mr Phillips has remarked, that even when a small quantity of carbonic acid is contained in it, no precipitate is produced unless a considerable quantity of lime-water be added. If, on the contrary, it contain lime, from too much of it having been employed in the preparation, it may be separated by dropping into the ley a solution of the carbonate of potass. When we have thus purified our solution of potass, it must be again filtered. Mr Phillips objected to this process as in the London Pharmacopœia of 1809, that the quantity of lime employed was much too large, and that a half of the weight of the subcarbonate is sufficient, as in fact 33 parts of lime will saturate the 26 of carbonic acid commonly contained in 100 parts of subcarbonate of potass; and his suggestion has been adopted in the edition 1815. But this objection is obviated by the mode of filtration used by the Edinburgh college; and although from calculation the quantity of lime seems excessive, it is necessary to render the potass perfectly caustic.

Medical use.—The solution of caustic potass, under various names, has at different times been celebrated as a lithontriptic, and as often fallen again into disuse. The very contradictory accounts of its effects as a solvent are now, in some degree, explicable, since it has been discovered that urinary calculi are very different in their natures, so that some of them are only soluble in acids, and others only in alkalies. Of the last description are the calculi of uric acid, which are very frequent, and those of urate of ammonia. On these, therefore, alkalies may be supposed to make some impression; and that alkalies, or alkaline carbonates, taken by the mouth, have occasionally relieved calculous complaints, is certain. It is however said, that their continued use debilitates the stomach; and M. Fourcroy has proposed applying the remedy immediately to the disease, by injecting into the blad-

der a tepid solution of potass or soda, so dilute that it can be held in the mouth. Before the alkaline solution be injected, the bladder is to be completely evacuated of urine, and washed out with an injection of tepid water. After the alkaline injection has remained in the bladder half an hour or more, it is to be evacuated, and allowed to settle. If, on the addition of a little muriatic acid, a precipitate be formed, we shall have reason to conclude that the calculus contains uric acid, and that the alkali has acted on it.

Very dilute alkaline solutions may also be taken into the stomach as antacids, but we possess others which are preferable.

Mr Brandish, who has strongly recommended the solution of caustic potash for the cure of scrofula, gives the following complicated formula for its preparation.

Take of

American pearl ashes, six pounds.
Fresh burnt lime,
Fresh ashes of ash wood, each two pounds.
Boiling water, six gallons.

He reverses the common method of slaking lime, by desiring it to be gradually added to the water kept boiling: He then adds the pearl ashes, then the wood ashes; stirs all together, and lastly draws off the clear liquor slowly. He used to prepare it without the pearl ashes, but found they rendered it softer, which no doubt they would, as the quantity of lime is insufficient to abstract all the carbonic acid, and would leave the liquor in a state of subcarbonate. He says that a wine pint of his solution should weigh 18 or 19 ounces. He recommends the addition of a drop or two of genuine oil of juniper to the pint of liquor, and orders it to be taken twice a-day in the following doses; to a child from four to six, 1 drachm by measure; from six to eight, one drachm and a half; eight to fifteen, 2 drachms; fifteen to eighteen, two and a half; to adults 3 and sometimes 4. It should, however, be begun in rather smaller doses. The vehicle may be fresh beer, malt-tea, barley-water, or water-gruel.

Externally, alkaline solutions have been more frequently used, either very dilute, simply as a stimulus, in rickets, gouty swellings, gonorrhœa, and spasmodic diseases, or concentrated as a caustic, to destroy the poison of the viper, and of rabid animals.

POTASSA; olim CAUSTICUM COMMUNE ACERRIMUM. *Ed.*
Potass; formerly Strongest Common Caustic.

Take of
The solution of potass, any quantity.
Evaporate it in a covered very clean iron vessel, till, on the ebullition ceasing, the saline matter flow gently like oil, which happens before the vessel becomes red. Then pour it out on a smooth iron plate; let it be divided into small pieces before it hardens, and immediately deposited in a well-stopt phial.

POTASSA FUSA. *Lond.*
Melted Potass.

Take of
Liquor of potass, one gallon.
Evaporate the liquor in a bright iron vessel over the fire, until after the cessation of the boiling the potass melt. Pour this out upon an iron plate into proper moulds.

KALI CAUSTICUM. *Dub.*
Caustic Kali.

Take of
Solution of caustic kali, any quantity.
Evaporate it over the fire in a very clean iron vessel, until, the ebullition having ceased, the saline matter, on increasing the heat, remain almost at rest in the vessel. Let the liquefied salt be poured out upon an iron plate, and while it is congealing, be cut into proper pieces, which are immediately to be put into a well-closed phial.
During the evaporation, let the operator avoid the drops spirted up.

THE principal thing to be attended to in this operation, is to conduct the evaporation so rapidly that the ley shall not absorb any carbonic acid from the atmosphere. As long as any water of solution remains, the ebullition is evident, and the evaporation is to be continued until it cease. The heat is then to be increased a little, which renders the potass perfectly fluid, and gives it the appearance of an oil, when it is ready to be poured out, either on a slab, as directed by the colleges, or into iron moulds, such as are used for the melted nitrate of silver.

The potass prepared according to these directions is sufficiently pure for medical use, but is not fit for chemical experiments. We can, however, obtain it perfectly white and

crystallized, according to Berthollet, by adding to the ley, when evaporated so far that it would assume the consistence of honey, if permitted to cool, a quantity of alcohol equal to one-third of the carbonate of potass operated on, mixing them together, and letting them boil a minute or two. The mixture is then to be poured into a glass vessel, and corked up, when the impurities will gradually subside, partly in a solid form, and partly dissolved in water. The supernatant alcoholic solution is then to be evaporated rapidly, till its surface become covered with a black crust, which is to be removed, and the liquid below is to be poured into a porcelain vessel, when it will concrete into a white substance, which is to be broken in pieces, and immediately excluded from the action of the air.

A less expensive way of obtaining potass perfectly pure is that of Lowitz. Evaporate a solution of potass till a thick pellicle form on its surface; allow it to cool, separate all the crystals formed, as they consist of foreign salts: renew the evaporation, in an iron or silver bason; and remove the pellicles which form on the surface with an iron skimmer, as long as any appear. When the ebullition ceases, remove the vessel from the fire, and agitate the fused salt with an iron spatula while it cools. Dissolve the saline mass in twice its weight of water, and evaporate in a silver bason till it begins to crystallize. The crystals are pure potass. The fluid which swims over them has a dark brown colour, and must be poured off: but if kept in a close-stopt phial, it will deposite its colouring matter, and by evaporation will furnish more crystals of potass.

Medical use.—Potass is only used as a caustic, or to form solutions of a known strength; and even its use as a caustic is inconvenient, from its being so quickly affected by the air, and from its rapid deliquescence, which renders it apt to spread.

Potassa cum calce. *Ed.*
Potass with Lime.

Take of

Solution of Potass, any quantity.

Evaporate it in a covered iron vessel till one-third remains; then mix it with as much new slaked lime as will bring it to the consistence of pretty solid pap, which is to be kept in a vessel closely stopt.

Lond.

Take of
Liquor of potass, three pints;
Fresh lime, one pound.
Boil down the liquor to one pint, then add the lime previously slaked, and mix them intimately.

KALI CAUSTICUM CUM CALCE. *Dub.*
Caustic Kali with Lime.

Evaporate solution of caustic kali to one-third, then add as much fresh burnt lime, in powder, as will form a sufficiently thick mass, which is to be kept in a well-closed vessel.

THE addition of the lime in these preparations renders them less apt to deliquesce, more easily managed, and milder in their operation than fused potass.

CARBONAS POTASSÆ. *Ed.*
Carbonate of Potass.

Let impure carbonate of potass (called in English *pearl ashes*) be put into a crucible, and brought to a low red heat, that the oily impurities, if there be any, may be burnt out: then triturate it with an equal weight of water, and mix them thoroughly by agitation. After the feces have subsided, pour the liquor into a very clean iron pot, and boil to dryness, stirring the salt towards the end of the process, to prevent its sticking to the vessel.

POTASSÆ SUBCARBONAS. *Lond.*
Subcarbonate of Potass.

Take of
Impure potashes, in powder, three pounds;
Boiling water, three pints and a half.
Dissolve the potashes in the water, and filter, then pour it into a bright iron vessel, and evaporate the water by a gentle heat until the liquor become thick; then, having removed it from the fire, stir it constantly with an iron spatula until it become a granulated salt.

A purer subcarbonate of potass may be prepared in the same manner from Tartar, previously burnt till it becomes of an ash colour.

SUBCARBONAS KALI. *Dub.*
Subcarbonate of Kali.

Take of
Potashes, in coarse powder,
Cold water, each six pounds.

Mix them by trituration, and macerate them for a week in a wide vessel, with occasional agitation. Filter the ley, and evaporate it to dryness in a very clean iron vessel. Towards the end of the evaporation, stir the saline mass constantly with an iron spatula. When thus reduced to coarse powder, keep it in close vessels.

Before the ashes are dissolved in the water, if they be not sufficiently pure, roast them in a crucible till they become white.

CARBONAS POTASSÆ PURISSIMUS; olim, SAL TARTARI. *Ed.*
Pure Carbonate of Potash; formerly *Salt of Tartar.*

Take of
Impure super-tartrate of potass, any quantity.

Wrap it up in moist bibulous paper, or put it into a crucible, and burn it into a black mass, by placing it among live coals. Having reduced this mass to powder, expose it in an open crucible to the action of a moderate fire, till it become white, or at least of an ash-grey colour, taking care that it do not melt. Then dissolve it in warm water; strain the liquor through a linen cloth, and evaporate it in a clean iron vessel, diligently stirring it, towards the end of the process, with an iron spatula, to prevent it from sticking to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes almost red. Lastly, when the salt is grown cold, keep it in glass vessels, well stopped.

KALI E TARTARO. *Dub.*
Kali from Tartar.

Take of
Crystals of tartar, any quantity.

Heat them to redness in a silver crucible, loosely covered, until they cease to emit fumes. Reduce the mass which remains to coarse powder, and roast it for two hours in the same crucible, uncovered, stirring it frequently. Boil this in twice its weight of water, for a quarter of an hour, and after the liquor has become pure, pour it off. Repeat this three times.

Filter the mixed leys, and evaporate them in a silver bason. While the salt which remains is drying, granulate it by frequent agitation, and then heat it to a dull red. Take it out of the vessel before it is quite cold, and keep it in well-stopt phials.

The potash of commerce we have already shewn to contain a considerable proportion of foreign salts. By the process directed by the colleges, it is purified from those which are crystallizable; and, although it still contains muriate of potass and silica, it is sufficiently pure for the purposes of medicine. Mr Phillips says, when prepared from pearl ash, it consists of about 26 carbonic acid, 71 potash and water, two muriate of potash, and one sulphate of potash, and a little silica.

The purest subcarbonate of potass, in common use, is that obtained by incinerating the impure supertartrate of potass, as all the substances it contains, except the potass, are decomposed by the heat. The tartaric acid and colouring matter are destroyed, and part of the carbonic acid, which is formed, unites with the potass.

But this salt, in whatever way obtained, is not strictly entitled to the appellation of carbonate, given it by the Edinburgh college; for it is not saturated with the acid, or rather it is a mixture of potass and carbonate of potass, in variable proportions. It is owing to the uncombined potass that it is still deliquescent, and in some degree caustic.

Medical use.—Subcarbonate of potass is frequently employed in medicine, in conjunction with other articles, particularly for the formation of saline neutral draughts and mixtures; but it is used also by itself, in doses from three or four grains to fifteen or twenty; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution.

Potassæ carbonas. *Lond.*
Carbonate of Potass.

Take of
Subcarbonate of potass from tartar, one pound;
Subcarbonate of ammonia, three ounces;
Distilled water, one pint.

Add the subcarbonate of ammonia to the potass dissolved in the water. Then expose it for three hours to the heat of 180° in a sand bath, or until the ammonia be expelled.—Lastly, set it aside to crystallize. The residuary liquor may

be evaporated in the same manner, so as again to afford crystals on being set aside.

Subcarbonate of potass is easily saturated with carbonic acid, by exposing it, in solution, to the contact of the air for a considerable time, or more quickly by making a stream of carbonic acid gas evolved from carbonate of lime by sulphuric acid, pass through a solution of it, or by distilling it with carbonate of ammonia, as proposed by Berthollet, and directed by the London college. The last is more expensive than the second, but it does not require any particular apparatus. M. Curadow has invented a cheaper mode of saturating potass with carbonic acid. He dissolves the potass in a sufficient quantity of boiling water, mixes it with as much dried tanners' bark as to make it pretty dry, and then exposes the mixture, in a covered crucible, to the heat of a reverberatory furnace for half an hour. By lixiviation and crystallization, the mixture affords beautiful permanent crystals of carbonate of potass. In this state it consists of about 43 acid, 40 potass, and 17 water. The saturation with carbonic acid is one of the best means of purifying the subcarbonate of potass; for it always separates silica from the uncombined alkali; and hence, perhaps, the employment of the subcarbonate from tartar is unnecessarily expensive.

Liquor potassæ subcarbonatis. *Lond.*
Solution of Subcarbonate of Potass.

Take of
Subcarbonate of potass, one pound;
Distilled water, twelve fluidounces.
Dissolve the subcarbonate of potass in the water, and filter through paper.

Aqua subcarbonatis kali. *Dub.*
Solution of Subcarbonate of Kali.

Take of
Subcarbonate of kali, any quantity.
Place it in a wide glass funnel, whose throat is obstructed with a rag. Set this in a cellar, that the salt may deliquesce in the moist air. Let the solution be caught in a vessel placed under it.

The preparation of the Dublin college is the old *Oleum tartari per deliquium*, and is a solution of carbonate of potass in a variable quantity of water; for, by exposure to the air,

the subcarbonate attracts not only water, but carbonic acid. It is therefore improperly named. The name of the London college is correct, and the preparation nearly uniform in point of strength. Dr Powell says, that the quantities ordered by the college will commonly give a solution amounting to nearly 18 ounces in bulk.

AQUA SUPERCARBONATIS POTASSÆ. *Ed.*
Solution of Supercarbonate of Potass.

Take of
Water, ten pounds.
Pure carbonate of potass, one ounce;
Dissolve, and expose the solution to a stream of carbonic acid, arising from
Carbonate of lime in powder,
Sulphuric acid, each three ounces;
Water, three pounds, gradually and cautiously mixed.
The chemical apparatus invented by Dr Nooth is well adapted for this preparation. But, if a larger quantity of the liquor be required, the apparatus of Dr Woulfe is preferable.
The colder the air, and the greater the pressure, the better will the solution be, which must be kept in well-corked vessels.

As soon as the preparation is finished, the liquor should be drawn off into pint bottles, which are to be well-corked, and kept in a cool situation, with the head down, or laid on one side. It should be perfectly transparent, and have an acidulous, not at all alkaline, taste; and, when poured out of the bottles, it should have a sparkling appearance.

Medical use.—In this solution, carbonate of potass is combined with excess of carbonic acid, by which means it is better adapted for internal use, as it is rendered not only more pleasant to the taste, but is less apt to offend the stomach. Indeed, it is the only form in which we can exhibit potass in sufficient doses, and for a sufficient length of time, to derive much benefit from its use in calculous complaints. It has certainly been frequently of advantage in these affections, but probably only in those instances in which the stone consists of uric acid, or urate of ammonia; for, although supersaturated with carbonic acid, yet the affinity of that acid for potass is so weak, that it really operates as an alkali.

Six or eight ounces may be taken two or three times a-day. It in general proves powerfully diuretic, and sometimes pro-

duces inebriation. This last effect is ascribed to the carbonic acid.

ACETIS POTASSÆ. *Ed.*
Acetite of Potass.

Take of
Pure carbonate of potass, one pound.
Boil it with a very gentle heat, in four or five times its weight of distilled acetous acid, and add more acid at different times, till on the watery part of the preceding quantity being nearly dissipated by evaporation, the new addition of acid ceases to raise any effervescence, which will happen when about twenty pounds of acid have been consumed. It is then to be slowly dried. The impure salt remaining is to be melted with a gentle heat, for a short time, but no longer than necessary, and afterwards dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered liquor will be limpid; but if otherwise, of a brown colour. Afterwards evaporate this liquor with a very gentle heat, in a very shallow glass vessel, occasionally stirring the salt as it becomes dry, that its moisture may be sooner dissipated. Lastly, the acetite of potass ought to be kept in a vessel very closely stopped, to prevent it from deliquescing.

POTASSÆ ACETAS. *Lond.*
Acetate of Potass.

Take of
Subcarbonate of potass, a pound and a half;
Acetic acid, a gallon.
Mix them together in a large glass vessel, and having evaporated the mixture over the fire to one-half, add gradually as much more acetic acid as may be sufficient to saturate the alkali completely. Evaporate again to one half, and filter. Then evaporate in the water bath, so that, on being removed from the fire, it shall crystallize.

ACETAS KALI. *Dub.*
Acetate of Kali.

Take of
Subcarbonate of kali, any quantity.
Add to it, at different times, about five times its weight of distilled vinegar, heated to a moderate temperature. When the effervescence shall have ceased, and the liquor is somewhat evaporated, add, at intervals, distilled vinegar, until

the mixture shall entirely cease to effervesce; then evaporate to dryness; and having increased the fire a little, bring the saline mass cautiously into a state of fusion. Dissolve the salt, after it has cooled, in water: filter the solution, and evaporate, until, on removing it from the fire, it shall concrete into a crystalline mass, which should be very white. Put this, as quickly as possible, into vessels accurately closed.

This is both a troublesome and expensive preparation; for, when attempted to be made by simply evaporating to dryness, the salt has always a dark unpleasant colour, which can neither be removed by repeated solution and crystallization, nor even by solution in alcohol. It is doubtful to what the colour is owing. It has been ascribed by some to part of the acetic acid being decomposed by heat during the exsiccation of the salt: they accordingly recommend the evaporation to be conducted very gently, and the pellicles to be skimmed from the surface of the liquor as fast as they are formed; and in this way, they say, they have procured, at once, a very white salt. Others again ascribe it to accidental impurities, contracted during the operation, and recommend the utmost attention to cleanliness, and the use of earthen vessels; while others ascribe it to some foreign matter, which rises in distillation with the last portions of the acetous acid, and therefore direct, that only the first portions which come over should be used, or that the acetous acid should be distilled with charcoal. The last opinion appears to be the most probable, since, when acetic acid procured from the distillation of an acetate is employed, a colourless solution is obtained, and solutions which become coloured do not at the same time become alkaline. But to whatever cause it be owing, the colour is most effectually destroyed by fusing the salt. The heat necessary to do this decomposes the colouring matter; and on dissolving the fused mass in water, and filtering the solution, we find a fine light charcoal on the filter. But this fusion is attended with considerable loss; for part of the acetic acid itself is decomposed.

To ascertain the exact saturation, litmus and turmeric paper should be alternately employed. Mr Phillips says, that rather more than 21 pints o fdistilled vinegar, of 1.007, are required to saturate 18 ounces of subcarbonate of potass.

The operator must be particularly careful, in melting it, not to use a greater heat, nor keep it longer liquefied, than

what is absolutely necessary: a little should be occasionally taken out, and put into water; and, as soon as it begins to part freely with its black colour, the whole is to be removed from the fire.

The exsiccation of the solution of the salt, after it has been fused, must be conducted very carefully, as it is exceedingly apt to be decomposed, which would render a new solution and exsiccation necessary. The test of its purity, by dissolving it in alcohol, as directed by the London college, is to discover if any of the acetic acid itself has been decomposed in the operation; for the carbonate of potass, which is in that case formed, is insoluble in alcohol.

To spare trouble and expence, attempts have been made to prepare acetate of potass with undistilled vinegar, and even with the residuum of the distillation of acetic acid: and they have been, to a certain degree, successful: but, as repeated fusion and crystallization are necessary to bring the salt to a certain degree of purity, it does not appear that they were more economical. But if, to acetate of potass, prepared with impure vinegar, we add a sufficient quantity of sulphuric acid, we obtain by distillation an acetic acid of great strength, which forms a beautiful acetate of potass without fusion. Lastly, this salt may be prepared by the decomposition of acetates; for example, of the acetate of lime, by tartrate of potass.

Acetate of potass has a sharp, somewhat pungent taste. It is deliquescent, and is soluble in about its own weight of water, at 60°, but Mr Phillips says in half its weight, at 40°. It is also, according to Dr Powell, soluble in alcohol in four times its weight. It is decomposed by the stronger acids; by a decoction of tamarinds; by the sulphates of soda and of magnesia; by muriate of ammonia; by the tartrate of soda and potass; and by some metalline salts. Its acid is destroyed by a high temperature.

Medical use.—Acetate of potass, however prepared, provided it be properly made, is a medicine of great efficacy, and may be so dosed and managed as to prove either mildly cathartic, or powerfully diuretic: few of the saline deobstruents equal it in virtue. The dose is from half a scruple to a drachm or two. A simple solution, however, of carbonate of potass in vinegar, without exsiccation, is perhaps not inferior, as a medicine, to the more expensive salt. Two drachms of the alkali, saturated with vinegar, have produced, in hydropic cases, ten or twelve stools, and a plentiful discharge of urine, without any inconvenience.

SULPHAS POTASSÆ *Ed.*

Sulphate of Potass; formerly *Vitriolated Tartar.*

Take of

Sulphuric acid, diluted with six times its weight of water, any quantity.

Put it into a capacious glass vessel, and gradually drop into it, as much pure carbonate of potass, dissolved in six times its weight of water, as is sufficient thoroughly to neutralize the acid. The effervescence being finished, strain the liquor through paper; and, after due evaporation, set it aside to crystallize.

Sulphate of potass may be also conveniently prepared from the residuum of the distillation of nitrous acid, by dissolving it in warm water, and saturating it with carbonate of potass.

POTASSÆ SULPHAS. *Lond.*

Take of

The salt, which remains after the distillation of nitric acid, two pounds;

Boiling water, two gallons.

Mix them so as to dissolve the salt, and then add as much subcarbonate of potass as will saturate the excessive acid. Then boil to a pellicle, and, after filtration, set it aside to crystallize. Decant off the liquor, aud dry the crystals on blotting paper.

SULPHAS KALI. *Dub.*

Sulphate of Kali.

Let the salt which remains after the distillation of nitrous acid reduced to powder, be dissolved in a sufficient quantity of boiling water. Add as much potash as will saturate the superfluous acid. Let the filtered liquor be evaporated with a very gentle heat, that it may crystallize.

THIS salt is very seldom prepared on purpose, as it may be obtained from the residuum of many other preparations, by simple solution and crystallization; for so strong is the affinity between sulphuric acid and potass, that they scarcely ever meet without combining to form this salt. All the sulphates, except that of baryta, are decomposed by potass and most of its combinations; and reciprocally, all the compounds of potass are decomposed by sulphuric acid and most of its combinations; and in all these decompositions, sulphate of potass is one of the products.

The greatest part of the sulphate of potass of commerce is obtained from the residuum of the distillation of sulphate of

iron with nitrate of potass, by lixiviating it, supersaturating the solution with carbonate of potass, filtering it boiling hot, and allowing it to crystallize. The liquor remaining after the precipitation of magnesia is also a solution of sulphate of potass. It is likewise got in considerable quantities from the residuum remaining in the retort, after the distillation of nitrous acid, and all the colleges have given directions for obtaining it, in this way, by simply saturating the excess of acid with subcarbonate of potass. Mr Phillips says it would be more economical to saturate any unavoidable excess of acid by lime, and reject the sulphate of lime formed, as the sulphate of potass is not so costly as the carbonate of potass used to make it.

As the residuum of the distillation of nitrous acid may not always be at hand, the Edinburgh college also give a receipt for making this salt, by directly combining its constituents. It would have been more economical to have used a solution of sulphate of iron, in place of sulphuric acid, by which means not only an equally pure sulphate of potass would have been procured, at less expence, but also a very pure carbonate of iron.

Sulphate of potass forms small, transparent, very hard crystals, generally aggregated in crusts, and permanent in the air. Their primitive form is a pyramidal dodecahedron with isosceles triangular faces meeting at the summit, at an angle of about 66.15, and at the base 113.45. It has a bitter taste, is slowly soluble in water, requiring 16 waters at 60°, and 4 at 212°. It is not soluble in alcohol. It decrepitates when thrown on live coals, and melts in a red heat.

It consists of 32.8 acid, and 67.2 potash and water, according to Mr Phillips. It is decomposed by the barytic salts; by the nitrates and muriates of lime and of strontia; by the tartrates partially; and by the salts of mercury, silver, and lead.

Medical use.—Sulphate of potass, in small doses, as a scruple, or half a drachm, is an useful aperient; in larger ones, as four or five drachms, a mild cathartic, which does not pass off so hastily as the sulphate of soda, and seems to extend its action farther.

Potassæ supersulphas. *Lond.*
Supersulphate of Potass.

Take of

The salt which remains after the distillation of nitric acid, two pounds,

Boiling water, four pints.

Mix, dissolve the salt, and filter. Then boil down to one-half, and set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

This salt is acid to the taste, reddens vegetable blues, and effervesces with alkaline carbonates. Mr Phillips found, that 100 grains required 25 of dried subcarbonate of soda for saturation. It is directed by Lowitz to be prepared by mixing seven parts of sulphuric acid with the same quantity of water in a large matrass, and adding to the hot mixture, as quickly as possible, four parts of potashes in fine powder. On cooling, the supersulphate of potass shoots in fine large crystals, whose primitive form is an acute rhomboid of 74° and 106°. These are to be quickly washed in water and dried. This mode of directly preparing it is, however, unnecessary, as it is produced in sufficient quantity in the distillation of nitric acid. Its preparation, however, is attended with some difficulty, and Mr Phillips at first thought that there was no supersulphate, as he only obtained from the residuum of the distillation of nitrous acid, sulphate with acid adhering to it. From subsequent experiments, he is of opinion, that it may be made to yield supersulphate or sulphate, according as the solution is more or less concentrated. When the residual salt is dissolved in only about an equal weight of water, Mr Phillips found it deposite on cooling, supersulphate of potass, without any appearance of pellicle; but if the solution be evaporated to a pellicle, according to the former directions of the college, the whole concretes into a solid mass; and when the solution is not perfectly concentrated, the crystals obtained are sulphate of potass. It is also with extreme surprise that we learned from Mr Phillips, that on sending to Apothecaries Hall, where at least the directions of the college ought to be minutely adhered to, what he received was a mixture of 58 sulphate of potass, with 42 nitrate of potass. With such an excessive quantity of acid as the college order in preparing nitrous acid, it is perfectly impossible that so much, if any, nitre could have escaped decomposition. This salt was formerly called *Sal enixum* and *Tartarus vitriolatus acidus.* It is soluble in two waters at 60°, and less than one at 212°. It consists of 37 parts of sulphate of potass, and 33 sulphuric acid.

It is used in its unrefined state by silversmiths, and is recommended by Lowitz for preparing acetic acid, by decomposing acetate of soda. It promises to be a valuable medicine, as enabling us to give sulphuric acid in combination with

an aperient salt, and being less disagreeable and more soluble than the neutral sulphate.

SULPHAS POTASSÆ CUM SULPHURE; olim, SAL POLYCHRESTUS. *Ed.*

Sulphate of Potass with Sulphur; formerly *Polychrest Salt.*

Take of

Nitrate of potass in powder;

Sublimed sulphur, of each equal parts.

Mingle them well together, and inject the mixture, by little and little at a time, into a red hot crucible; the deflagration being over, let the salt cool, after which it is to be put into a glass vessel well corked.

IN this process the nitric acid of the nitrate of potass is decomposed by the sulphur, which is in part acidified. But the quantity of oxygen contained in the nitric acid is not always sufficient to acidify the whole sulphur employed; therefore, part of it remains in the state of sulphureous acid, which is probably chemically combined with part of the potass in the state of sulphite; for the whole saline mass formed is more soluble in water than sulphate of potass. It is crystallizable, and by exposure to the air gradually attracts oxygen, and is converted into sulphate, or perhaps supersulphate of potass; for even when recently prepared, it is manifestly acid. But this preparation, like all those depending on the uncertain action of fire, is apt to vary. In some experiments which I made to determine the state in which the sulphur existed in this salt carefully prepared, it seemed to be sulphuric acid; for it neither gave out a sulphureous smell on the addition of sulphuric acid, nor was a solution of it precipitated by acids. In others the presence of sulphuretted hydrogen was obvious; but in no instance could sulphur, in any notable quantity, be detected. Hence its Edinburgh name, *Sulphas potassæ cum sulphure*, and the mode of preparation proposed by some, of simply triturating these substances together, are manifestly incorrect. In its medical effects and exhibition, it agrees with sulphureous mineral waters, which contain a proportion of neutral salt.

TARTRIS POTASSÆ; olim, TARTARUM SOLUBILE. *Ed.*

Tartrate of Potass; formerly *Soluble Tartar.*

Take of

Carbonate of potass, one pound;

Supertartrite of potass, three pounds, or as much as may be sufficient;
Boiling water, fifteen pounds.

To the carbonate of potass, dissolved in the water, gradually add the supertartrite of potass in fine powder, as long as it raises any effervescence, which generally ceases before three times the weight of the carbonate of potass has been added; then strain the cooled liquor through paper; and, after due evaporation, set it aside to crystallize.

Potassæ tartras. *Lond.*
Tartrate of Potass.

Take of
Subcarbonate of potass, sixteen ounces;
Supertartrate of potass, three pounds;
Boiling water, one gallon.

Dissolve the subcarbonate of potass in the water, then add the supertartrate of potass in powder, until it cease to excite effervescence. Filter the liquor through paper. Then evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

Tartaras kali. *Dub.*
Tartrate of Kali.

Take of
Subcarbonate of kali, one pound;
Crystals of tartar, in very fine powder, two pounds and a half, or as much as will saturate the kali;
Boiling water, a gallon.

Gradually add the tartar to the subcarbonate of kali dissolved in the water; strain the liquor through paper, evaporate it, and let it crystallize by cooling.

The tartaric acid is capable of uniting with potass in two proportions, forming in the one instance a neutral, and in the other an acidulous salt. The latter is an abundant production of nature; but it is easily converted into the former, by saturating it with potass, or by depriving it of its excess of acid. It is by the former method that the colleges direct tartrate of potass to be prepared; and the process is so simple, that it requires little comment. For the sake of economy, we should come as near the point of saturation as possible; but any slight deviation from it will not be attended with much inconvenience. Indeed it is perhaps advisable to have a slight excess of acid, which, forming a small quantity of very soluble salt, leaves the remainder perfectly neutral. This is

the case in the process of the Pharmacopœia, as Mr Phillips says that 36 (30?) parts of supertartrate of potass require 15.7 of subcarbonate for their saturation, instead of 12, the quantity ordered. The evaporation must be conducted in an earthen vessel, for iron discolours the salt. It is easily crystallized, and the crystals become moist in the air. We have here a striking example of the change produced upon crystals, by saturating the excessive acid of a super-salt, the primitive form of the supertartrate being a rectangular octohedron, and of the tartrate a rectangular tetrahedral prism. It has an unpleasant bitter taste. It is soluble in four parts of cold water, and still more soluble in boiling water, and it is also soluble in alcohol. It is totally or partially decomposed by all acids. On this account it is improper to join it with tamarinds, or other acid fruits; which is too often done in the extemporaneous practice of those physicians who are fond of mixing different cathartics together, and know little of chemistry. It is also totally decomposed by lime, baryta, strontia, and magnesia, and partially by the sulphates of potass, soda, and magnesia, and by the muriate of ammonia.

Medical use.—In doses of a scruple, half a drachm, or a drachm, this salt is a mild, cooling aperient: two or three drachms commonly loosen the belly; and an ounce proves pretty strongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. It is an useful addition to the purgatives of the resinous kind, as it promotes their operation, and at the same time tends to correct their griping quality.

Carbonas sodæ. *Ed.*
Carbonate of Soda.

Take of
Impure carbonate of soda, any quantity.
Bruise it; then boil in water till all the salt be dissolved. Strain the solution through paper, and evaporate it in an iron vessel, so that after it has cooled, the salt may crystallize.

Dub.

Take of
Barilla, in powder, ten pounds;
Water, two gallons.
Boil the barilla in the water, in a covered vessel, for two hours, agitating it from time to time. Strain the liquor, and boil the barilla which remains, after triturating it again

with an equal quantity of water. This may be repeated a third time. Evaporate the leys, filtered and mixed, in a wide iron vessel, to dryness, taking care that the saline mass remaining be not again liquefied by too great a degree of heat, and agitate it with an iron spatula, until its colour become white. Lastly, dissolve it in boiling water; and, after due evaporation, let it crystallize by slow refrigeration. The crystals will be purer, if, before each boiling, the barilla be exposed to the air for some time. It should be crystallized when the air is at the freezing temperature, and in a liquor whose specific gravity is 1220.

If the salt be not pure, repeat the solution and crystallization.

Sodæ subcarbonas. *Lond.*
Subcarbonate of Soda.

Take of

Impure soda in powder, one pound;
Boiling distilled water, four pints.

Boil the soda in the water for half an hour, and filter. Evaporate the solution to two pints, and set aside to crystallize. Throw away the residuary liquor.

These directions are principally intended for the purification of the Spanish barilla, which is a fused mass, consisting, indeed, principally of carbonate of soda, but also containing charcoal, earths, and other salts. The two first causes of impurity are easily removed by solution and filtration, and the salts may be separated by taking advantage of their different solubility in cold and in hot water. But the preparation of carbonate of soda, by the decomposition of sulphate of soda, has now become a manufacture, and is carried to such perfection, that its further purification is almost unnecessary for the purposes of the apothecary.

The primitive form is an octohedron, with a rhombic base of 60° and 120°, the planes of which meet at the summit at 104, and at the base at 76°.

Sodæ subcarbonas exsiccata. *Lond.*
Dried Subcarbonate of Soda.

Take of

Subcarbonate of soda, one pound.

Apply a boiling heat to the subcarbonate of soda in a clean iron vessel, until it be perfectly exsiccated, stirring it continually with an iron spatula. Lastly, reduce it to powder.

Carbonas sodæ siccatum. *Dub.*
Dried Carbonate of Soda.

Liquefy, over the fire, crystals of carbonate of soda, in a silver crucible, and then, increasing the heat, stir the liquefied salt, until, by the consumption of the water, it become dry.

Reduce it to fine powder, and keep it in close vessels.

Subcarbonate of soda, deprived of its water of crystallization, is a very excellent remedy, for which we are indebted to Dr Beddoes; he desires it to be prepared by simply exposing the pounded crystals before the fire; which appears to be preferable to the process directed by the colleges, in which much of the carbonic acid may be expelled. By simple efflorescence, crystallized carbonate of soda loses more than half its weight, and falls down into a fine permanent powder. Whenever soda is prescribed in the form of pills, the effloresced carbonate is to be used, as, when made of the crystallized salt, they crack, and fall to pieces by the action of the air upon them.

Medical use.—Dr Beddoes first recommended the powder of effloresced soda, in calculous complaints, as a substitute for the supercarbonated alkaline waters, when these produced giddiness, or were too expensive; but its use has since been extended much farther; and it is found to be, not only an excellent antacid, but seems almost to possess specific virtues in affections of the urinary organs. One or two scruples may be given, in the course of the day, in the form of powder, or in pills made up with soap and some aromatics.

Sodæ carbonas. *Lond.*
Carbonate of Soda.

Take of
Subcarbonate of soda, one pound;
Subcarbonate of ammonia, three ounces;
Distilled water, a pint.

Add the ammonia to the subcarbonate of soda dissolved in the water; then apply a heat of 180°, in a sand bath, for three hours, or until all the ammonia be expelled. Lastly, set it aside to crystallize.

In the same manner evaporate the residuary liquor, and set it aside again to crystallize.

This salt bears the same relation to the subcarbonate of soda that the carbonate of potass does to its subcarbonate. Klaproth first described it, and says it consists of 39 carbonic acid, 38

soda, and 23 water. It is found native in hard striated masses in the province of Sukena in Africa, and is called *Trona*.

Mr Phillips objects on calculation to the quantity of carbonate of ammonia employed, as unnecessarily too large; for in subcarbonate of soda, the alkali is to the acid as three to two, and in the carbonate they are equal, and in 100 parts of crystals of subcarbonate are 35 of salt, consisting of 21 soda and 14 acid, requiring therefore 7 additional acid to neutralize it. Now, as 100 carbonate of ammonia contains 50 acid, it follows, that 14 will furnish the necessary acid, and that 25, the quantity ordered by the college, is excessive.

Aqua supercarbonatis sodæ. *Ed.*
Solution of Supercarbonate of Soda.

This is prepared from ten pounds of water, and two ounces of carbonate of soda, in the same manner as the solution of supercarbonate of potass.

By supersaturating soda with carbonic acid, it is rendered more agreeable to the palate, and may be taken in larger quantities, without affecting the stomach. This is now in common use as a cooling beverage, under the title of soda-water; and it may not be unnecessary to mention, that its place cannot be at all supplied by what is sold as soda powder, which is not a supercarbonate of soda, but merely a mixture of salts, which effervesces on being dissolved. Indeed, one moment's reflection must shew the impossibility of reducing to a solid form, a salt which cannot exist in solution, except under very great pressure.

Phosphas sodæ. *Ed.*
Phosphate of Soda.

Take of
Bones burnt to whiteness, and powdered, ten pounds;
Sulphuric acid, six pounds;
Water, nine pounds.

Mix the powder with the sulphuric acid in an earthen vessel; then add the water, and mix again: then place the vessel in a vapour bath, and digest for three days; after which, dilute the mass with nine pounds more of boiling water, and strain the liquor through a strong linen cloth, pouring over it boiling water, in small quantities at a time, until the whole acid be washed out. Set by the strained liquor, that the impurities may subside; decant the clear solution, and evaporate it to nine pounds. To this liquor poured from the impurities, and heated in an earthenware vessel, add carbonate of soda, dissolved in warm water, until the effer-

vescence cease. Filter the neutralized liquor, and set it aside to crystallize. To the liquor that remains after the crystals are taken out, add a little carbonate of soda, if necessary, so as to saturate exactly the phosphoric acid; and dispose the liquor, by evaporation, to form crystals, as long as it will furnish any. Lastly, the crystals are to be kept in a well-closed vessel.

Dub.

Take of

Burnt bones, in powder, five pounds;

Sulphuric acid, three pounds and a half, by weight.

Mix the powder, in an earthen vessel, with the sulphuric acid; gradually add five pints of water, and agitate the mixture; digest for three days, adding, from time to time, more water, to prevent the mass from becoming dry, and continue the agitation: then add five pints of boiling water, and strain through linen, pouring on boiling water repeatedly, until all the acid be washed out. Set aside the strained liquor until the feces subside, from which pour it off; and reduce, by evaporation, to one half: then add, of carbonate of soda (dissolved in a sufficient quantity of warm water), three pounds ten ounces. Filter; and, by alternate evaporation and cooling, let it form crystals, which are to be kept in a well-closed vessel.

If the salt be not sufficiently pure, dissolve and crystallize it again.

The first part of this process consists in destroying the gelatine of the bones, by the action of heat. When burnt to perfect whiteness, they retain their form, but become friable, and consist of phosphate of lime, mixed with a very little carbonate of lime and carbonate of soda. In performing this part of the process, we must take care not to heat the bones to a bright red, as by it they undergo a kind of semi-fusion, and become less soluble. The complete combustion of the charcoal is facilitated by the free contact of the air: we must, therefore, bring every part, in succession, to the surface, and break the larger pieces.

In the second part of the process, the phosphate of lime is decomposed by the sulphuric acid. This decomposition is, however, only partial. The sulphuric acid combines with part of the lime, and forms insoluble sulphate of lime. The phosphoric acid, separated from that portion of lime, immediately combines with the rest of the phosphate of lime, and

forms superphosphate of lime, which is not farther decomposable by sulphuric acid.

The superphosphate of lime, thus formed, is soluble in water; but, as the sulphate of lime, with which it is mixed, concretes into a very solid mass, it is, in some measure, defended from the action of water. On this account, the whole mass is directed to be digested, for three days, in vapour, by which means it is thoroughly penetrated, and prepared for solution in the boiling water, which is afterwards poured on it. It is probably to render the subsequent solution easier, that Thenard directs the bone-ashes to be made with water into a thin paste *(bouillé)*, before the sulphuric acid is added to them.

Having thus got a solution of superphosphate of lime, it is next decomposed by carbonate of soda, dissolved in water. This decomposition, likewise, is only partial, as it deprives the superphosphate of lime of its excess of acid only, and reduces it to the state of phosphate. The phosphate of lime, being insoluble, is easily separated by filtration, and the phosphate of soda remains in solution. According to Thenard, the nicest point in the whole process is the determination of the proper quantity of carbonate of soda to be added. As the phosphate of soda does not crystallize freely, unless there be a slight excess of base, he directs, that a little more carbonate of soda be added than what is merely sufficient to saturate the excess of acid in the superphosphate of lime, but not to continue the addition until it cease to produce any precipitate. We must also take care not to carry the evaporation of the solution of phosphate of soda so far as to form a pellicle; for it then concretes into an irregular mass, and does not form beautiful crystals. After each crystallization, we must examine the liquor which remains, and, if it be acid, or merely neutral, add to it a little of the solution of carbonate of soda. In this way, Thenard got from 2100 parts of bone ashes, 700 of sulphuric acid, and 667 of carbonate of soda, 885 of phosphate of soda. According to Fourcroy, phosphate of lime consists of 0.41 acid, and 0.59 lime, and superphosphate of lime of 0.54 acid, and 0.46 lime: phosphate of lime treated with sulphuric acid, is only deprived of 0.24 lime, and changed into 0.76 of superphosphate, consisting of 0.59 phosphate of lime, and 0.17 of phosphoric acid; and it is only with this portion of acid that we are able to combine soda. Fourcroy is also of opinion, that phosphate of lime requires only 0.4 of its weight of sulphuric acid to decompose it, whereas 0.6 are employed by the Edinburgh college, and 0.7

by the Dublin. This is not only, therefore, a waste of acid, but it renders the product impure, by being mixed with sulphate of soda, which is sometimes actually the case in the phosphate of soda of commerce. Besides, as bone-ashes are of very little value, it is better that a portion of them should escape undecomposed, than that an excess of acid should be added to them.

Mr Funcke, of Linz, has discovered a still more economical and expeditious method. It consists in saturating the excess of lime in calcined bones with diluted sulphuric acid, and then dissolving the remaining phosphate of lime in nitric acid. To this solution he adds an equal quantity of sulphate of soda, and then recovers the nitric acid by distillation. The phosphate of soda is then separated from the sulphate of lime, by the affusion of water and crystallization.

Phosphate of soda crystallizes in rhomboidal prisms, terminated by three-sided pyramids. Its taste resembles that of common salt. At 60° it is soluble in four parts of water, and at 212° in two. It effloresces in the air. By heat, it undergoes the watery fusion, and at last melts into a white mass. It consists, according to Thenard, of 15 phosphoric acid, 19 soda, and 66 water of crystallization. It is decomposed by most of the salts having an earthy base.

Medical use.—Phosphate of soda was introduced into the practice of physic by the ingenious Dr George Pearson of London. It possesses the same medical qualities as sulphate of soda, and the tartrate of potass and soda, being an excellent purgative, in the quantity of an ounce or ten drachms, and it has the peculiar advantage over these two salts, of being much less nauseous than they are. Its taste is extremely similar to that of common salt; and, when given in a bason of water gruel, or veal broth, made without salt, it is scarcely perceptible by the palate; and consequently it is well adapted for patients whose stomachs are delicate, and who have an antipathy against the other saline purges. The only objection to its general use is the very great difference between its price and that of sulphate of soda; a difference which might certainly be diminished.

Murias sodæ siccatum. *Dub.*
Dried Muriate of Soda.

Take of
Muriate of soda, any quantity.
Roast it over the fire in an iron vessel, loosely covered, until it cease to decrepitate, agitating it from time to time.

By this process, the muriate of soda is reduced into the state in which it is employed for the distillation of muriatic acid. It not only deprives it entirely of its water of crystallization, which, from being variable in quantity, would otherwise render the acid obtained unequal in strength, but also destroys some colouring matter which it contains; for, if we prepare muriatic acid from crystallized muriate of soda, we obtain a coloured muriatic acid, while the decrepitated muriate furnishes a perfectly colourless one.

Sulphas sodæ. *Ed.*
Sulphate of Soda.

Dissolve the acidulous salt, which remains after the distillation of muriatic acid, in water; and having mixed powdered chalk with it, to remove the superfluous acid, set it aside until the sediment subsides; then strain through paper the liquor decanted from them, and evaporate so that it may crystallize.

Sodæ sulphas. *Lond.*

Take of

The salt which remains after the distillation of muriatic acid, two pounds;

Boiling water, two pints and a half.

Dissolve the salt in the water, and gradually add as much subcarbonate of soda as will saturate the excessive acid. Evaporate until a pellicle appear, and, after filtering the liquor, set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

Dub.

Dissolve the salt, which remains after the distillation of muriatic acid, in a sufficient quantity of boiling water. Filter the solution, and, after due evaporation, crystallize the salt by slow refrigeration.

The Edinburgh college do not preserve the superabundant acid, by saturating it with carbonate of soda, as the London college, but get rid of it by saturating it with carbonate of lime, with which it forms an insoluble sulphate of lime. In fact, the price of sulphate of soda is so very small, that it is no economy to use carbonate of soda to saturate the superabundant acid.

By far the greatest part of the sulphate of soda is obtained from manufacturers, as a result of processes performed for the

sake of other substances, as in the preparation of muriate of ammonia, oxygenized muriatic acid, &c. It may be economically obtained by making into a paste, with a sufficient quantity of water, eight parts of burnt gypsum, five of clay, and five of muriate of soda. This mixture is burnt in a kiln or oven, then ground to powder, diffused in a sufficient quantity of water, and, after being strained, is evaporated and crystallized.

The primitive form appears to be a right rhomboid prism of about 72 and 108.

Sulphate of soda crystallizes in six-sided prisms, terminated by dihedral summits. The crystals are often irregular, and their sides are usually channelled. Their taste is at first salt, and afterwards disagreeably bitter. They are soluble in 2.67 parts of water at 60°, and in 0.8 at 212°. In the air they effloresce. They undergo the watery fusion, and, in a red heat, melt. They consist of 23.52 sulphuric acid, 18.48 soda, and 58 water; and when dried at 700°, of 56 acid, and 44 soda. It is decomposed by baryta and potass, and salts containing these bases, and by the salts of silver, mercury, and lead.

Medical use.—Taken from half an ounce to an ounce, or more, it proves a mild and useful purgative; and in smaller doses largely diluted, a serviceable aperient and diuretic. It is commonly given in solution, but it may also be given in powder, after it has effloresced. In this form the dose must be reduced to one-half.

Tartris potassæ et sodæ; olim, sal rupellensis. *Ed.*
Tartrite of Potass and Soda, formerly *Rochelle Salt.*

It is prepared from the carbonate of soda and supertartrate of potass, in the same manner as the tartrate of potass.

Tartaras sodæ et kali. *Dub.*
Tartrate of Soda and Kali.

Take of

Carbonate of soda, twenty ounces;
Crystals of tartar, in very fine powder, two pounds;
Distilled water, boiling, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the crystals of tartar; filter the liquor through paper; evaporate, and set it aside to crystallize by slow cooling.

Soda tartarizata. *Lond.*
Tartarized Soda.

Take of
Subcarbonate of soda, twenty ounces;
Supertartrate of potass, in powder, two pounds;
Boiling water, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the supertartrate of potass. Filter the solution through paper; evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

The tartaric acid, in several instances, is capable of entering into combination, at the same time, with two bases. In the present example, the superabundant acid of the supertartrate of potass is neutralized with soda, and, in place of a mixture of tartrate of potass and tartrate of soda, each possessing their own properties, there results a triple salt, having peculiar properties.

The tartrate of potass and soda forms large and very regular crystals, in the form of prisms with eight sides, nearly equal, which are often divided longitudinally, almost through their axis. The principal form is a rhomboidal tetrahedral prism of 80° and 100°, with rhombic faces. It has a bitter taste. It is soluble in about five parts of water, and effloresces in the air. It is decomposed by the strong acids, which combine with the soda, and separate supertartrate of potass, and by baryta and lime. By heat its acid is destroyed. It consists of 54 tartrate of potass, and 46 tartrate of soda. Mr Phillips found that 18 parts of subcarbonate of soda were sufficient to neutralize 24 of supertartrate of potass.

Medical use.— It was introduced into medical practice by M. Seignette, an apothecary at Rochelle, whose name it long bore, and is still very much employed as an excellent purgative salt.

Aqua ammoniæ, olim Aqua ammoniæ causticæ. *Ed.*
Water of Ammonia, formerly *Water of Caustic Ammonia.*

Take of
Muriate of ammonia, one pound;
Quicklime, fresh burnt, one pound and a half;
Distilled water, one pound;
Water, nine ounces.

Pour the water on the powdered lime, contained in an iron or earthen vessel, which is then to be covered up until the

slaked lime cool. Then mix the muriate, previously ground into very fine powder, thoroughly with the lime, by triturating them together in a mortar, and immediately put the mixture into a retort of bottle glass. Place the retort in a sand-bath, and connect with it a Woulfe's apparatus. In the first and smallest bottle, furnished with a tube of safety, put two ounces of the distilled water, and in the second the rest of the distilled water.

The fire is now to be kindled, and gradually increased, until the bottom of the sand-pot becomes red, and no more ammonia comes over. Mix the fluid contained in each of the bottles, and preserve it in small phials, accurately closed.

Aqua ammoniæ causticæ. *Dub.*
Water of Caustic Ammonia.

Take of

Muriate of ammonia, sixteen ounces;
Lime, fresh burnt, two pounds;
Water, six pints.

Sprinkle one pint of the water upon the lime, placed in a stoneware vessel, and cover it up. Twenty-four hours afterwards, mix the salt with the lime, which will have crumbled to powder, taking care to avoid the vapours. Then put the mixture into a retort, and pour upon it the rest of the water. Having previously agitated them, draw off, with a moderate heat, twenty ounces, by measure, of liquor, into a refrigerated receiver, having luted carefully the joining of the vessels.

The specific gravity of this liquor is to that of distilled water as 936 to 1000.

Liquor ammoniæ. *Lond.*
Liquor of Ammonia.

Take of

Muriate of ammonia, eight ounces;
Fresh lime, six ounces;
Water, four pints.

Pour a pint of the water upon the lime; then cover the vessel and set it aside for an hour; afterwards add the muriate of ammonia and the rest of the water, previously heated to ebullition, and cover up the vessel again. Filter the liquor after it has cooled, and draw off by distillation twelve fluid-ounces of liquor of ammonia.

The specific gravity of liquor of ammonia is to that of water as 0,960 to 1,000.

The lime is slaked before it is mixed with the muriate of ammonia, in order that the heat generated during the slaking may not decompose the muriate when they are mixed before adding the water.

In this process, the muriate of ammonia is decomposed by the lime, in consequence of its having a stronger affinity for muriatic acid than ammonia has. It is absolutely necessary that the lime employed be very recently burnt, as the presence of carbonic acid would render the ammonia partially carbonated. This accident is also prevented by the great excess of lime used, which, having a greater affinity for carbonic acid than ammonia has, retains any small quantity of it which may be accidentally present. The water is essential to the existence of the ammonia in a liquid form; for, in itself, it is a permanently elastic fluid. In the process adopted by the Dublin college, a much greater quantity of water, however, is used than what is sufficient to absorb all the ammonia: the rest is intended to render the decomposition slower and more manageable, and to keep the muriate of lime, which remains in the retort, in solution; for otherwise it would concrete into a solid mass, adhering strongly to the bottom of the retort, very difficult to be washed out, and often endangering its breaking. A very small degree of heat is sufficient for the distillation, and the whole ammonia rises with the first portion of water, or even before it. It is therefore necessary that the vessels be very closely luted to each other, to prevent it from escaping. But this renders the utmost care necessary in the distillation; for too sudden, or too great a heat, from the rapid disengagement of gas, or even the expansion of the air contained in the vessels, would endanger their bursting.

In the process directed in the Edinburgh Pharmacopœia, this danger is completely obviated, by disengaging the ammonia in the form of gas, and combining it with the water, by means of pressure in a pneumatic apparatus. By this process, the water should be saturated with ammonia; but of this strength it is never sold in the shops, unless particularly inquired for, as, for common sale, it is always diluted with a certain proportion of water.

Dörfurt, Bucholz, and Van Mons, agree in recommending nearly the following process, which resembles that of the Edinburgh college. Slake 16 oz. of lime with a sufficient quantity of water to form a thick paste; put it into a cucurbit, and add 16 oz. of sal ammoniac; lute on the capital, furnished with a bent tube, reaching to the bottom of a receiver containing 24 oz. of water, and draw off 24 oz. so as to

fill the space of 48 oz. previously marked on the receiver, and keep it in phials perfectly closed, by dipping their necks when corked in wax.

We have already mentioned the properties of ammonia in its gaseous form. When combined with water, it imparts to it many of these properties, and lessens its specific gravity.

Table of the quantities of Real or Gaseous Ammonia in solutions of different Specific Gravities. (*Dalton.*)

Specific Gravity.	Grains of ammonia in 100 water grain measures of liquid.	Grains of ammonia in 100 grains of liquid.	Boiling point of the liquid. Fahr. scale.	Volume of gas condensed in a given vol. of liquid.
.85	30	35.3	26°	494
.86	28	32.6	38	456
.87	26	29.9	50	419
.88	24	27.3	62	382
.89	22	24.7	74	346
.90	20	22.2	86	311
.91	18	19.8	98	277
.92	16	17.4	110	244
.93	14	15.1	122	211
.94	12	12.8	134	180
.95	10	10.5	146	147
.96	8	8.3	158	116
.97	6	6.2	173	87
.98	4	4.1	187	57
.99	2	2	196	28

Sir Humphry Davy's results were somewhat different. He found 100 parts of sp. gr. 0.875, to contain 32.5 of ammonia; of sp. gr. 0.9054, 25.37; and of sp. gr. 0.9692, 9.5 of ammonia.

Water of ammonia decomposes many of the earthy, and all the metalline salts, and is capable of dissolving, or combining with, many of the metalline oxides, and even of oxydizing some of the metals. When pure, water of ammonia does not effervesce with any of the acids, or form a precipitate with alcohol. As it readily absorbs carbonic acid from the atmosphere, the Edinburgh college, very properly, order it to be kept in small phials. By neglecting this precaution in the shops, it often becomes carbonated before the large bottles, in which it is commonly kept, be half done.

Medical use.—Water of ammonia is very rarely given internally, although it may be used in doses of ten to twenty

drops, largely diluted, as a powerful stimulant in asphyxia, and similar diseases. Externally, it is applied to the skin as a rubefacient, and, in the form of gas, to the nostrils, and to the eyes, as a stimulant; in cases of torpor, paralysis, rheumatism, syncope, hysteria, and chronic ophthalmia.

ALCOHOL AMMONIATUM, olim SPIRITUS AMMONIÆ. *Ed.*
Ammoniated Alcohol, formerly *Spirit of Ammonia.*

Take of
Alcohol, thirty-two ounces;
Quicklime, recently burnt, twelve ounces;
Muriate of ammonia, eight ounces;
Water, eight ounces.

From these ingredients Ammoniated Alcohol is prepared, exactly in the same manner as the water of ammonia.

SPIRITUS AMMONIÆ. *Dub.*
Spirit of Ammonia.

Take of
Proof-spirit, three pints;
Muriate of ammonia, four ounces;
Potashes, six ounces.

Mix, and distil, with a slow fire, two pints.

Lond.

Take of
Rectified spirit, two pints.
Liquor of ammonia, one pint.
Mix them.

WHEN muriate of ammonia is decomposed by potashes, the product is a mixture of carbonate of ammonia, with a variable quantity of ammonia. Again, as diluted alcohol is employed in this process, and one half only is drawn off, it is evident that there is either a want of economy, or the whole alcohol comes over before any of the water. But if the latter supposition be true, there is also a want of economy, for the alcohol will dissolve only the ammonia, and leave the whole carbonate undissolved. The fact is, that when we perform the process as still retained by the Dublin college, a very large proportion of carbonate of ammonia sublimes, which remains undissolved in the distilled liquor; but as this liquor (after the particles of carbonate of ammonia which were diffused through it, have separated in the form of very regular crystals, adhering to the sides of the vessel) effervesces with acids, the distilled liquor cannot be pure alcohol, but

must contain a proportion of water capable of dissolving some carbonate of ammonia.

But, to prove the want of chemical knowledge in the contrivers of this process, it is only necessary to mention, that the product is unfit for the preparation of the aromatic ammoniated alcohol, as it will not dissolve the volatile oils.

The process now, for the first time, directed by the Edinburgh college, is therefore infinitely preferable, as it is not only more elegant, but more economical, and dissolves the volatile oils perfectly.

The Berlin college direct this preparation to be made by simply mixing two parts of alcohol with one of water of ammonia; and the London college have substituted this process for the unchemical one in their former edition. Mr Phillips objects to the new process, when made with the *liquor ammoniæ* so strong as it was in the Pharmacopœia 1809, its great difference in strength from that of the former Pharmacopœia, while its doses are still stated to be the same. For this error, not the college, but the commentators on its code, have to answer, and if we know the proportionate strength it may be rectified. In the editio altera 1815, the strength is reduced more than one half. Mr Phillips found, that when the spirit of ammonia, as prepared by the process 1809, had a sp. gr. of 0.914, the saturating power of a fluidounce as an alkali was equal to 95 grains of marble, whereas, by the former process, its sp. gr. was 0.845, and its saturating power 32 grains of marble; the former being three times as great as the latter, besides being caustic instead of subcarbonated. He has proposed to substitute another process, which shall be noticed in the remarks upon the Spt. Ammoniæ aromaticus.

CARBONAS AMMONIÆ, olim AMMONIA PRÆPARATA. *Ed.*
Carbonate of Ammonia, formerly *Prepared Ammonia.*

Take of
Muriate of ammonia, one pound;
Soft carbonate of lime (commonly called chalk), dried, two pounds.

Having triturated them separately, mix them thoroughly, and sublime from a retort into a refrigerated receiver.

Dub.

Take of
Muriate of ammonia, in powder, and well dried,
Dried carbonate of soda, of each half a pound.

Mix them, put them into an earthen retort, and sublime, with a heat gradually raised, into a cooled receiver.

Ammoniæ subcarbonas. *Lond.*
Subcarbonate of Ammonia.

Take of
Muriate of ammonia, one pound;
Prepared chalk, dried, one pound and a half.
Triturate them separately, them mix and sublime them with a gradually increased heat, until the retort become red.

In this process the two substances employed undergo a mutual decomposition, the muriatic acid combining with the lime or the soda, and the carbonic acid with the ammonia. The proportion of carbonate of lime directed by the Edinburgh college is more than sufficient to decompose the muriate of ammonia; but it is the safe side to err on; for it is only inconvenient, from obliging us to make use of larger vessels, and perhaps uneconomical, from requiring more fuel; whereas, if any portion of the muriate of ammonia were to remain undecomposed, it would sublime along with the carbonate, and render the product impure. Mr Phillips says, that 94 of carbonate of lime are sufficient to decompose 100 muriate of ammonia; but his experiments are not conclusive, as the results were obtained by calculation, and *lime* in solution was used. Göttling uses three parts of chalk to two of muriate of ammonia, but he dries his chalk before he weighs it. The chalk is always to be very carefully dried before it is used in this preparation, as the presence of moisture injures the product. The ingredients are to be thoroughly mixed by trituration, before they are introduced into the retort, that no part of the muriate of ammonia may escape decomposition; and we are even sometimes directed to cover the surface of the mixture, after they are in the retort, with powdered chalk. This, however, is unnecessary. Carbonate of lime does not act on muriate of ammonia till a considerable heat be applied. Göttling says, that the sublimation must be conducted in the open fire, and therefore he uses an earthenware cucurbit, with a tubulated capital. When a glass retort is employed, it should have a very wide neck; and the best form for the receiver is cylindrical, as it enables us to get out the carbonate of ammonia condensed in it without breaking it. The residuum which remains in the retort furnishes muriate of lime by lixiviation and evaporation.

By the Dublin college, carbonate of soda is employed for the preparation of carbonate of ammonia. The theory of the process is the same, and the decomposition is effected at

a lower temperature. But as soda is very rarely saturated with carbonic acid, part of the ammonia is evolved in the form of gas, which, if not permitted to escape, will burst the vessels. To prevent this loss, therefore, Mr Göttling uses a cucurbit and capital, furnished with a bent tube, which is to be immersed in a phial of water: by which contrivance, while the carbonate of ammonia is condensed in the capital, the gaseous ammonia is absorbed by the water. When soda is used, the residuum contains muriate of soda.

Carbonate of ammonia is obtained in the form of a white crystallized mass, of a fibrous texture, having the smell and taste of ammonia, but weaker. It is soluble in twice its weight of cold water; Mr Phillips says four times; its solubility is increased by increase of temperature; but when dissolved in boiling water, it loses a portion of its carbonic acid with effervescence. It is insoluble in alcohol. It is permanent in the air, and is not decomposed, but is easily vaporized by heat. It is said to vary very much in its composition, and to contain more ammonia, and less acid and water, in proportion to the high temperature employed in preparing it, the quantity of alkali varying from 50 to 20 *per cent.* It is decomposed by most of the acids, and all the alkaline, and some of the earthy bases; by the earthy sulphates, except those of baryta and strontia; by the earthy muriates and fluates; by the nitrates of baryta, and superphosphate of lime.

Medical use.—Carbonate of ammonia exactly resembles ammonia in its action on the living body; but is weaker, and is principally used as smelling salts in syncope and hysteria.

AQUA CARBONATIS AMMONIÆ, olim AQUA AMMONIÆ. *Ed.*
Water of Carbonate of Ammonia, formerly *Water of Ammonia.*
Take of
Muriate of ammonia,
Carbonate of potass, each sixteen ounces;
Water, two pounds;
Having mixed the salts, and put them in a glass retort, pour the water upon them, and distil to dryness in a sand bath, gradually increasing the heat.

Dub.
Take of
Muriate of ammonia, one pound;
Carbonate of soda, twenty-eight ounces;
Water, three pints.

Distil off by a heat, gradually raised, two pints.
The specific gravity of this liquor is 1095.

Liquor ammoniæ subcarbonatis. *Lond.*
Liquor of Subcarbonate of Ammonia.

Take of
Subcarbonate of ammonia, four ounces;
Distilled water, a pint.
Dissolve the subcarbonate of ammonia in the water, and filter through paper.

The nature of the last of these preparations is evident; and from its being more simple and uniform, and even economical, it is preferable to the former, for which it is a substitute, as the product in that case is also a solution of carbonate of ammonia, while the residuum in the retort is an alkaline muriate. In this instance, the decomposition of the muriate of ammonia cannot be effected by carbonate of lime, because the addition of the water prevents the application of the necessary heat, whereas alkaline carbonates act at a moderate temperature.

Liquor volatilis cornu cervini. *Dub.*
Volatile Liquor of Hartshorn.

Take of
Hartshorn, any quantity.
Put it into a retort, and distil, with a gradually increased heat, the volatile liquor, salt, and oil. Then repeat the distillation of the volatile liquor until it becomes as limpid as water, separating by filtration the oil and salt after each distillation. The liquor will be more easily purified, if, after each distillation, except the first, there be added about a sixth part of its weight of charcoal of wood previously heated to redness, then extinguished, by covering it with sand, and powdered while it is hot.
If hartshorn cannot be had, the bones of any other land animal may be substituted for them.

The wholesale dealers have very large pots for this distillation, with earthen heads, almost like those of the common still; for receivers they use a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head is connected by means of an adopter with the lower jar, which is also furnished with a cock for drawing off the fluids condensed in it. The upper jar is entire, and in it is condensed the solid carbonate of ammonia. When a large quantity of the subject is to be distilled, it is customary to continue the

operation for several days successively; only unluting the head occasionally, to put in fresh materials. When the upper jar becomes entirely filled with carbonate of ammonia, it cracks. It is then to be removed, the salt to be taken out of it, and a fresh one substituted in its place.

When only a small quantity is wanted, a common iron pot, such as is usually fixed in sand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be large, and a glass, or rather tin, adopter inserted between it and the head of the pot.

The distilling vessel being charged with pieces of horn, a moderate fire is applied, which is slowly increased, and raised at length almost to the utmost degree. At first water arises, which gradually acquires colour and smell, from the admixture of empyreumatic oil and ammoniacal salts; carbonate of ammonia next arises, which at first dissolves, as it comes over, in the water, and thus forms what is called the *spirit*. When the water is saturated, the remainder of the salt concretes in a solid form to the sides of the recipient. If it be required to have the whole of the salt solid, and undissolved, the water should be removed as soon as the salt begins to arise, which may be known by the appearance of white fumes; and that this may be done the more commodiously, the receiver should be left unluted, till this first part of the process be finished. The white vapours, which now arise, sometimes come over with such vehemence as to throw off or burst the receiver: to prevent this accident, it is convenient to have a small hole in the luting, which may be occasionally stopt with a wooden peg, or opened, as the operator shall find proper. Lastly, the oil arises, which acquires greater colour and consistency as the operation advances. Carbonate of ammonia still comes over, but it is partly dissolved in the hot oily vapour. At the same time, there is a considerable disengagement of gas, consisting of a mixture of carburetted hydrogen, often containing sulphur and phosphorus, and of carbonic acid.

All the liquid matters being poured out of the receiver, the salt, which remains adhering to its sides, is to be washed out with a little water, and added to the rest. It is convenient to let the whole stand for a few hours, that the oil may the better disengage itself from the liquor, so as to be separated first by a funnel, and afterwards more perfectly, by filtration through wet paper.

None of these products, except perhaps a small quantity of the carbonic acid, exist ready formed in the matter subjected

to the distillation, but are produced by a new arrangement of its constituents. For the production of ammonia, it is absolutely necessary that it contain nitrogen, or be what we have called a quaternary oxide. Although some vegetable, and most animal, substances are of this kind, yet only the most solid parts of animals, such as bone or horn, are employed for the production of ammonia; because they furnish it less mixed with other substances, are easily obtained, and at little expence, and are very manageable in the distillation. On the application of heat, as soon as all the water which they contained is expelled, their elements begin to act on each other, and to form binary, or at most ternary compounds. Water is formed of part of the oxygen and hydrogen, ammonia of nitrogen and hydrogen, carbonic acid of carbon and oxygen, then oil of hydrogen and carbon, while the superfluous carbon remains in the retort in the state of charcoal. As the formation of these substances is simultaneous, or in immediate succession, they are not obtained separately, but are mixed with each other. The water is saturated with carbonate of ammonia, and impregnated with empyreumatic oil, while the carbonate of ammonia is discoloured with oil; and the oil contains carbonate of ammonia dissolved in it. They may, however, be separated from each other, in a great measure, in the manner already described. But a small portion of oil obstinately adheres both to the salt and its solution, which constitutes the only difference between salt and spirit of hartshorn, as they are called, and the purer carbonate of ammonia, as obtained by the decomposition of muriate of ammonia.

AQUA ACETITIS AMMONIÆ, vulgo SPIRITUS MINDERERI. *Ed.*
Water of Acetite of Ammonia, commonly called *Spirit of Mindererus.*

Take of
Carbonate of ammonia in powder, any quantity.
Pour upon it as much distilled acetous acid as may be sufficient to saturate the ammonia exactly.

AQUA ACETATIS AMMONIÆ. *Dub.*
Water of Acetate of Ammonia.

Take of
Carbonate of ammonia, two ounces.
Add gradually, with frequent agitation, three pounds and a half of distilled vinegar, or as much as will saturate the ammonia, as proved by the test of litmus.

Liquor ammoniæ acetatis. *Lond.*
Solution of Acetate of Ammonia.

Take of

Carbonate of ammonia, two ounces;
Acetic acid, four pints.

Add the acid to the carbonate of ammonia until the effervescence cease, and mix.

The exact point of saturation should be ascertained by the alternate use of litmus and turmeric papers.

By this process, we obtain acetate of ammonia, dissolved in the water of the acetic acid: but as this is apt to vary in quantity, the solution also varies in strength, and the crystallization of the salt is attended with too much difficulty to be practised for pharmaceutical purposes. Its crystals are long, slender, and flatted, of a pearly white colour, and of a cool sweetish taste, are very deliquescent, melt at 170°, and sublime at 250°. It is decomposed by the acids, alkalies, and several of the earths, and metalline salts; and when in solution, its acid is decomposed spontaneously, and by heat. It is also decomposed by a solution of superacetate of lead. This was suspected to be owing to the vinegar employed being contaminated with sulphuric acid; but Mr Phillips has proved, that it arises from some of the carbonic acid remaining diffused through the solution.

Different proposals have been made to get a solution of greater strength and uniformity than that still retained by the British colleges. Mr Lowe saturates four ounces of carbonate of potass with distilled vinegar, and evaporates the solution to 36 ounces. He then mixes it with two ounces of muriate of ammonia, and distils the mixture in a glass retort. Acetate of ammonia comes over. The last edition of the Prussian Pharmacopœia prepares it by saturating three ounces of carbonate of ammonia with a strong acetic acid (obtained by distillation from acetate of soda, dissolved in two parts of water, and decomposed by sulphuric acid), and diluting the solution with water, so that it shall weigh twenty-four ounces. One ounce, therefore, contains the alkali of a drachm of carbonate of ammonia.

Medical use.—Acetate of ammonia, when assisted by a warm regimen, proves an excellent and powerful sudorific; and as it operates without quickening the circulation, or increasing the heat of the body, it is admissible in febrile and inflammatory diseases, in which the use of stimulating sudorifics are attended with danger. Its action may likewise be determined to the kidneys, by walking about in a cool air. The common dose is half an ounce, either by itself or in combination with other substances.

Chap. IV.—EARTHS, and EARTHY SALTS.

Murias barytæ. *Ed.*
Muriate of Baryta.

Take of
Carbonate of baryta,
Muriatic acid, of each one part;
Water, three parts.

Add the carbonate, broken into little bits, to the water and acid, previously mixed. After the effervescence has ceased, digest for an hour, strain the liquor, and set it aside to crystallize. Repeat the evaporation as long as any crystals are formed.

If the carbonate of baryta cannot be procured, the muriate may be prepared in the following manner from the sulphate.

Take of
Sulphate of baryta, two pounds;
Charcoal of wood, in powder, four ounces.

Roast the sulphate, that it may be more easily reduced to a very fine powder, with which the powdered charcoal is to be intimately mixed. Put the mixture into a crucible, and having fitted it with a cover, heat it with a strong fire for six hours. Then triturate the matter well, and throw it into six pounds of water in an earthen or glass vessel, and mix them by agitation, preventing as much as possible the action of the air.

Let the vessel stand in a vapour bath until the part not dissolved shall subside, then pour off the liquor. On the undissolved part pour four pounds more of boiling water, which, after agitation and deposition, are to be added to the former liquor. Into the liquor, when still warm, or if it shall have cooled, again heated, drop muriatic acid as long as it excites any effervescence. Then strain it, and evaporate it so as to crystallize.

In the materia medica of the Edinburgh college, the carbonate of baryta is introduced, for the purpose of forming the muriate; but as that mineral is not very common, and sometimes not to be procured, it became necessary to describe the manner of preparing the muriate from the sulphate. This is, however, attended with very considerable difficulties, on ac-

count of the very strong attraction which subsists between the sulphuric acid and baryta.

The sulphate of baryta may be decomposed,

1. By compound affinity, by means of carbonate of potass or muriate of lime.

Carbonate of potass is capable of effecting this decomposition, either in the dry or humid way. Klaproth boils sixteen ounces of finely powdered sulphate of baryta with 32 ounces of purified carbonate of potass, and five pounds of water, for an hour in a tin kettle, constantly agitating the mixture, and renewing the water as it evaporates. He then allows it to settle, pours off the fluid, which is a solution of sulphate of potass, and edulcorates the precipitate with plenty of water. He next dissolves the carbonate of baryta, which it contains, in muriatic acid. The portion of sulphate which is not decomposed, may be treated again in the same manner.

On the other hand, Van Mons mixes equal parts of sulphate of baryta and carbonate of potass with one-fourth of their weight of charcoal, all in powder, and heats the mixture to redness in a crucible. When it cools, he washes out the sulphate and sulphuret of potass, with water, then boils the residuum with a little potass, and washes it again. The carbonate of baryta thus obtained he dissolves in muriatic acid.

But by these methods of decomposing the sulphate of baryta, we do not get rid of the metallic substances which it often contains, and which render the muriate thus prepared unfit for medical use. The metalline muriates may, however, be expelled, according to Westrumb, by heating the salt to redness as long as any fumes arise. The pure muriate of baryta is then to be dissolved in water, and crystallized. Göttling, with the same intention, of getting rid of metalline substances, chooses sulphate of baryta, perfectly colourless, and treats it with muriatic or nitro-muriatic acid before he proceeds to decompose it.

La Grange has proposed a new method of decomposing the sulphate of baryta, by means of muriate of lime, which he prepares from the residuum of the decomposition of muriate of ammonia by lime, by dissolving it in a small quantity of hot water, and evaporating it to dryness. He mixes equal parts of this muriate with sulphate of baryta in powder, and projects it by spoonfuls into a crucible previously heated to redness. When it is all in complete fusion, he pours it out upon a polished stone previously heated. The matter, which cracks as it cools, has a whitish-grey colour, and is very hard,

sonorous, and deliquescent, is now to be boiled in about six times its weight of distilled water, its solution filtered, and the residuum boiled in a smaller quantity of water. The mixed solutions are then evaporated to a pellicle, and on cooling furnish beautiful crystals of muriate of baryta, which are to be washed with cold water, and purified by a second solution and crystallization. The mother water of the first crystallization still contains muriate of baryta, which may be separated from the muriate of lime, with which it is mixed, by repeated solutions and crystallizations. La Grange thinks that this process not only saves time, fuel, and muriatic acid, but that it furnishes a purer muriate of baryta than the following process.

2. By decomposing its acid, by means of charcoal.

The acid of the sulphate of baryta is decomposed at a very high temperature by charcoal. At such a temperature charcoal has a greater affinity for oxygen than sulphur has; it therefore decomposes the sulphuric acid, by depriving it of its oxygen, and flies off in the state of carbonic oxide or acid gas, while the sulphur combines with the baryta. On adding water to the sulphuret thus formed, new combinations take place. A portion of sulphate of baryta is regenerated, while hydroguretted sulphuret, and sulphuretted hydroguret of baryta, remain in solution. This solution is exceedingly prone to decomposition, and must, therefore, be preserved from the action of the air as much as possible. It also crystallizes by cooling, and therefore should be kept at a boiling heat. On the addition of muriatic acid, there is a violent effervescence and disengagement of sulphuretted hydrogen gas, which must be avoided as much as possible, by performing the operation under a chimney, while very pure muriate of baryta remains in solution. When prepared in this way, it cannot be contaminated with any of the noxious metals, as their compounds with sulphur and hydrogen are not soluble. On this account, therefore, it is the process adopted by the Edinburgh college.

Muriate of baryta commonly crystallizes in tables. It has a disagreeable bitter taste; is soluble in three parts of water at 60°, and in less boiling water. It is scarcely soluble in alcohol; and its solution burns with a yellow flame. It crystallizes by evaporation; its crystals are permanent; and by the action of heat decrepitate, dry, and melt. For making a solution, the crystals should be used entire; for when previously powdered, it always turns out turbid. When crystallized,

it contains about 20 acid, 64 baryta, and 16 water; when dried, 23.8 acid, and 76.2 baryta. It is decomposed by the sulphates, nitrates, succinates, oxalates, tartrates, and sulphites; and by the alkaline phosphates, borates, and carbonates, and their acids. It is also decomposed by succinate of ammonia, nitrate of silver, acetate, nitrate and phosphate of mercury, acetate of lead, tartrates of iron and antimony, burnt sponge, and Hermbstadt's antimonial tincture, antimonial wine, soap, &c., extracts of gentian, marsh trefoil, and the inspissated juices of aconite, hemlock and hyoscyamus.

It is not decomposed by muriate of iron, or corrosive sublimate, and bears the addition of aromatic distilled waters, simple syrups, gum arabic mucilage, some simple extracts, pure opium, and similar substances, when they do not contain astringent matter. When pure it has no colour; does not deliquesce; does not burn with a red or purple flame, when dissolved in alcohol; and is not precipitated by gallic acid, prussiate of potass and iron, or hydro-sulphuret of ammonia. By washing with alcohol muriate of baryta, rendered impure by the presence of muriate of iron, the latter alone is dissolved.

It is commonly given in solution.

SOLUTIO MURIATIS BARYTÆ. *Ed.*
Solution of Muriate of Baryta.

Take of
Muriate of baryta, one part;
Distilled water, three parts. Dissolve.

THE proportion of water directed here for the solution of muriate of baryta is considerably less than what is stated to be necessary by the writers on chemistry. It is, however, sufficient, even at the lowest ordinary temperatures; a circumstance which should be attended to in making saturated solutions of saline bodies.

Medical use.—Muriate of baryta is generally said, by writers on the materia medica, to be a *stimulant* deobstruent; and yet Hufeland, one of its greatest supporters, says, that it succeeds better in cases attended with inflammation and increased irritability than with atony and torpor. When given in large doses, it certainly produces nausea, vomiting, diarrhœa, vertigo, and death.

Its effects on a morbid state of the body are also disputed. Some assert that it is of advantage in no disease; while others

bestow upon it the most unqualified praises. By the latter, it is principally celebrated,

1. In all cases of scrofula;
2. In obstructions and tumours;
4. In cases of worms;
4. In cutaneous diseases.

The dose of the solution, at first, is five or ten drops twice or thrice a-day, to be gradually and cautiously increased to as much as the patient can bear.

The solution is also used externally as a stimulating and gently escharotic application in cutaneous diseases, fungous ulcers and specks upon the cornea.

Calx. *Lond.*
Lime.

Take of
Limestone, one pound.
Break it into bits, and burn it for an hour in a crucible with a violent heat, or until the carbonic acid be totally expelled, so that on dropping on it acetic acid, no air bubbles are formed.
Lime may be made in the same manner from *oyster-shells*, after they have been washed in boiling water, and freed from all impurities.

Lime is not found in nature, but it is easily procured by the action of fire from any of the abundant carbonates, mineral or animal. For most purposes common lime will do; but as it is seldom totally deprived of its carbonic acid, it may be necessary for the apothecary to prepare it himself. Clean oyster-shells afford it in the greatest purity; and as pure lime is not altered by any heat that can be applied, there is no risk of pushing the fire too far. Marble, and many lime-stones, also furnish a very pure lime; but those which contain a mixture of other earths, are apt to become vitrified on the surface, which prevents them from slaking.

Aqua calcis. *Ed.*
Lime Water.

Take of
Fresh burnt lime, half a pound.
Put it into an earthen vessel, and gradually sprinkle on it four ounces of water, keeping the vessel covered, while the lime grows hot, and falls into powder. Then pour on it twelve pounds of water, and mix the lime thoroughly with

the water by agitation. After the lime has subsided, repeat the agitation, and let this be done about ten times, always keeping the vessel covered, that the free access of the air may be prevented. Lastly, let the water be filtered through paper, placed in a funnel, with glass rods interposed between them, that the water may pass as quickly as possible. It must be kept in very close bottles.

Dub.

Take of
Lime recently burnt, one pound;
Boiling water, one pint.
Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut while the lime grows warm and falls into powder: then pour upon it three gallons of cold water, and close the vessel, agitating it frequently for twenty-four hours; lastly, filter the water through paper, placed in a covered funnel, and keep it in well-closed bottles.

LIQUOR CALCIS. *Lond.*
Solution of Lime.

Take of
Lime, half a pound;
Boiling distilled water, twelve pints.
Pour the water on the lime, and stir them together; immediately cover the vessel, and set it aside for three hours; then preserve the liquor upon the remaining lime in well-corked bottles, and decant off the limpid solution when wanted for use.

WE have already had occasion to speak of the properties of lime, and shall therefore now confine our remarks to the solution of it in water, commonly called Lime-water. In making this, we should first add only so much water as is sufficient to slake the lime, which reduces it to a fine powder, easily diffused through water; for if we add more water at first, it forms a paste with the external part of the lime, and defends the internal from the action of the water. During the whole process, the air must be excluded as much as possible, as lime has a very strong affinity for carbonic acid, and attracts it from the atmosphere. The proportion of water used is scarcely able to dissolve one-tenth of the lime; but lime is of little value; and our object is to form a saturated solution quickly and easily. Lime is actually more soluble in cold wa-

ter than in hot: therefore it is unnecessary to use boiling water. The Edinburgh and Dublin colleges filter their solutions; and if we use the precautions directed, it may be performed without the lime absorbing a perceptible quantity of carbonic acid. The bottles in which lime-water is kept should be perfectly full, and well corked.

The London college do not filter, but decant off their solution, and if carefully performed it will be perfectly pure; and the directions given by them, in their last edition, of keeping their lime-water upon an excess of lime, is certainly an advantage, as we are sure of its being always saturated, for fresh lime will be always dissolved to supply the place of that rendered insoluble, and precipitated by the absorption of carbonic acid.

Lime-water is transparent and colourless. It has an austere acrid taste, and affects vegetable colours as the alkalies do. Good lime-water is precipitated white by alkaline carbonates, and orange by corrosive sublimate. It enters very readily into combination with all the acids, sulphur, and phosphorus, and decomposes the alkaline carbonates, phosphates, fluates, borates, oxalates, tartrates, and citrates, the ammoniacal acetates, muriates and succinates, the sulphates of alumina and magnesia, the metallic salts, spiritous liquors, and astringent substances.

Medical use.—When applied to the living fibre, lime-water corrugates and shortens it; it therefore possesses astringent powers. It is also a powerful antacid, or at least it combines with, and neutralizes acids when it comes in contact with them. It also dissolves mucus, and kills intestinal worms. From possessing these properties, it is used in medicine, in diseases supposed to arise from laxity and debility of the solids, as diarrhœa, diabetes, leucorrhœa, scrofula, and scurvy; in affections of the stomach accompanied with acidity and flatulence; when the intestines are loaded with mucus; and in worms. Lime-water is scarcely capable of dissolving, even out of the body, any of the substances of which urinary calculi consist; it has therefore no pretensions to the character of a lithontriptic. It has been also recommended in crusta lactea, in cancer, and in chronic cutaneous diseases. Externally, it is applied to ill-conditioned ulcers, gangrenous sores; as a wash in tinea capitis and psora; and as an injection in gonorrhœa, fistulas, and ulcers of the bladder.

When taken internally, its taste is said to be best covered by lukewarm milk. Its dose is commonly from two to four

ounces, frequently repeated; but when long continued, it weakens the organs of digestion.

CARBONAS CALCIS PRÆPARATUS; olim, CRETA PRÆPARATA, et CANCRORUM LAPILLI. *Ed.*

Prepared Carbonate of Lime; formerly Prepared Chalk, and Crabs Stones.

CARBONATE of lime, whether the softer variety commonly called Chalk, or the harder variety called Crabs Eyes and Crabs Stones, after having been triturated to powder in an iron mortar, and levigated on a porphyry stone with a little water, is to be put into a large vessel, and water to be poured upon it, which, after agitating the vessel repeatedly, is to be decanted off, while loaded with minute powder. On allowing the water to settle, a subtile powder will subside, which is to be dried.

The coarse powder which the water could not suspend, may be levigated again, and treated in the same manner.

CRETA PRÆPARATA. *Lond.*

Prepared Chalk.

Take of

Chalk, one pound.

Add a little water to the chalk, and triturate it to fine powder. Throw this into a large vessel filled with water, then agitate them, and after a short pause, decant off the supernatant liquid, still turbid, into another vessel, and set it aside, that the powder may subside. Lastly, having poured off the water, dry this powder.

TESTÆ PRÆPARATÆ. *Lond.*

Prepared Oyster Shells.

Wash the shells, previously well cleaned, in boiling water, then prepare them in the same manner as chalk is prepared.

CRETA PRÆPARATA. *Dub.*

Prepared Chalk.

Grind it to powder in an earthen-ware mortar, with the addition of a little water; then mix it with a sufficient quantity of water by agitation; and after allowing it to stand a little, until the coarser particles fall to the bottom, pour off the liquor. This may be frequently repeated, triturating previously each time. Finally, the very fine powder, which,

after some time, will subside in the decanted liquor, is to be collected and dried upon a bibulous stone or paper.

OSTREARUM TESTÆ PRÆPARATÆ, *Prepared Oyster Shells,*
OVORUM TESTÆ PRÆPARATÆ, *Prepared Egg Shells,*
Are to be prepared in the same manner as chalk.

THE preparation of these substances merely consists in reducing them to an impalpable powder.

Medical use.—Carbonate of lime is commonly called an absorbent earth. It certainly is an antacid; that is, it combines with and neutralizes most acids, while its carbonic acid is expelled in the form of gas. It is therefore exhibited in affections of the stomach accompanied with acidity, especially when at the same time there is a tendency to diarrhœa. The fear of its forming concretions in the bowels, is probably imaginary; for it is not warranted either by theory or experience.

Applied externally, carbonate of lime may be considered as an absorbent in another point of view; for its beneficial action on burns and ulcers probably arises entirely from its imbibing the moisture or ichorous matter, as a sponge would do, and thus preventing it from acting on the abraded surfaces, and excoriating the neighbouring parts.

CRETA PRÆCIPITATA. *Dub.*
Precipitated Chalk.

Take of
Water of muriate of lime, any quantity.
Add as much carbonate of soda, dissolved in four times its weight of distilled warm water, as is sufficient to precipitate the chalk. Wash the matter which falls to the bottom, three times, by pouring on, each time, a sufficient quantity of water. Lastly, having collected it, dry it upon a chalk stone or paper.

THIS preparation affords carbonate of lime in its purest state, and, although expensive, may be employed when it is intended for internal use.

CALCIS MURIAS. *Lond.*
Muriate of Lime.

Take of
The salt which remains after the distillation of the subcarbonate of ammonia, two pounds;
Water, one pint.

Dissolve and filter through paper. Evaporate the liquor until the salt be rendered dry. Keep this in a well-closed phial.

LIQUOR CALCIS MURIATIS. *Lond.*
Liquor of Muriate of Lime.

Take of
Muriate of lime, two ounces;
Distilled water, three fluidounces.
Dissolve the muriate of lime in the water, then filter through paper.

SOLUTIO MURIATIS CALCIS. *Ed.*
Solution of Muriate of Lime.

Take of
Hard carbonate of lime, that is white marble, broken into pieces, nine ounces;
Muriatic acid, sixteen ounces;
Water, eight ounces.
Mix the acid with the water, and gradually add the pieces of carbonate of lime. When the effervescence has ceased, digest them for an hour, pour off the liquor and evaporate it to dryness. Dissolve the residuum in its weight and a half of water, and, lastly, filter the solution.

AQUA MURIATIS CALCIS. *Dub.*
Water of Muriate of Lime.

Take of
Chalk, in coarse powder, one ounce;
Diluted muriatic acid, two ounces.
Gradually add the chalk to the acid, and, after the effervescence is finished, filter.

FROM the difficulty of crystallizing this salt, it is directed by the Edinburgh college to be evaporated to the total expulsion of its water of crystallization, as being the surest way of obtaining a solution of uniform strength. With the same view, the Dublin College saturate muriatic acid of a given strength; and Dr Wood directs, that the solution should always have a determinate specific gravity. It may be economically prepared from the residuum in the decomposition of muriate of ammonia, by lime or chalk, according to the directions of the Berlin Pharmacopœia, now adopted by the London college, by watery fusion, solution, filtration, and crystallization. Its purity is ascertained by its remaining colourless and transparent, with infusion of galls and caustic ammonia; a brown colour indicating the presence of iron, and a precipitation that of alumina. But it may be purified by boil-

ing it in solution an hour, with a sufficient quantity of pure chalk, or other carbonate of lime, filtrating it, evaporating it gently, till it acquire the specific gravity of 1.5, allowing it to stand some days in a corked bottle, decanting it carefully from the sediment, and duly evaporating it.

The crystals of this salt are prisms of six smooth and equal sides, but they are often so aggregated, that they can only be termed acicular. Its taste is pungent, bitter, and disagreeable. When heated, it melts, swells, and loses its water of crystallization. It is one of the most deliquescent salts known, and is so soluble, that water seems capable of dissolving twice its weight, or, at least, forms with it a viscid liquor; but as it is still capable of attracting moisture from the air, and of emitting caloric, when farther diluted, it can scarcely be considered as a true solution. Dörfurt says, it is perfectly soluble in one and a half cold water, and in much less than its own weight of boiling water. It is also soluble in an equal weight of boiling alcohol, and its solution burns with a crimson flame. It is decomposed by the sulphuric, nitric, oxalic, tartaric, succinic, phosphoric, fluoric, and boracic acids; by baryta, potass, soda, and strontia; by carbonated, sulphated, phosphated, tartarated, acetated alkalies; superoxalate of potass, sub-borate of soda, boro-tartrate of potass and soda, tartrate of potass and soda, succinate of ammonia, alum, sulphate of magnesia, nitrate of silver, nitrate, phosphate, and acetate of mercury, acetate of lead, and sulphate of iron, copper and zinc. Crystallized, it contains, according to Bergman, 31 acid, 44 lime, and 25 water; dried at a red heat, 42 acid, 50 lime, and 8 water.

Medical use.—It was first proposed as a medicine by Fourcroy, and has been lately extolled in scrofulous and glandular diseases, and cases of debility in general, by several eminent practitioners of our own country, Dr Beddoes, Dr R. Pearson, and Dr Wood. Thirty drops of the solution are a sufficient dose for children, and a drachm for adults, repeated twice or thrice a-day. In an over-dose, it has produced qualms and sickness; and three drachms and a half killed a dog, the stomach of which, upon dissection, had its villous coat bloodshot, and in many parts almost black, and converted into a gelatinous slime. Perhaps it is the muriate of lime which is the active ingredient in the lotions prepared by triturating calomel or corrosive sublimate in lime-water. The compound resulting is a solution of muriate of lime, with oxide of mercury diffused through it. The property of this salt, of producing intense cold during its solution, might also be

applied to medical use; and its strong affinity for water and alcohol fits it for the rectification of alcohol and ether.

Cornu ustum. *Lond.*
Burnt Horn.

Burn pieces of horn in the open fire, until they become perfectly white; then reduce them to powder, and prepare it in the same manner as is directed for chalk.

Pulvis cornu cervini usti. *Dub.*
Powder of Burnt Hartshorn.

Burn pieces of hartshorn till they become perfectly white; then reduce them to a very fine powder.

The pieces of horn generally employed in this operation are those left after distillation.

In the burning of hartshorn, a sufficient fire, and the free admission of air are necessary. The potter's furnace was formerly directed, for the sake of convenience; but any common furnace or stove will do. Indeed, too violent a heat makes their surface undergo a kind of fusion and vitrification, which both prevents the internal parts from being completely burnt, and renders the whole less soluble. If the pieces of horn be laid on some lighted charcoal, spread on the bottom of the grate, they will be burnt to whiteness, still retaining their original form.

According to the analysis of Merat Guillot, hartshorn consists of 27. gelatine, 57.5 phosphate of lime, 1. carbonate of lime, and there was a loss of 14.5, probably water. Now, as the gelatine is destroyed by burning, and the water expelled, the substance which remains is phosphate of lime, mixed with less than two *per cent.* of carbonate of lime. Fourcroy and Vauquelin have analysed bones more accurately, and found that they contain phosphate of magnesia, iron, and manganese, and that human bones contain less of the first of these, and more of the two others than animal bones, which is probably owing to the constant excretion of phosphate of magnesia in human urine. In human bones there are also traces of alumine and silex.

Medical use.—From its white earthy appearance, it was formerly considered as an absorbent earth. But since it has been accurately analysed, that idea has been laid aside, and its use has been suggested as a remedy in rickets, a disease in which the deficiency of the natural deposition of phosphate of lime in the bones seems to be the essential, or, at least, the most striking symptom. Mr Bonhomme, therefore, gave it to

the extent of half a scruple, mixed with phosphate of soda, in several cases with apparent success. Whatever objections may be made to this theory, the practice certainly deserves a trial.

Magnesia. *Ed.*
Magnesia.

Let carbonate of magnesia, put into a crucible, be kept in a red heat for two hours; then put it up in close-stopt glass vessels.

Lond.

Take of
Carbonate of magnesia, four ounces.
Burn it with a very fierce fire for two hours, or until acetic acid dropped upon it cause no effervescence.

Magnesia usta. *Dub.*
Calcined Magnesia.

Take of
Magnesia, any quantity.
Expose it to a strong heat in a crucible, for two hours; and, when cold, put it into a glass vessel.

By this process the carbonate of magnesia is freed of its acid and water; and, according to the late Dr Black's experiments, loses about $\frac{7}{12}$ of its weight. A kind of opaque, foggy vapour is observed to escape during the calcination, which is nothing else than a quantity of fine particles of magnesia, buoyed off along with a stream of the disengaged gas. About the end of the operation, the magnesia exhibits a kind of luminous or phosphorescent property, which may be considered as a pretty exact criterion of its being deprived of its acid.

It is to be kept in close vessels, because it attracts, though slowly, the carbonic acid of the atmosphere. Its sp. gr. is 2.33, and when sprinkled with water, heat is produced, and it absorbs 18 *per cent.* Magnesia decomposes alum, borax, tartrate and succinate of ammonia, tartrate of potass, tartrate of potass and soda, and all the officinal metallic salts.

Medical use.—It is used for the same general purposes as the carbonate. In certain affections of the stomach, accompanied with much flatulence, magnesia is preferable, both because it contains more magnesia in a given bulk, and, being deprived of its acid, it neutralizes the acid of the stomach, without any extrication of gas, which is often a troublesome

consequence when carbonate of magnesia is employed in these complaints.

CARBONAS MAGNESIÆ. *Ed.*
Carbonate of Magnesia.

Take of
Sulphate of magnesia;
Carbonate of potass, equal weights.
Dissolve them separately in twice their weight of warm water, and let the liquors be strained, or otherwise freed from their feces; then mix them, and instantly add eight times their weight of boiling water. Let the liquor boil for a little on the fire, stirring it at the same time; then let it rest till the heat be somewhat diminished; after which strain it through linen: the carbonate of magnesia will remain upon the cloth, and is to be washed with pure water till it become altogether void of saline taste.

Lond.

Take of
Sulphate of magnesia, one pound;
Subcarbonate of potass, nine ounces;
Water, three gallons.
Dissolve separately the subcarbonate in three pints of the water, and the sulphate in five, and filter. Then add the rest of the water to the solution of the sulphate; boil it, and, while it is boiling, mix with it, under constant stirring, the solution of the subcarbonate, and filter through linen. Lastly, wash the powder with repeated affusions of boiling water, and dry upon blotting paper, with a heat of 200°.

MAGNESIA. *Dub.*
Magnesia.

Take of
Sulphate of magnesia,
Subcarbonate of kali, of each two pounds;
Boiling water, twenty pints.
Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix the defæcated liquors. Boil the mixture a little, and, while still warm, filter it through linen, stretched, so as to fit it for collecting the magnesia. Wash off the sulphate of kali, by repeated affusions of boiling water; and, lastly, dry the magnesia.

IN this process, there is a mutual decomposition of the two salts employed. The potass unites itself to the sulphuric

acid, while the carbonic acid combines with the magnesia, to form subcarbonate of magnesia. The large quantity of water used is necessary for the solution of the sulphate of potass formed; and the boiling is indispensably requisite for the expulsion of a portion of the carbonic acid, which is furnished in excess by the alkali, and would otherwise retain a part of the magnesia in solution: 100 parts of crystallized carbonate of potass are sufficient for the decomposition of 125 parts of sulphate of magnesia; and, from these quantities, about 45 parts of carbonate of magnesia are obtained. Mr Phillips says, that 3 of the alkaline salt are sufficient to decompose 4 of the sulphate of magnesia: his proportions have been adopted by the London college.

The ablutions should be made with very pure water; for nicer purposes distilled water may be used; and soft water is, in every case, necessary. Hard water, for this process, is peculiarly inadmissible, as the principle in waters, giving the property called *hardness*, is generally a salt of lime, which decomposes the carbonate of magnesia, by compound affinity, giving rise to carbonate of lime, while the magnesia unites itself to the acid of the calcareous salt, by which the quantity of the carbonate is not only lessened, but is rendered impure by the admixture of carbonate of lime. Another source of impurity is the silica, which the subcarbonate of potass generally contains. It is most easily got rid of by exposing the alkaline solution to the air for several days before it is used. In proportion as it becomes saturated with carbonic acid, the silica is precipitated, and may be separated by filtration.

In the preparation of the subcarbonate of magnesia, the Berlin college order subcarbonate of soda to be used, which has the advantage of forming with the sulphuric acid of the sulphate of magnesia a much more soluble salt than the sulphate of potass, and the magnesian precipitate is said to turn out lighter and whiter, the less water there is employed in its preparation. The carbonate of magnesia of commerce is prepared from the muriate of magnesia, which remains in solution after the crystallization of muriate of soda from sea-water.

The carbonate of magnesia, thus prepared, is a very light, white, opaque substance, without smell or taste, effervescing with acids. It is not, however, saturated with carbonic acid. By decomposing sulphate of magnesia by an alkaline carbonate, without the application of heat, carbonate of magnesia is gradually deposited in transparent, brilliant, hexagonal crystals, terminated by an oblique hexagonal plane, and soluble in about 480 times their weight of water. The crystallized

carbonate of magnesia consists of 50 acid, 25 magnesia, and 25 water; the subcarbonate requires at least 850 times its weight of water for its solution, and consists of 48 acid, 40 magnesia, and 12 water; and that of commerce, of 34 acid, 45 magnesia, and 21 water. It is decomposed by all the acids, potass, soda, baryta, lime, and strontia, the sulphate, phosphate, nitrate, and muriate of alumina, and the superphosphate of lime.

Medical use.—Carbonate of magnesia is principally given to correct acidity of the stomach, and, in these cases, to act as a purgative; for solutions of magnesia in all acids are bitter and purgative, while those of the other earths are more or less austere and astringent. A large dose of magnesia, if the stomach contain no acid to dissolve it, neither purges nor produces any sensible effect; a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures several stools; whereas the common absorbents, in the same circumstances, instead of loosening, bind the belly. When the carbonate of magnesia meets with an acid in the stomach, there is extricated a considerable quantity of carbonic acid gas, which sometimes causes uneasy distention of the stomach, and the symptoms of flatulence. In such cases, therefore, magnesia is preferable to its carbonate; but, on other occasions, as in nausea and vomiting, good effects arise from the action of the gas evolved.

SULPHAS ALUMINÆ EXSICCATUS, olim ALUMEN USTUM. *Ed.*
Dried Sulphate of Alumina, formerly *Burnt Alum.*

Melt alum in an earthen or iron vessel, and keep it over the fire until it cease to boil.

ALUMEN EXSICCATUM. *Lond.*
Dried Alum.

Melt alum in an earthen pot over the fire, which is to be increased until the ebullition cease.

ALUMEN USTUM. *Dub.*
Burnt Alum.

Take of
Alum, any quantity.
Expose it in an earthen vessel to a strong fire, until it cease to boil.

THE vessel in which this process is conducted, must contain at least three times as much as the alum operated on, as

this swells exceedingly in drying, and would otherwise run over.

Mr Chaptal found, that by exsiccation in a red heat, alum of his own manufacture lost 0.67, Roman alum 0.50, English alum 0.47, and Levant alum only 0.40. These differences arise principally from different proportions of water of crystallization, but also from an excess of alumina, which the last contains.

According to Kirwan, crystallized alum consists of 17.66 acid, 12 alumina, and 70.24 water, and alum desiccated at 700°, of 36.25 acid, and 63.75 basis, by which it would appear, that at that heat it loses not only all its water, but also more than half its acid.

Dried alum is only applied externally, as a gentle escharotic to fungous ulcers.

Chap. V.—METALLINE PREPARATIONS.

ANTIMONY.

Sulphuretum antimonii præparatum. *Ed.*

Prepared Sulphuret of Antimony.

Sulphuret of antimony is prepared in the same way as carbonate of lime.

Dub.

Reduce it to powder, and separate for use the impalpable particles, in the manner directed for the preparation of chalk.

By reducing the sulphuret of antimony to the state of an impalpable powder, it is both rendered much more active, and is prevented from irritating the stomach mechanically, of which there would be some danger, from the sharpness of its spiculæ. Even in this state, however, it is not a very certain remedy. In general, it operates as a mild sudorific or cathartic; but sometimes, if it meet with much acid in the stomach, it becomes more active, producing vomiting and hypercatharsis. Therefore, it seems prudent to evacuate the primæ viæ before it be exhibited, and to combine it with an absorbent earth.

It is principally given in scrofula, glandular obstructions, cutaneous diseases, and rheumatism. Its dose is from 10 to 30 grains, and upwards; and it is best exhibited in the form of a powder or bolus. It seems to constitute a quack remedy which has acquired some reputation in Ireland for the cure of cancer. It is used externally for dressing the sore.

OXIDUM ANTIMONII CUM SULPHURE, PER NITRATEM POTASSÆ; olim CROCUS ANTIMONII. *Ed.*

Oxide of Antimony, with Sulphur, by Nitrate of Potass; formerly *Crocus of Antimony.*

Take of

Sulphuret of antimony,

Nitrate of potass, equal weights.

After they are separately powdered, and well mixed, let them be injected into a red hot crucible; when the deflagration is over, the reddish matter is to be separated from the whitish crust, and reduced to powder, which is to be edulcorated by repeated washings with hot water, till the water come off insipid.

IN this process, the nitric acid of the nitre, and part of the sulphuret, are mutually decomposed: the sulphur is acidified, and combines with the potass of the nitre, while the antimony is converted into protoxide, which combines with the undecomposed portion of the sulphuret, and forms a dark brown, opaque, vitrified mass; so that, after the scoriæ, and other saline matters, have been removed by washing, the substance which remains, according to Proust, consists of three parts of protoxide of antimony, and one of sulphuret of antimony.

With regard to the mode of preparation, Bergman observes, that by the common process of throwing the mixture into an ignited uncovered crucible, there is sometimes a loss of nearly one half; and, therefore, advises the mixture to be put into a cold crucible, which is to be covered, and heated till the matter melts, by which means there is very little loss. With Dörfurt, however, this process did not succeed; because, as soon as the applied heat reached a certain degree, the whole mass took fire, and deflagrated violently. Indeed, in this process, the application of heat to the crucible is perfectly unnecessary, and the Berlin Pharmacopœia directs the mixture to be put into a clean iron pot, and kindled by touching it with a bit of live coal, or, what is better, the end of a tobacco pipe, or iron rod heated to redness. In this the fusion and separation of the scoriæ is no less complete than when the mixture is gradually projected into a heated cruci-

ble, and, unless for very great quantities, it is more convenient.

What is kept in the shops, is almost universally prepared with less nitre than is here ordered. The consequence is, that too much sulphur remains not acidified, the antimony is scarcely oxidized, and the preparation is unfit for the uses to which it ought to be applied. When nitre has been thus culpably economized, the crocus has a steel grey, instead of a liver brown colour.

The sulphuretted oxide of antimony is a very uncertain preparation, often operating with very great violence. Its internal use is, therefore, almost proscribed, or at least confined to veterinary practice. It is used in pharmacy, as the basis of other preparations in some Pharmacopœias; but the London college have rejected it altogether.

OXIDUM ANTIMONII, CUM SULPHURE VITRIFICATUM; olim VITRUM ANTIMONII. *Ed.*

Vitrified Oxide of Antimony with Sulphur, formerly *Glass of Antimony*.

Strew sulphuret of antimony, beat into a coarse powder, like sand, upon a shallow, unglazed, earthen vessel, and apply a gentle heat underneath, that the sulphuret of antimony may be heated slowly: stirring it, at the same time, continually, to prevent it from running into lumps. White vapours, of a sulphureous smell, will arise from it. When they cease with the degree of heat first applied, increase the fire a little, so that vapours may again arise; proceed in this manner, till the powder, when brought to a red heat, exhales no more vapours. Melt this powder in a crucible, with an intense heat, till it assumes the appearance of melted glass; then pour it out on a heated brass-plate.

GLASS of antimony, according to Proust, consists of one part of sulphuret of antimony, combined with eight of oxide of antimony. Hence, in this process, the greatest part of the antimony is deprived of its sulphur, and is, at the same time, converted into the protoxide, which combines with the small portion of sulphuret which remains undecomposed. But, as this preparation is not easily made in the manner here directed, unless in a furnace constructed on purpose, apothecaries may advantageously adopt the synthetical method of Bergman, which consists in melting in a crucible, with one twelfth or eighth of its weight of sulphur, protoxide of antimony, prepared by deflagrating it with more than twice its weight of nitre. At the temperature necessary for melting it, part of the protoxide of antimony loses its oxygen, and is con-

verted into sulphuret, and combines with the remaining protoxide, in the proportions which form the glass of antimony.

The glass of antimony is transparent, and has a fine hyacinthine colour. On dissolving it in muriatic acid, it gives out sulphuretted hydrogen gas. Its medical operation is so uncertain, that it is only used in making other preparations.

OXIDUM ANTIMONII VITRIFICATUM CUM CERA; olim VITRUM ANTIMONII CERATUM. *Ed.*

Vitrified Oxide of Antimony with Wax, formerly *Cerated Glass of Antimony.*

Take of

Yellow wax, one part;

Vitrified oxide of antimony with sulphur, eight parts.

Melt the wax in an iron vessel, and throw into it the powdered oxide; roast the mixture over a gentle fire, for a quarter of an hour, continually stirring it with a spatula; then pour it out, and, when cold, grind it into powder.

THE glass melts in the wax, with a very gentle heat: after it has been about twenty minutes on the fire, it begins to change its colour, and in ten more, comes near to that of Scotch snuff, which is a mark of its being sufficiently prepared; the mixture loses about one-ninth of its weight in the process.

This medicine was for some time much esteemed in dysenteries. The dose is from two or three grains to twenty, according to the age and strength of the patient. In its operation, it makes some persons sick, and vomit; it purges almost every one; though it has sometimes effected a cure without occasioning any evacuation or sickness. It is now, however, much less used than formerly.

SULPHURETUM ANTIMONII PRÆCIPITATUM. *Ed.*

Precipitated Sulphuret of Antimony.

Take of

Water of potass, four pounds;

Water, three pounds;

Prepared sulphuret of antimony, two pounds.

Boil them in a covered iron pot, over a slow fire, for three hours, adding more water, if necessary, and frequently stirring the mixture with an iron spatula; strain the liquor, while warm, through a double cloth, and add to it, when filtered,

Diluted sulphuric acid,

as much as is necessary to precipitate the sulphuret, which must be well washed with warm water.

Lond.

Take of
Sulphuret of antimony, in powder, two pounds;
Solution of potass, four pints;
Distilled water, three pints.
Mix and boil, with a gentle fire, for three hours, constantly stirring, and adding, from time to time, as much distilled water as to keep up the original quantity. Quickly filter the solution through double linen, and gradually drop into it, when still hot, as much diluted sulphuric acid as may precipitate it; then wash away the sulphate of potass with warm water; dry the precipitated sulphuret of antimony and triturate it to powder.

SULPHUR ANTIMONIATUM FUSCUM, *Dub.*
Brown Antimoniated Sulphur.

Take of
Prepared sulphuret of antimony.
Subcarbonate of kali, each one ounce.
Melt them previously mixed, in a crucible. Powder the mass, when cold. Put it into a matrass, with pour pints of water, and boil for a quarter of an hour. Remove the vessel from the fire, and cover it; let it rest a little, and, as soon as the liquor has become limpid, decant it cautiously from the sediment. The antimoniated sulphur will, in part, be separated by the cooling of the liquor: add a sufficient quantity of diluted sulphuric acid to precipitate the whole of it, which happens with excess of acid; agitate the mixture, that what is last thrown down (which is of an orange colour) may be mixed with the rest. After allowing it to stand a sufficient time, pour the liquor from the sediment, which is to be washed with cold water, as long as it affects litmus paper. Lastly, dry it upon blotting paper.

IN both of these preparations, the result is a hydro-sulphuret of antimony with excess of sulphur. Formerly there were two officinal antimonials of this nature, one of which (*Kermes mineral*) contained no excess of sulphur, and the other (*Sulphur auratum antimonii*) contained a much larger proportion of sulphur than those now officinal, which, therefore, hold a

middle place between them. According to Thenard, they consist of

	Sulph. aur.	Kermes min.
Brown oxide of antimony	68.3	72.760
Sulphuretted hydrogen	17.877	20.298
Sulphur -	12.	4.156
Water and loss -	1.823	2.786
	100.	100.

Thenard considers the sulphur as only mechanically and accidentally mixed; and that the essential difference between these preparations consists in the degree of oxidizement of the antimony.

But, notwithstanding the great celebrity of Thenard as a chemist, and his having paid particular attention to the combinations of antimony, we may be allowed to doubt the accuracy of his opinion; for it must appear to every one, an affected refinement of analysis, to discover in such substances a difference of only 2 *per cent.* of oxidizement, more especially as he admits an inaccuracy in his analysis of at least as much: and as Proust has since shewn that both preparations contain the protoxide, the only difference between these bodies appears to be the proportion of sulphur they contain.

Hydro-sulphuret of antimony is prepared either in the dry way, as directed by the Dublin, or in the humid way, as in the receipt of the Edinburgh and London colleges. When sulphuret of antimony is boiled in a solution of potass, water is decomposed, the hydrogen combines with the sulphur, and the antimony is oxidized; and, as long as the solution boils, it contains a mixture of hydro-sulphuret of potass and hydro-sulphuret of antimony. But, on cooling, a great part of the latter precipitates in the form of a red powder (Kermes mineral).

In the dry way, when sulphuret of antimony and carbonate of potass are melted together, the carbonic acid is expelled with effervescence, and a sulphuret of potass and antimony is formed. On boiling this in water, water is decomposed, the antimony is oxidized, and the hydrogen combines with the sulphur. The sulphuretted hydrogen, thus formed, combines partly with the potass, and partly with the oxide of antimony.

Such is the present theory. With regard to the practice; for the preparation of Kermes mineral, Lemery melted sixteen parts of sulphuret of antimony, and one of sulphur, with eight parts of carbonate of potass. The last edition of the

Prussian Pharmacopœia directs two parts of sulphuret of antimony, and one of exsiccated carbonate of soda, to be melted, and afterwards boiled fifteen minutes in six or eight parts of water, which, on cooling, deposites a considerable quantity of kermes. The fluid from which the kermes has been deposited may be again boiled in the residuum of the first decoction, and it will dissolve a fresh proportion of kermes; and this process may be repeated as long as there remains any to dissolve. After this the residuum, when melted, consists almost solely of antimony. It therefore seems, that the alkali renders almost all the sulphur soluble, and only disposes the oxidizement of as much antimony as is capable of combining with the sulphuretted hydrogen. There appears to be no reason why the whole of the antimony should not be converted into kermes, by employing a proper addition of sulphur and alkali.

Kermes is also made in the humid way. Fourcroy boils, in twenty parts of water, six parts of pure potass of commerce, and into the boiling solution throws about the twentieth part of the weight of the alkali, or 0.3 of a part, of powdered sulphuret of antimony, and continues the boiling for seven or eight minutes, then filters, and allows the kermes to precipitate by cooling. Hermbstadt uses very different proportions; for he boils twelve parts of sulphuret of antimony, and three of salt of tartar, in ninety-six parts of water, down to sixty-four, and then filters, &c. Gren employs four parts of sulphuret of antimony, sixteen of carbonate of potass, and sixty-four of water, and boils for several hours. Göttling boils eight parts of sulphuret of antimony, and two of sulphur, in a sufficient quantity of solution of potass, down to one half.

The precipitated sulphuret of antimony, like the kermes, may be prepared either in the dry or in the moist way. The latter mode seems to be the most universally employed on the Continent. Göttling boils two parts of sulphuret of antimony, and three of sulphur, in a sufficient quantity of a recent solution of potass, filters the solution, and precipitates with sulphuric acid, diluted with twelve times its weight of water. The Prussian college use equal parts of sulphuret of antimony and of sulphur. Wiegleb treats in the same manner two parts of sulphuret of antimony with one of sulphur. But to his proportions it has been objected, that the product resembles kermes more than sulphur auratum. If this objection be just, it must apply, in a still stronger degree, to the formula of the British colleges, in which no sulphur is added.

In the dry way, two parts of sulphuret of antimony and three of sulphur may be melted with five or six of pure carbonate of potass in a covered crucible, as quickly as possible, poured into an iron mortar, reduced to powder, and dissolved by boiling the powder in water. The solution is to be filtered warm, diluted with a sufficient quantity of water, and precipitated by dilute sulphuric acid. By some, the solution is allowed to remain at rest for twenty-four hours before it be filtered, and some precipitate by nitrous acid.

The process for making the golden sulphuret of antimony depends on the property which the hydroguretted sulphuret of potass possesses, of dissolving, and retaining dissolved, even at ordinary temperatures, a portion of orange oxide of antimony; and as the attraction by which potass exists in this compound is weaker than its affinity for acids, on the addition of any acid, the potass unites with the acid, a portion of sulphuretted hydrogen gas escapes, and the oxide of antimony, combined with the rest of the sulphur and hydrogen, are precipitated in the form of a light orange powder. When the acid is added gradually, the proportion of oxide of antimony decreases, while that of the sulphur increases in each successive portion of precipitate. Hence, in the old manner of preparing this substance, from the scoriæ formed in reducing antimony from its sulphuret, and which contained but little sulphur, the two first portions of precipitate, being dark coloured, were rejected, and only the produce of the third precipitation retained for use. The want of economy in this process is sufficiently obvious, as well as the very great improvement in modern times, of adding a sufficient quantity of sulphur, and precipitating the whole at once.

Medical use.—In its action on the body, the hydro-sulphuret of antimony is an active substance, and, according to the dose, acts as a diaphoretic, cathartic, or emetic. Its use is, in this country, in a great degree superseded by more certain preparations.

Murias antimonii. *Ed.*
Muriate of Antimony.

Take of
Oxide of antimony, with sulphur, by nitrate of potass,
Sulphuric acid, each one pound;
Dried muriate of soda, two pounds.

Pour the sulphuric acid into a retort, gradually adding the muriate of soda and oxide of antimony, previously mixed. Then perform the distillation in a sand-bath. Expose the

distilled matter for several days to the air, that it may deliquesce, and then pour the liquor from the fæces.

Muriate of antimony was originally prepared by distilling sulphuret of antimony with muriate of quicksilver. Muriate of antimony, or butter of antimony, as it was called from its appearance when recently prepared, passes over into the receiver, and black sulphuret of quicksilver remains in the retort; or by increasing the heat, red sulphuret of mercury, which, when obtained by this process, was formerly termed Cinnabar of antimony, is sublimed. But this mode of preparation is both expensive and dangerous to the health of the operator.

Scheele invented a method of avoiding these inconveniences. A sulphuretted oxide of antimony is prepared by deflagrating two parts of sulphuret of antimony with three of nitrate of potass in an iron mortar. The mass thus obtained is powdered, and one pound of it put into a glass vessel, on which is poured first a mixture of three pounds of water and fifteen ounces of sulphuric acid, and afterwards fifteen ounces of powdered common salt. The whole is digested for twelve hours, and stirred all the while, and the solution, when cool, strained through linen. On the residuum one-third of the above menstruum is poured, and the mixture digested and strained.—Mr Stott says, that the digestion need not be continued longer than two or three hours, and that the heat must be kept moderate, as the muriate of antimony begins to evaporate before it boils. Although this preparation, as we shall afterwards see, answers the purpose for which it is intended, it is a mixture of sulphate of soda and muriate of antimony.

The muriate may be obtained separately from the other salts by distillation. This was proposed by Gmelin, and improved by Wiegleb, who distilled a mixture of one part of sulphuret of antimony, four of muriate of soda, and three of sulphuric acid diluted with two of water; but the product is rendered impure by the admixture of sulphur, and there is great danger of the vessels bursting, from the immense quantity of sulphuretted hydrogen gas disengaged.

The process of the Edinburgh college was first introduced into the London Pharmacopœia in 1781.

The Prussian Dispensatory pours upon two ounces of crocus of antimony, and six of dried muriate of soda, introduced into a retort, four ounces of sulphuric acid previously diluted with two ounces of distilled water, and distils. But we have already observed, that the antimony in the crocus is seldom sufficiently oxidized or deprived of its sulphur, which occa-

sions the production of much sulphuretted hydrogen gas; and from the concentrated state in which the materials are employed, the muriatic acid gas is sometimes disengaged, especially if the heat be improperly applied, so rapidly, that it has not time to act upon the oxide of antimony.

At last, in 1797, Göttling, by substituting the glass of antimony for the crocus, diluting further the sulphuric acid, and using the muriate of soda crystallized, removed these inconveniences. He introduces into a retort a mixture of four ounces of glass of antimony in powder, with sixteen of muriate of soda, and then pours into it twelve ounces of sulphuric acid, diluted with eight of water. He lutes on a tubulated receiver with gypsum, and distils to dryness in a sand-bath, with a heat gradually increased. By this process, he says, about twenty ounces of very strong fuming solution of muriate of antimony are obtained. The residuum in the retort is sulphate of soda, but unfit for internal use, on account of its being mixed with some antimony.

Muriate of antimony or antimonane, as it is called by Sir H. Davy, is crystallizable, but in general is a soft semitransparent substance, of a yellowish-white colour, very fusible and volatile at a moderate degree of heat. It is remarkably deliquescent, and forms a permanent solution; but if more than a certain proportion of water be added, it is decomposed; a large quantity of submuriate of antimony being precipitated, in the form of white silky crystals, while a supermuriate remains in solution. Antimonane consists, according to the experiments of Mr John Davy, of 56 antimony and 44 chlorine, or of *one* proportion of antimony and *two* of chlorine.

Muriate of antimony has been used as a caustic, but not for a long time; it is so extremely unmanageable. It is now only prepared as preliminary to the precipitation of the submuriate or oxide of antimony from it.

Oxydum antimonii nitro-muriaticum, *Dub.*
Nitro-Muriatic Oxide of Antimony.

Take of

Prepared sulphuret of antimony, two ounces;
Muriatic acid, eleven ounces by measure;
Nitrous acid, one drachm by measure.

Add the sulphuret gradually to the acids, previously mixed in a glass vessel, avoiding the vapours. Digest with a heat gradually increased, until the effervescence cease, and then boil for one hour. Filter the liquor when cold, and receive it when filtered in a gallon of water. The oxide of anti-

mony will fall to the bottom. Wash this repeatedly in a sufficiently large quantity of water, until the liquor poured off be perfectly free from acid, as known by the test of lithmus; and, lastly, dry the oxide upon bibulous paper.

In this preparation, the antimony oxidized by the nitric acid is dissolved in the muriatic; and the muriate of antimony thus formed is decomposed by water. According to Sir H. Davy, a portion of the water furnishes oxygen to the antimony, and hydrogen to the chlorine, which are thus converted into protoxide and muriatic acid; a supermuriate of antimony remains in solution, and an insoluble submuriate is precipitated in the form of white acicular or silky crystals, formerly known under the title of *Pulvis Algarotti*, and is the *oxydum antimonii nitro-muriaticum* of the Dublin college. That this is a submuriate, is proved by its yielding a small proportion of muriate on distillation, as pointed out by Bergman.

Antimonii oxydum. *Lond.*
Oxide of Antimony.

Take of

Tartarized antimony, one ounce;
Subcarbonate of ammonia, two drachms;
Distilled water, what is necessary.

Dissolve the salts separately in water, then mix the liquors, and boil until the oxide of antimony be precipitated. Wash this with water, and dry it.

This process, which is now introduced by the London college as a substitute for the numerous impure oxides of antimony in preceding Pharmacopœias, will furnish a very pure protoxide of antimony, and does not seem liable to any objection. What its effects as a medicine are, I know not; but I am disposed to think that they will be more uniform than those of the more uncertain products, and that therefore the introduction of the formula is a real improvement upon the pharmaceutical treatment of antimony.

Oxidum antimonii cum phosphate calcis. *Ed.*
Oxide of Antimony, with Phosphate of Lime.

Take of

Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, equal weights.

Mix, and put them in a wide red-hot iron pot, and stir the mixture constantly, until it be burnt into a matter of an ash-grey colour, which is then to be removed from the fire,

ground into powder, and put into a coated crucible. Lute to this crucible another inverted over it, and perforated in the bottom with a small hole, and apply the fire, which is to be raised gradually to a white heat, and kept in that increased state for two hours. Lastly, grind the matter, when cold, into a very fine powder.

PULVIS ANTIMONIALIS. *Dub.*
Antimonial Powder.

Take of
Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, of each two pounds.

Boil the hartshorn in a sufficient quantity of water, to separate the animal jelly. Then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot, heated to redness, stirring continually until the sulphureous vapour cease, and the mass acquire an ash-grey colour. When cold, reduce it to powder, and put it into a luted crucible. Invert another crucible, having a small hole in its bottom, over this, and lute them accurately together. Roast the powder for two hours, with a heat gradually increased to whiteness, and, when cold, grind it to a very fine powder.

Lond.

Take of
Sulphuret of antimony in powder, one pound;
Horn-shavings, two pounds.

Mix, and throw them into a wide iron pot, heated to whiteness, stirring them assiduously until they become of an ash-grey colour. Take them out and powder them. Put the powder into a coated crucible, to which another crucible, having a small hole in its bottom, and inverted over it, is luted. Then apply heat, and gradually increase it, until it be kept white for two hours. Triturate the residuum into very fine powder.

THIS is supposed to be nearly the same with the celebrated nostrum of Dr James, the composition of which was ascertained by Dr George Pearson, to whom we are also indebted for the above formula.

By burning sulphuret of antimony and shavings of hartshorn in a white heat, the sulphur is entirely expelled, and the antimony is oxidized, while the gelatine of the hartshorn is destroyed, and nothing is left but phosphate of lime, combined with a little lime. Therefore, the mass which results is a mixture of oxide of antimony and phosphate of lime, which

corresponds, at least as to the nature of the ingredients, with James's powder, which, by Dr Pearson's analysis, was found to consist of 43 phosphate of lime, and 57 oxide of antimony. M. Pulley also analysed some James's powder, and found it composed of protoxide of antimony 37, phosphate of lime 21, sulphate of potass 24, and potass combined with protoxide of antimony 18. On which occasion, M. Cadet, ignorant that even quack-medicines were often imitated and adulterated, accuses Dr Pearson of having sanctioned with his name a false analysis, in order to conceal a secret so profitable to his country! Mr Chenevix, by considering the uncertainty of the application, and the precarious nature of the agency of fire, by which means a variable portion of the oxide of antimony may be volatilized, and that which remains may be oxidized in various degrees, proposes to prepare a substitute for James's powder by dissolving together equal weights of submuriate of antimony, and of phosphate of lime, in the smallest possible quantity of muriatic acid, and then pouring this solution gradually into water sufficiently alkalized with ammonia. As muriate of antimony is partially decomposed by water, it is absolutely necessary that the muriatic solution be poured into the alkaline liquor, for, by an opposite mode of procedure, a great part of the antimony would be precipitated in the state of submuriate, and the first portion of the precipitate would consist chiefly of antimony, and the last of phosphate of lime.

Phosphate of lime is most conveniently obtained pure by dissolving calcined bone in muriatic acid, and precipitating it by ammonia. If the ammonia be quite free from carbonic acid, no muriate of lime is decomposed. Mr Chenevix also found, that his precipitate is entirely soluble in every acid which can dissolve either phosphate of lime or oxide of antimony separately, and that about 0.28 of James's powder, and, at an average, 0.44 of the pulvis antimonialis of the late London Pharmacopœia, resist the action of every acid.

In the new edition, twice the proportion of hartshorn shavings is used, which is said to obviate the inconvenience of the vitrification of part of the antimony when too high a temperature was applied, to render the process more manageable, and to furnish a whiter product, but it does not correspond with Dr Pearson's analysis of James's powder, for which it was intended as a substitute, and alters materially the strength of an established preparation.

Medical use.—The oxide of antimony with phosphate of lime, howsoever prepared, is one of the best antimonials we

possess. It is given as a diaphoretic in febrile diseases, in doses of from three to eight grains, repeated every third or fourth hour. In larger quantities, it operates as a purgative or emetic. From its being insoluble in water, it must be given either in the form of a powder, or made into a pill or bolus.

TARTRIS ANTIMONII, olim TARTARUS EMETICUS. *Ed.*
Tartrite of Antimony, formerly *Tartar-Emetic.*

Take of
Oxide of antimony with sulphur by nitrate of potass, three parts;
Supertartrate of potass, four parts;
Distilled water, thirty-two parts.
Boil in a glass vessel for a quarter of an hour, strain through paper, and set aside the filtered liquor to crystallize.

ANTIMONIUM TARTARIZATUM. *Lond.*
Tartarized Antimony.

Take of
Sulphuret of antimony in powder, two ounces;
Nitrate of potass, one ounce;
Supertartrate of potass, two ounces;
Sulphuric acid, two ounces by weight;
Distilled water, a pint and a half.
Mix the acid with the water (half a pint, Dr Powell) in a proper glass vessel, and heat them in a sand-bath. When they have become moderately heated, gradually add the sulphuret and nitrate mixed; then filter, and boil to dryness. Wash the residuum with distilled water until it be free from taste, and while still wet mix it with the supertartrate of potass, and throw it into a pint of distilled water; then boil down the solution, and set it aside to crystallize.

TARTARUM ANTIMONIATUM SIVE EMETICUM. *Dub.*
Antimoniated or Emetic Tartar.

Take of
Nitromuriatic oxide of antimony, two ounces;
Crystals of tartar, in very fine powder, two ounces and a half.
Distilled water, eighteen ounces by measure.
Boil the water in a glass vessel, then gradually throw into it the oxide and tartar, previously mixed, and boil for half an hour; then filter the liquor through paper, and crystallize by slow cooling.

The tartaric acid is capable of combining, in many examples, with two bases at the same time, forming with them triple crystallizable salts. In the present instance, it is combined with oxide of antimony and potass; and as the potass is essential to its constitution, and the real tartrate of antimony is a different salt, its name, on chemical principles, should certainly have been Tartrate of Antimony and Potass.

In the preparation of this salt, the different combinations of protoxide of antimony have been employed. Any of them will afford a very pure salt. The crocus, precipitated oxide, submuriate and glass, are all occasionally employed. The Edinburgh college uses the crocus. To this the principal objection is, that it is never found in the shops in a state fit for this purpose. Even when properly prepared, it is with difficulty acted upon by the supertartrate of potass, unless it be levigated and elutriated. Mr Phillips found, that 100 parts of cream of tartar dissolved only 6 parts out of 100 of very finely powdered crocus, 16 when levigated, but 75 when it was elutriated; and in the last case, the liquor assumed a deep green colour, which, though proceeding from the presence of iron, is a test that a sufficient proportion of the metallic oxide is dissolved, as it does not occur until the tartar has taken up three-fourths of its weight of the crocus. But, besides the expence of levigating and elutriating the crocus, it is liable to be mixed with carbonate of lime, derived probably from the stones employed in the levigation; and the crystals of tartarized antimony procured in this way, are consequently contaminated even with a larger proportion of tartrate of lime than is furnished by the tartar. The glass is more easily soluble than the crocus, as, when finely powdered, 78 parts were dissolved, and gave the solution a dark green colour. But this oxide is very expensive, and glass of lead is sometimes fraudulently substituted for it. When the glass or crocus is used, Mr Phillips recommends, that after being powdered or levigated, they should be boiled in dilute sulphuric acid to remove any carbonate of lime, and that a small quantity of sulphuric acid should be added to decompose the tartrate of lime. To the oxide of antimony, as prescribed by the London college 1809, Mr Phillips objected its great expence, its quantity being too small in proportion to the tartar, and that the crystals of tartar-emetic formed with it, as well as with the crocus or glass, are contaminated with the tartrate of lime usually contained in the tartar. To the use of the submuriate, as directed by the Dublin college, this last objection does not apply, because the muriatic acid retains the tartrate of lime

in solution when the tartrate of antimony crystallizes. Having criticized the processes of all the colleges, Mr Phillips proposed to substitute one of his own. The qualities requisite in an eligible method of preparing tartar-emetic, he says, are, the certainty of obtaining protoxide of antimony unmixed with peroxide or sulphuretted oxide, yet not absolutely pure, but mixed with a substance capable of preventing the crystallization of the tartrate of lime; moderate expence, and the possibility of using iron vessels, both in preparing the oxide of antimony and the tartarized antimony. These requisites, Mr Phillips thinks, he has found in employing the sulphate of antimony prepared by boiling powdered metallic antimony in twice its weight of sulphuric acid to dryness in an iron vessel over a common fire, and stirring it with an iron spatula. The greyish coloured product was thrown into water, and washed, till the uncombined sulphuric acid was removed. 100 parts of the subsulphate thus procured were boiled in a solution of an equal weight of tartar; about 76 parts of the subsulphate were readily dissolved, and the solution, when filtered, afforded at the first crystallization rather more than 90 parts of crystals of tartarized antimony, perfectly white and unmixed with any extraneous salt. The solution, by further evaporation, furnished an additional quantity of crystals of emetic tartar, slightly incrusted with sulphate of lime, from which, however, they were completely purified by solution, and repeating the crystallization. A considerable quantity of sulphate of lime was also deposited and separated during the evaporation. This process Mr Phillips asserts to be neither tedious, difficult, uncertain nor unsafe. The process adopted in the present edition of the London Pharmacopœia is of the same nature, depending upon the formation of a sulphate of antimony, although in a more complicated way. I have not repeated it, but Dr Powell tells us that the new formula, which "has, after numerous trials, been adopted, is due to Mr Hume of Long-Acre, to whose practical skill it is right to acknowledge great obligation. It is necessary that the whole of the supertartrate of potass should be combined with the oxide, and therefore that there should be a full sufficiency of the latter, otherwise the first crystals, as it cools, will be of the supertartrate only; whilst, on the other hand, if a superabundance of oxide of antimony be used, it will remain upon the filter, and not influence the crystals: the former inconvenience, therefore, is especially, to be avoided, and for that purpose, more oxide than may be strictly neces-

sary is directed. The evaporation must not be carried too far, as there appears to be some tartrate of potass in the solution, whose crystals will, in that case, be mixed with the triple salt. The crystals ought always to be formed, for it is only when they are that the proportions of the salt can be considered as precise." But whatever form of protoxide of antimony may be preferred, the quantity of water employed must be sufficient to dissolve the tartar-emetic formed. The time during which the ebullition is to be continued, is stated differently by different pharmaceutists. No harm can arise from continuing it longer than is absolutely necessary; but it is certainly a waste of time and fuel to protract it for hours.

Another circumstance which renders tartar-emetic variable in its effects, is, the mode of crystallization. Some evaporate it to dryness; others to a pellicle, and set it aside to crystallize; and others again crystallize by slow evaporation. On account of the silica which is combined with the oxide of antimony, and which, being held in solution by the potass, impedes the crystallization, and varies the nature of the product, Vauquelin recommends that the solution be first evaporated to dryness, and that the saline mass obtained should be redissolved in boiling water, and then crystallized; for, towards the end of the first evaporation, the silica separates, and becomes totally insoluble. In this way, he says, that we obtain both a purer salt, and in larger quantity. If we employ an excess of supertartrate of potass, part of it will remain undecomposed, and will crystallize before, or along with the tartar-emetic. This source of impurity is easily avoided, by using an excess of the antimonial oxide, which remaining undissolved, occasions no error, and prevents the necessity of throwing away the crystals which form on the filtering paper, if the solution be saturated.

The primitive form of the crystals of tartrate of antimony and potass seems to be the regular tetrahedron, but it assumes a variety of secondary forms. It has a styptic metallic taste. It is soluble in three times its weight of water at 212°, and in fifteen at 60°. As this statement of its solubility is very different from that of most writers, from Bergman to Fourcroy, who say that it requires 80 parts of water at 60°, and somewhat less than 40 of boiling water, it is necessary to mention, that it was ascertained by careful experiment, with very fine crystals of tartar-emetic, more than half an inch in length, and perfectly free from the admixture of any foreign salt. The crystals, by exposure to the air, become white and opaque, but do not readily fall to powder. The property of

deliquescing, ascribed to them by Göttling, must have arisen from the presence of other salts, as he does not prepare his tartar-emetic by crystallization, but by evaporating the solution to dryness. The solution of tartar-emetic slightly reddens tincture of turnsole. It is decomposed by acids, alkalies, alkaline carbonates, sulphuretted hydrogen and its compounds, vegetable juices, decoctions, and infusions, and many of the metals.

According to Thenard, tartar-emetic consists of tartrate of antimony 54, tartrate of potass 34, water 8, and loss 4; or, oxide of antimony 38, tartaric acid 34, potass 16, water and loss 12; and by estimation from the analysis of tartrate of potass, and supertartrate of potass, by the same chemist, it appears, that to saturate 38 parts of protoxide of antimony, 70.4 of supertartrate of potass are necessary: the whole of the superfluous acid, being 16, combines with the oxide, while 34 of the tartrate of potass combine with the tartrate of antimony thus formed, and 20.4 of tartrate of potass remain in solution in the mother water. But Mr Phillips found, that 100 parts of supertartrate of potass dissolve 70 of protoxide of antimony, which makes me distrust Thenard's estimates.

From what has been said, it will appear, that without any fraudulent intention, tartar-emetic is often imperfect. Its goodness should be ascertained by taking a few crystals promiscuously from every fresh parcel, washing them in water, and then introducing each crystal separately into dilute solutions of sulphuret of potass, when, if the salt be perfect, a considerable orange precipitate will occur in each. But tartar-emetic is more commonly sold in the form of powder, to conceal its imperfections; this ought to be examined in the same way as the crystals; but as it may consist of a mixture of tartarized antimony and tartar, it ought to be rejected, if, in attempting to prepare with it the *liquor antimonii tartarizati*, it do not readily and totally dissolve in the water, and form a perfectly clear solution, previous to and after the addition of the wine.

I have been thus particular in the account of the preparation and chemical properties of tartar-emetic, because it is not only of all the preparations of antimony the most certain in its operation, but is almost indispensable for the successful practice of medicine.

Medical use.—In doses of from one to three grains it operates as an emetic, and sometimes as a cathartic. In smaller doses, it excites nausea, and proves a powerful diaphoretic and expectorant. As an emetic, it is chiefly given in the beginning of fevers and febrile diseases, in chincough, and, in

general, whenever we wish to evacuate the stomach quickly. When great debility is present, and in the advanced stages of typhoid fever, its use is improper, and even sometimes fatal. As a diaphoretic, it is given in small doses, of from an eighth to a quarter of a grain; and as an expectorant, in doses still smaller.

The only proper form for exhibiting it is in solution; and as the intensity of its action on the body is liable to variation, from differences in its own strength, and in the constitution of the patient, it should almost always be given in divided doses, at short intervals, if we wish to excite vomiting; and at longer intervals, if we wish it to act only on the skin or lungs.

VINUM TARTRITIS ANTIMONII, olim VINUM ANTIMONIALE. *Ed.*
Wine of Tartrite of Antimony, formerly *Antimonial Wine.*
Take of
Tartrite of antimony, twenty-four grains;
Spanish white wine, one pound.
Mix them, so that the tartrite of antimony may be dissolved.

LIQUOR ANTIMONII TARTARIZATI. *Lond.*
Solution of Tartarized Antimony.
Take of
Tartarized antimony, one scruple;
Boiling distilled water, four fluidounces;
Wine, six fluidounces.
Dissolve the tartarized antimony in the boiling distilled water, then add the wine.

FORMERLY antimonial wine was a fortuitous preparation, by steeping glass of antimony in white wine; a portion of the glass of antimony was dissolved by the supertartrate of potass contained in the wine; and as the quantity of this is variable, so also the quantity of oxide of antimony dissolved varied: and, therefore, the preparation is with propriety entirely rejected, since its strength could never be known. It was also formerly to be regretted, that the strength of the solutions of tartar-emetic in wine, as prescribed by the different colleges, was not uniform. According to the Edinburgh college, one ounce contained two grains of tartar-emetic, while, according to the London, it contained four grains. Both now contain two grains.

In its employment and effects, the vinous solution of tartar-emetic does not differ from one made with water.

Chap. VI.—SILVER.

Nitras argenti. *Ed.*
Nitrate of Silver.

Take of
Purest silver, flatted into plates, and cut in pieces, four ounces;
Diluted nitrous acid, eight ounces;
Distilled water, four ounces.
Dissolve the silver in a matrass with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and place it on the fire, which should at first be gentle, and afterwards increased by degrees till the mass flows like oil; then pour it into iron pipes, previously heated and anointed with tallow. Lastly, keep it in a glass vessel very well corked.

Dub.

Take of
Silver, flatted into plates, and cut in pieces,
Nitrous acid, of each one ounce by weight;
Distilled water, two ounces, by measure.
Put the silver in a glass phial, placed in a sand-bath, and pour on the acid, previously diluted with the water; then, gradually increasing the heat, dissolve the metal, and evaporate the liquor to dryness. Liquefy the mass which remains, in a crucible over a slow fire. Pour it into proper moulds, and keep it in a glass vessel well corked.

Lond.

Take of
Silver, one ounce;
Nitric acid, one fluidounce.
Distilled water, two fluidounces.
Mix the nitric acid with the water, and dissolve the silver in the mixture in a sand-bath. Then gradually increase the heat, to dry the nitrate of silver. Melt this in a crucible with a gentle fire, until the water being expelled it cease to boil; then immediately pour it out into proper moulds.

The acid employed must be very pure. If it contain, as the acid of commerce always does, sulphuric or muriatic acid, these re-act upon the nitrate as soon as it is formed, and a

white precipitate, consisting of sulphate and muriate of silver, falls to the bottom.

The method which the refiners employ for examining the purity of their aquafortis (the name they give to dilute nitrous acid), and purifying it, if necessary, is to let fall into it a few drops of a solution of nitrate of silver already made; if the liquor remain clear, it is fit for use: otherwise, they add a small quantity more of the solution, which immediately turns the whole of a milky white colour; the mixture being then suffered to rest for some time, deposites a white sediment, from which it is cautiously decanted, examined again, and, if necessary, farther purified by a fresh addition of this solution.

Mr Phillips objected to the London process 1809, that there was an unnecessary waste of nitric acid, as one fluidounce and a half was sufficient to dissolve about 1023 grains, instead of 480. It has accordingly been reduced to an ounce.

It is necessary to employ very pure water in this process, for the muriates and earthy salts which common water generally contain, precipitate part of the silver in the state of a muriate or oxide. If distilled water be not used, the water should be added to the acid before it be tried, and purified by the nitrate of silver.

The solution will go on the more speedily, if the silver, flatted into thin plates, be rolled loosely up, so that the several surfaces do not touch each other. By this management, a greater extent of the surface is exposed to the action of the menstruum, than when the plates are cut in pieces and laid above each other. If the silver be alloyed with copper, the solution will have a permanent greenish-blue colour, and acquire a bright blue on the addition of ammonia. If it contain gold, the gold is not dissolved, but is found at the bottom of the solution, in the form of a black or deep purple powder.

The crucible ought to be of porcelain; as, with the common crucibles, the loss arising from the nitrate of silver sinking into their substance is too great. It ought also to be large enough to hold five or six times the quantity of the dry matter; for it bubbles and swells up greatly, so as to be apt to run over. During the evaporation also, little drops are now and then spirted up, whose causticity is increased by their heat, against which the operator ought therefore to be on his guard. The fire must be kept moderate till this ebullition ceases, and till the matter becomes consistent in the heat that made it boil before: the fire is then to be quickly increased, till the matter flows thin at the bottom like oil, on

which it is to be immediately poured into the mould; for if the heat be continued after this, the nitrate of silver begins to be decomposed, and the silver is reduced.

The mould should be of iron, or one may be formed in a mass of tempered tobacco pipe clay, not too moist, by making, with a smooth stick, previously greased, a sufficient number of holes. Each piece is to be wiped clean from the grease, and wrapt up in soft dry paper, not only to keep the air from acting upon them, but likewise to prevent their corroding or discolouring the fingers in handling.

Nitrate of silver is crystallizable. Its crystals are brilliant plates, having a variable number of sides. Their taste is austere, and intensely bitter. They are very soluble in water, but permanent in the air and not deliquescent. They are decomposed by heat, light, phosphorus, charcoal, many metals, all the alkalies and earths, sulphuric, muriatic, phosphoric, and fluoric acids, and by the salts they form. When deprived of water, and melted according to the directions of the colleges, nitrate of silver forms a black or dark grey coloured mass, hard, sonorous, and consisting of radii, diverging from the centre. It is not deliquescent when free from copper, which is seldom the case. It may, however, be prepared perfectly pure, even from a solution containing copper, by evaporating and crystallizing it as long as it furnishes firm tabular crystals. These are then to be washed with a little distilled water, and melted with a gentle heat. The nitrate of copper remains in the mother water, from which the silver it conains may be precipitateed by muriatic acid.

Medical use.—A strong solution of nitrate of silver corrodes and decomposes animal substances: in a more diluted state, it stains them of an indelible black; and, for this purpose, it is now used as an indelible marking ink. The fused nitrate of silver is the strongest and most manageable caustic we possess, and is employed to remove fungous excrescences, callous edges, warts, strictures in the urethra, and the like. It is also used to destroy the venereal poison in chancres, before it has acted on the system. A weak solution of it may be applied, as a stimulus, to indolent ulcers, or injected into fistulous sores.

Notwithstanding its causticity, it has been given internally. Boërhaave, Boyle, and others, commend it highly in hydropic cases. The former assures us, that, made into pills with crumb of bread and a little sugar, and taken on an empty stomach (some warm water, sweetened with honey, being drank immediately after), it purges gently, without griping,

and brings away a large quantity of water, almost without the patient's perceiving it: that it kills worms, and cures inveterate ulcerous disorders. He, nevertheless, cautions against using it too frequently, or in too large a dose; and observes, that it always proves corrosive and weakening to the stomach.

It has been more recently employed, and with success, in epilepsy and angina pectoris. On account of its very great activity, each pill should not contain above one-eighth or one-fourth of a grain.

Chap. VII.—Arsenic.

Arsenici oxydum sublimatum. *Lond.*
Sublimed Oxyde of Arsenic.

Reduce oxyde of arsenic to powder; then put it into a crucible; expose it to the fire, and sublime it into another crucible inverted over the first.

The white oxide of arsenic of commerce is obtained as an insignificant product in roasting cobalt ores, and is therefore often impure. By sublimation, however, it is easily separated from foreign matters, but the operator must be very careful to avoid the fumes which arise during the process.

Liquor arsenicalis. *Lond.*
Arsenical Solution.

Take of
Sublimed oxyde of arsenic, in very fine powder;
Subcarbonate of potass from tartar, of each sixty-four grains,
Distilled water, a pint.
Boil together in a glass vessel, until the arsenic be entirely dissolved. Add to the solution, when cold,
Compound spirit of lavender, four fluidrachms.
Lastly, add as much distilled water as will make the whole amount exactly to a pint.

Arsenias kali. *Dub.*
Arseniate of Kali.

Take of
White oxyde of arsenic,

Nitrate of kali, of each one ounce.

Reduce them separately to powder; and, after mixing them, introduce them into a glass retort, placed in a sand-bath, which is to be gradually heated, until the bottom of the retort become obscurely red. It is expedient to transmit the vapours issuing from the retort, by means of a proper apparatus through distilled water, that the nitrous acid extricated by the heat may be condensed. Dissolve the residuum in four pounds of boiling distilled water; and, after due evaporation, set it aside to crystallize.

The preparation of the London college is a solution of arsenite of potass, and corresponds with Dr Fowler's tasteless ague-drop. The spirit of lavender is added merely to prevent its being mistaken for water, an accident which might happen from its want of colour and taste. It may also preserve it from decomposition, as stated by Mr Hume. Now that arsenic is so much used, it is useful to have an officinal solution of an uniform strength. Dr Powell has justly observed, that "where the dose is small, and the effects so powerful, the most minute attention to its proportion and preparation become necessary;" a drachm of the solution contains one-half of a grain, and it will seldom be necessary to give above ten minims for a dose.

The Dublin preparation is crystallized arseniate of potass. On the application of the heat, the nitric acid of the nitre is decomposed, the oxygen combines with the oxide of arsenic, and converts it into arsenic acid, which unites with the potass, and nitrous gas and red nitrous acid escape. I should not think the latter of sufficient importance to be condensed, as directed by the Dublin college; especially when we consider the possibility of its being contaminated by arsenic, unless, perhaps, according to the latter supposition, it be intended to preserve the operator from the noxious fumes.

Chap. VIII.—COPPER.

Ærugo præparata. *Dub.*
Prepared Verdegris.

Let the verdegris be ground to powder, and the minute particles be separated in the manner directed for the preparation of chalk.

The intention of this process is merely to obtain the subacetate of copper in the state of the most minute mechanical division.

Solutio sulphatis cupri composita, olim Aqua styptica. *Ed.*

Compound Solution of Sulphate of Copper, formerly *Styptic Water.*

Take of
Sulphate of copper,
Sulphate of alumina, each three ounces;
Water, two pounds;
Sulphuric acid, an ounce and a half;
Boil the sulphates in the water, to dissolve them, and then add the acid to the liquor filtered through paper.

In this preparation, the substances dissolved in the water exert no chemical action on each other, and the composition was probably contrived, from the false idea, that the sum of the powers of substances having similar virtues, was increased by mixing them with each other.

Medical use.—It is chiefly used as a styptic for stopping bleedings at the nose; and, for this purpose, cloths, or dossils, steeped in the liquor, are to be applied to the part.

Ammoniaretum cupri, olim Cuprum ammoniacum. *Ed.*

Ammoniaret of Copper, formerly *Ammoniacal Copper.*

Take of
Pure sulphate of copper, two parts;
Carbonate of ammonia, three parts;
Rub them carefully together in a glass mortar, until, after the effervescence has entirely ceased, they unite into a violet-coloured mass, which must be wrapped up in blotting paper, and first dried on a chalk-stone, and afterwards by a gentle heat. The product must be kept in a glass phial, well corked.

Cuprum ammoniatum. *Dub.*

Ammoniated Copper.

Take of
Sulphate of copper, one ounce;
Carbonate of ammonia, an ounce and a half;
Triturate them in an earthen-ware mortar, until, after the effervescence has entirely ceased, they unite into a mass, which is to be wrapped up in bibulous paper, dried, and kept in a phial, closed with a glass-stopper.

Lond.

Take of
Sulphate of copper, half an ounce;
Subcarbonate of ammonia, six drachms.
Rub them together in a glass mortar, until the effervescence cease; then dry the ammoniated copper, wrapped up in blotting paper, with a gentle heat.

It may seem strange, that particular directions should be given concerning the manner of drying a mixture, which is prepared by rubbing two dry substances together. But such a phenomenon is by no means uncommon, and arises from the quantity of water of crystallization contained in the ingredients being greater than what is required in the new compound formed: As soon, therefore, as the ingredients begin to act upon each other, a quantity of water is set at liberty, which renders the mass moist.

The nature of this compound, and consequently the name which should be given it, are not yet sufficiently ascertained. Prepared according to the directions of the colleges, it evidently contains oxide of copper, ammonia, and sulphuric acid. If these substances be chemically combined, it should be denominated the Sulphate or Subsulphate of copper and ammonia. By exposure to the air during its exsiccation, and by keeping, it is apt to lose its blue colour entirely, and become green, and is probably converted into carbonate of copper. It should therefore be prepared in small quantities at a time.

Medical use.—Ammoniaret of copper has been strongly recommended in epilepsy; but, from its good effects sometimes ceasing after it has been used for some time, a want of success, in some cases, and the disagreeable consequences with which its use is sometimes attended, it has not lately been much prescribed. In my practice, however, its success has been almost uniform and often astonishing. It is employed by beginning with doses of half a grain twice a-day, and increasing them gradually to as much as the stomach will bear. Dr Cullen sometimes increased the dose to five grains.

AQUA CUPRI AMMONIATI. *Dub.*
Water of Ammoniated Copper.

Take of
Lime-water, eight ounces, by measure;
Muriate of ammonia, two scruples;
Verdegris prepared, four grains.
Mix and digest them for twenty-four hours, then pour off the pure liquor.

LIQUOR CUPRI AMMONIATI. *Lond.*
Solution of Ammoniated Copper.

Take of
Ammoniated copper, one drachm;
Distilled water, one pint.
Dissolve the ammoniated copper in the water, and filter through paper.

IN the Dublin preparation, the lime-water decomposes the muriate of ammonia, and forms muriate of lime; while the ammonia disengaged, immediately reacts upon the oxide of copper contained in the verdigris, and renders it soluble. The mode of preparing this solution, now adopted by the London college, has the great merit of simplicity; but, unfortunately, from the large quantity of water employed, one half of the ammoniaret of copper is decomposed, and the oxide is precipitated. Mr Phillips found, that one-fourth of the water used, or even less, was sufficient for the solution of the ammoniaret.

Medical use.—The solution is applied externally for cleaning foul ulcers, and disposing them to heal. It has been recommended also for taking off specks and films from the eyes; but, when used with this intention, it ought to be diluted with some pure water, as in the degree of strength in which it is here ordered, it irritates and inflames the eyes considerably. It is the readiest, and perhaps the most delicate, test of arsenic, by which its blue colour is converted into green.

CHAP. IX.—IRON.

LIMATURA FERRI PURIFICATA. *Ed.*
Purified Filings of Iron.

Place a sieve over the filings, and apply a magnet, so that the filings may be attracted upwards through the sieve.

THIS process does not fulfil the purpose for which it is intended; for the adhesion of a very small particle of iron renders brass and other metals attractable by the magnet. The filings of iron got from the shops of different artificers, which are always mixed with solder, and other metals, cannot be purified in this way, so as to render them fit for internal use; and, indeed, the only way they can be obtained sufficiently pure, is by filing a piece of pure iron with a clean file.

OXIDUM FERRI NIGRUM PURIFICATUM, olim SQUAMÆ FERRI PURIFICATÆ. *Ed.*

Purified Black Oxide of Iron, formerly *Purified Scales of Iron.*

Let the scales of the oxide of iron, which are to be found at the foot of the blacksmith's anvil, be purified by the application of a magnet; for the magnet will attract the smaller and purer scales, and will leave those which are larger and less pure.

OXYDUM FERRI NIGRUM. *Dub.*

Black Oxide of Iron.

Separate the scales of oxide of iron, gathered at a blacksmith's forge, from impurities, by applying the magnet. Then reduce them to powder, of which the finest particles are to be collected in the manner directed for the preparation of chalk.

HERE the application of the magnet is useful, because these scales contain no foreign metal, but are mixed with earthy and other impurities, which could be separated in no other way. The Prussian Dispensatory direct this oxide to be prepared by moistening the carbonate of iron with olive oil, distilling it to dryness in a retort, and heating it almost to redness. The iron, in this process, is reduced from the state of peroxide to that of protoxide.

CARBONAS FERRI PRÆPARATUS, olim FERRI RUBIGO. *Ed.*

Prepared Carbonate of Iron, formerly *Rust of Iron.*

Moisten purified filings of iron frequently with water, that they may be converted into rust, which is to be ground into an impalpable powder.

Dub.

Take of

Iron-wire, any quantity.

Cut it into pieces, which are to be moistened frequently with water, and exposed to the air until they be corroded into rust. Then triturate them in an iron mortar, and by pouring water upon them, wash over the finest part of the powder which is to be dried.

IRON is one of the most easily oxidized of the metals. By exposure at the same time to air and moisture, it is very quickly oxidized, while it also absorbs carbonic acid, and is converted into a reddish-brown pulverulent substance, well

known by the name of rust of iron. For medical use it is prepared as the other substances insoluble in water.

Carbonas ferri præcipitatus. *Ed.*
Carbonas ferri. *Dub.*
Precipitated Carbonate of Iron.

Take of
Sulphate of iron, four ounces;
Carbonate of soda, five ounces;
Water, ten pints.

Dissolve the sulphate in the water, and add the carbonate of soda previously dissolved in a sufficient quantity of water, and mix them thoroughly.

Wash the precipitated carbonate of iron with warm water, and afterwards dry it.

Ferri subcarbonas. *Lond.*
Subcarbonate of Iron.

Take of
Sulphate of iron, eight ounces;
Subcarbonate of soda, six ounces;
Boiling water, a gallon.

Dissolve the sulphate of iron and subcarbonate of soda separately, each in four pints of the water; then mix the solutions, and set aside until the precipitate subside; then having poured off the supernatant liquor, wash the subcarbonate of iron with warm water, and dry it wrapped up in bibulous paper, with a gentle heat.

On mixing the solutions of these salts together, there is an immediate mutual decomposition. Sulphate of soda is formed, which remains in solution, and carbonate of iron, which is precipitated of a green colour. The precipitate, when first formed, is the carbonate of black oxide of iron, or contains the iron in the state of protoxide, the state in which it exists in the green sulphate of iron; but in the process of drying, it absorbs more oxygen, becomes of a red colour, and part of it is converted into red oxide of iron. As the precipitate is extremely light and bulky, it is not easily separated by allowing it to subside, and pouring off the clear liquor; filtration should therefore be employed. The carbonate of soda is used in preference to the carbonate of potass, on account of the greater solubility of sulphate of soda than of sulphate of potass, which renders the subsequent ablution of the salt more easy.

Mr Phillips found very great differences in the results, from very slight differences in conducting the process, as appears from the following table, to which is added the results when subcarbonate of potass was employed instead of subcarbonate of soda.

Precipitated in	Washed in	Dried by	Carb. acid *per cent.*	Subcarbonate of Soda.	Carb. acid *per cent.*	Subcarbonate of Potass.
Hot w.	Hot w.	steam	14.5	Chocolate br.	7	Orange br
.....	.....	the air.	14.5	Yellowish br.		
.....	Cold w.	steam.	1.5	Orange br.	2	Brick red
Cold w	Hot w.	.....	8.0	Purplish br.		
.....	Cold w.	.....	1.0	Reddish br.		
.....	.....	the air.	none	Ochre yel.		
Water kept near 212° for an hour.		steam.	1.3	Blackish br.	3	Orange br.

These differences indicate the precipitates to be mixtures of peroxide, protoxide, and subcarbonate of protoxide of iron, in various proportions. The peroxide is deep red or yellow, as the oxygen is quickly or slowly absorbed; the protoxide is black, and its carbonate brown. When cold water only is used in this process, carbonate of iron remains in the solution, from which the oxide has been precipitated; when hot water is used, part of the carbonic acid is expelled, the subcarbonate is precipitated mixed with oxide; but when heat is long applied, the subcarbonate itself is decomposed, and the precipitate is chiefly oxide. Mr Phillips concludes, that it is more economical to use hot water in every part of the process, and to use potass instead of soda in the preparation.

Medical use.—The carbonate of iron is an excellent and safe chalybeate. It may be given in doses of from five grains to sixty; but all chalybeates answer better in small doses, frequently repeated, than in large doses.

Sulphas ferri. *Ed.*
Sulphate of Iron.

Take of
Purified filings of iron, six ounces;
Sulphuric acid, eight ounces;
Water, two pounds and a half.

Mix them, and after the effervescence ceases, digest the mixture for some time upon warm sand; then strain the decanted liquor through paper, and, after due evaporation, set it aside to crystallize.

Dub.

Take of
Iron-wire, two ounces;
Sulphuric acid, three ounces and a half, by weight;
Water, one pint.

Mix the acid by degrees with the water, in a glass vessel, and gradually add the iron-wire, cut into pieces: digest the mixture till the metal be dissolved, and strain the liquor through paper. Lastly, set aside the liquor, after due evaporation, to crystallize by slow refrigeration.

Lond.

Take of
Iron,
Sulphuric acid, each eight ounces;
Water, four pints.

Mix the sulphuric acid with the water in a glass vessel, and add the iron; when the effervescence has ceased, strain the solution through paper, and after due evaporation set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

Sulphate of iron cannot be procured perfectly pure, except by the direct union of sulphuric acid and iron; and as it is of consequence that it should be pure when administered internally, directions for its preparation have been given by all the colleges. The difference which may be observed in the proportions of the materials employed, is of little consequence, as sulphuric acid and iron unite only in one proportion.

Iron scarcely acts upon sulphuric acid, unless assisted by heat. It then becomes oxidized, by abstracting oxygen from a portion of the acid, and converting it into sulphureous acid gas or sulphur, and combines with the remainder of the acid. But it acts with great rapidity on diluted sulphuric acid; in which case it is not oxidized at the expence of the acid itself, but by decomposing the water, and therefore the hydrogen of the water is separated in the form of gas. The action of the acid and iron upon each other often ceases before the acid is nearly saturated, and may be renewed by the addition of a little water. The reason is, that all the water which was not decomposed, is employed to dissolve the sulphate of iron formed.

The properties and uses of sulphate of iron have been already mentioned.

SULPHAS FERRI EXSICCATUS. *Ed.*
Dried Sulphate of Iron.

Take of
Sulphate of iron, any quantity.
Expose it to the action of a moderate heat in an unglazed earthen vessel, until it become white and perfectly dry.

SULPHAS FERRI EXSICCATUM. *Dub.*
Dried Sulphate of Iron.

Take of
Sulphate of iron, any quantity.
Let it whiten by exposing it in an unglazed earthen vessel, to a high temperature (200° to 212° Fahr.)

THE heat applied here must not be so great as to decompose the sulphate of iron, but only to deprive it of its water of crystallization.

OXIDUM FERRI RUBRUM. *Ed.*
Red Oxide of Iron.

Expose dried sulphate of iron to an intense heat, until it is converted into a very red substance.

Dub.

Roast with an intense heat dried sulphate of iron until it become very red. Then wash it, until, according to the test of litmus, the water decanted from it be free of acid; lastly, dry it on blotting paper.

BY the violent heat applied in this preparation, the sulphate of iron is completely decomposed, and copious white fumes are expelled. The iron is converted into the red oxide; part of the sulphuric acid is therefore reduced to the state of sulphureous acid, and the rest of the acid is expelled in a very concentrated state. This process was formerly employed in this country, and still is in Germany, for the preparation of sulphuric acid; which, however, from the presence of the sulphureous acid, is possessed of some peculiar properties, such as emitting fumes and crystallizing.

The residuum is composed of red oxide of iron, combined with a little red sulphate of iron, which renders it deliquescent. To obtain the oxide perfectly pure, the residuum must therefore be washed with water, and dried quickly, to prevent the absorption of carbonic acid.

Tinctura muriatis ferri. *Ed.*
Tincture of Muriate of Iron.

Take of
Purified black oxide of iron in powder, three ounces;
Muriatic acid, about ten ounces, or as much as may be sufficient to dissolve the powder.
Digest by a gentle heat, and after the powder is dissolved, add of alcohol, as much as will make the whole quantity of liquor amount to two pounds and a half.

Dub.

Take of
Carbonate of iron, half a pound;
Muriatic acid, three pounds;
Rectified spirit, three pints.
Pour the muriatic acid on the carbonate of iron in a glass vessel; and shake the mixture occasionally during three days. Then set it by, that the fæces, if any, may subside, and pour off the liquor; evaporate this to one pint slowly, and when cold, add the spirit.

Lond.

Take of
Subcarbonate of iron, half a pound;
Muriatic acid, a pint;
Rectified spirit, three pints.
Pour the acid upon the subcarbonate in a glass vessel, and shake it occasionally for three days. Set it aside, that the dregs, if any, may subside. Pour off the clear liquor, and add to it the spirit.

Tinctura muriatis ferri cum oxydo rubro. *Dub.*
Tincture of Muriate of Iron with the Red Oxide.

Take of
Red oxide of iron, one ounce;
Muriatic acid, four ounces by measure;
Rectified spirit of wine, the requisite quantity.
Digest the oxide with the acid for twenty-four hours, then boil for half an hour. Evaporate the filtered liquor to the thickness of syrup, and when cold, add rectified spirit of wine, with frequent agitation, until the tincture acquire the specific gravity of 1050.

In making this preparation, the colleges use iron in a different state; the Edinburgh, the black oxide; the Dublin,

the red oxide; and the London, the carbonate. Mr Phillips observes, that although the proportions of the London college answer with muriatic acid of specific gravity 1.17, and peroxide of iron, prepared in his method, containing only 3 *per cent.* of carbonic acid, the solution will have acid in excess, when the muriatic acid has only the strength of 1.142, and the carbonate contains 14.5 *per cent.* of carbonic acid, the common state of these substances, as prepared by the directions of the college Muriatic acid is capable of combining either with the black or red oxides of iron, and forms with each, salts, having distinctive properties.

The red muriate of iron is not crystallizable; has a dark orange colour; is deliquescent; forms a brown-red solution, having a very astringent taste; and is soluble in alcohol. The green muriate is crystallizable; has little colour; is very soluble in water, forming a pale green solution; and is insoluble in alcohol. But the aqueous solution of green muriate attracts oxygen so rapidly from the atmosphere, that unless the access of the air be totally excluded, it is always partially converted into red muriate. The solutions of iron, and of its black oxide, are accordingly found always to contain a greater or less proportion of red muriate, and are therefore not uniform or constant in their properties.

"Having prepared this tincture in the proportions of the London Pharmacopœia, with precipitated carbonate of iron, I found," says Dr Perceval," that in some instances, when rectified spirit was mixed with the evaporated muriate, crystals of green muriate of iron deposited, which the spirit did not dissolve. The strength of the tincture was consequently variable. This observation suggested the process of Tinctura muriatis ferri cum oxydo rubro, which is now inserted amongst the præp. extemp. of the Dublin Pharmacopœia. The muriatic solution is of an orange-red, and does not crystallize when spirit is added.

"Instead of evaporating it to a certain weight, which is a troublesome operation, spirit is added so as to bring the liquor to a certain specific gravity, which is the standard of the strength of the medicine."

It is an excellent chalybeate, and may be given in doses of ten or twenty drops twice or thrice a-day, in any proper vehicle.

Murias ammoniæ et ferri. *Ed. Dub.*
Muriate of Ammonia and Iron.

Take of

Red oxide of iron (washed and again dried. *Ed.*)

Muriate of ammonia, equal weights.
Mix them thoroughly, and sublime (with a sudden and sufficiently great degree of heat. *Dub.*)

FERRUM AMMONIATUM. *Lond.*
Ammoniated Iron.

Take of
Subcarbonate of iron;
Muriate of ammonia, of each one pound.
Mix them accurately; and instantly sublime, by the application of a quick fire; lastly, reduce to powder.

ALTHOUGH, at a low temperature, ammonia decomposes the muriate of iron, at a high temperature iron and its oxides decompose muriate of ammonia. But as muriate of ammonia is itself a volatile salt, great part of it escapes undecomposed; so that the product is a mixture of muriate of ammonia with red muriate of iron. According to the formula of all the colleges, the decomposition is effected by simple affinity. As soon as the oxide of iron acts on the muriate of ammonia, the ammonia which is separated comes over: then, as the heat increases, undecomposed muriate of ammonia is sublimed; which, as the process advances, is mixed with an increasing proportion of muriate of iron. In the former process of the London college, the decomposition was more complex; and a considerable quantity of hydrogen gas was produced. But Mr Phillips says, that the carbonate is unfit for the purpose; for in proportion as it contains carbonic acid, carbonate of ammonia is formed, instead of ammoniaret of iron. The colleges employ a much larger quantity of iron than is necessary. According to the German pharmaceutists, if the iron be equal to one-sixteenth of the muriate of ammonia, it is sufficient. The new Prussian Dispensatory directs one ounce of iron to be dissolved in a mixture of two parts of muriatic acid, and one of nitrous acid; this solution of red muriate of iron to be mixed with twelve ounces of muriate of ammonia, and the whole evaporated to dryness; and the dry mass to be sublimed in a wide-necked retort, with a heat increased to redness.

Whatever process be employed, the heat must be applied as quickly as possible; and the sublimed product thoroughly mixed by trituration, and kept in well-stopt glass vessels.—It should have a deep orange colour, and a smell resembling saffron, and should deliquesce in the air.

Medical use.—This preparation is supposed to be highly aperient and attenuating; though no otherwise so than the rest of the chalybeates, or at most only by virtue of the saline

matter joined to the iron. It has been found of service in hysterical and hypochondriacal cases, and in distempers proceeding from a laxity and weakness of the solids, as the rickets. From two or three grains to ten may be conveniently taken in the form of a bolus.

Tinctura ferri ammoniati. *Lond.*
Tincture of Ammoniated Iron.

Take of
Ammoniated iron, four ounces;
Proof-spirit, one pint.
Macerate and strain

This is merely a spiritous solution of the preceding article, and is a much less elegant medicine than the simple tincture of muriate of iron.

Ferrum tartarizatum. *Lond.*
Tartarized Iron.

Take of
Iron, one pound;
Supertartrate of potass, in powder, two pounds;
Water, one pint.
Triturate them together, and expose to the action of the air for eight days in a wide glass vessel; then grind the matter, after being dried in a sand bath, to a very minute powder. Add another pint of water to this powder, and set it aside for eight days; then dry the mass, and powder it again.

Tartarum ferri. *Dub.*
Tartar of Iron.

Take of
Carbonate of iron, half an ounce;
Crystals of tartar, in very fine powder, one ounce;
Distilled water, a pint.
Boil them together in a glass vessel over a slow fire for an hour, and filter the liquor through paper. When cool, and filtered a second time, evaporate it until a pellicle appear on the surface. In cooling, it will form a saline mass, which is to be powdered, and kept in close vessels.

This is in fact a triple tartrate of iron and potass, the excess of acid in the supertartrate of potass being saturated by oxide of iron. In the Dublin process the combination is direct; in that of the London college, the iron is oxidized du-

ring the process, in which it is moistened and exposed to the action of the air.

Mr Phillips has examined this preparation attentively. He says, that as usually prepared it has a light green colour, and is readily attracted by the magnet, unalterable by exposure to the air, and with difficulty soluble in water, and that one-fifth of the iron filings employed remain unaltered, so that it must be considered as merely a mixture of metallic iron with supertartrate of potass, coloured by oxide of iron.

Dr Perceval of Dublin says, that when prepared according to the directions of the Irish college, and the precipitated carbonate was found to answer best, it forms a mass of concreted spicular crystals of an olive colour, which attracts humidity from the air. In solution it destroys the colour of litmus, and its taste is rather sweetish than sour.

To prepare a real tartarized iron, Mr Phillips digests 32 parts of filings of soft iron in 64 parts of tartar, adding water occasionally to the mass during the action of the tartar upon the iron, until it appear by the test of litmus paper that the acid is perfectly saturated. During this process, 15 parts of the iron are dissolved, being converted into nearly 22 parts of peroxide. To this he adds seven times its weight of water, (532 parts), which easily dissolves the tartarized iron by trituration, forming a solution which readily passes through the filter, and contains one-eighth part of its weight of tartarized iron, or nearly 16 grains of oxide in the fluidounce. This solution is of a deep greenish-brown colour, remains for a great length of time without undergoing any change, (except at first the deposition of the tartrate of lime of the tartar.) It is precipitated by alcohol, and decomposed by lime-water, by solutions of potass and soda and their subcarbonates, when heated, but not when cold; nor by ammonia or its subcarbonate, hot or cold. It is not crystallizable, but when dried, is of a dark greenish-brown colour, and attracts moisture from the atmosphere, but does not deliquesce, is exceedingly tenacious, resembling gum, and can scarcely be made to form a perfect solution.

It is evident, that when properly prepared, tartarized iron cannot be exhibited in powder as commonly directed, and the advantage of exhibiting this preparation in solution is, that when the acid is perfectly saturated, the taste of the iron is scarcely perceptible; and hence it can be exhibited with success to persons to whom the common solutions of iron are nauseous. It deserves notice, that when there is acid in excess, the taste of the iron is much more easily detected.

VINUM FERRI. *Lond.*
Wine of Iron.

Take of
Iron-filings, two ounces;
Spanish white wine, two pints.
Mix and set aside for a month, often shaking the vessel, and then filter through paper.

Dub.

Take of
Iron wire, cut in pieces, four ounces;
White Rhenish wine, four pints.
Sprinkle the iron with a bottle of the wine, and expose it to the air until it be covered with rust; then add the rest of the wine; digest for seven days, with occasional agitation, and filter.

THIS is merely a solution of the preceding article in wine; for the iron is only dissolved in the wine by means of the supertartrate of potass it contains. The Rhenish wine directed by the Dublin college will, therefore, dissolve a larger quantity of iron than the Spanish white wine of the London college. A pint of sherry will dissolve only about two grains of carbonate of iron; but if soft iron be used, about twenty-two grains of peroxide according to Mr Phillips. But a solution of a known proportion of the preceding article in wine, will give a medicine of more equal powers, may be made extemporaneously, and is also remarkably permanent.

The dose is from a drachm to half an ounce, repeated twice or thrice a-day in chlorotic cases.

ACETAS FERRI. *Dub.*
Acetate of Iron.

Take of
Carbonate of iron, half an ounce;
Acetic acid, three ounces by measure.
Digest for three days, and strain.

Dr Perceval found, that in experiments made to determine the comparative solubility of iron in its different states in acetic acid, that two drachms of the acid acquired a light amber tinge from ten grains of scales of iron, and left a residuum of $9\frac{1}{2}$; a reddish amber colour from iron-filings, residuum $6\frac{1}{4}$; a light red from the red oxide, residuum $8\frac{3}{4}$; and from the precipitated carbonate a deep claret colour, and the whole was dissolved. Hence the last was preferred for making directly an acetate of iron.

Tinctura acetatis ferri. *Dub.*
Tincture of Acetate of Iron.

Take of
Acetate of kali, two ounces;
Sulphate of iron, one ounce;
Rectified spirit of wine, two pints.

Rub the acetate of kali and sulphate of iron in an earthenware mortar, until they unite into a soft mass; then dry it with a moderate heat, and triturate it, when dried, with the spirit. Digest the mixture in a well-corked phial for seven days, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor.

The acetic acid is capable of combining with both oxides of iron; and as the iron in the sulphate is in the state of black oxide, which has a strong attraction for oxygen, it is probable that the acetate prepared in the way directed is a mixed acetate.

It has an extremely styptic taste, and is given in doses of thirty or forty drops.

Tinctura acetatis ferri cum alcohol. *Dub.*
Tincture of Acetate of Iron with Alcohol.

Take of
Acetate of kali, one ounce;
Sulphate of iron, one ounce;
Alcohol, one pint.

Rub the acetate of kali and sulphate of iron in an earthenware mortar until they unite into a soft mass; dry this with a moderate heat, and triturate it when dried with the alcohol. Digest the mixture in a well-corked phial for twenty-four hours, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor.

Alcohol is incapable of dissolving the green salts of iron, but dissolves the red salts readily. This tincture contains a very pure acetate of iron, more perfectly neutralized than most metallic salts. Its extract is of a beautiful crimson colour, which does not crystallize, but first assumes the consistence of wax, and then dries transparent, an ounce measure affording ten grains. A drachm measure gave gr. $\frac{3}{10}$ of prussiate of iron, by precipitation. Dr Perceval has commented upon this preparation at considerable length. In the London Pharmacopœia 1746, a *Tinctura Saturnina* was extracted from a mixture of acetate of lead and sulphate of iron. This was, in fact, a tincture of acetate of iron contaminated with a little lead. Dr Perceval substituted in his practice a preparation of

Glauber's, by using equal weights of acetate of potass and sulphate of iron. This tincture, if made with rectified spirit, grows turbid by keeping, and deposites an oxide of iron, which does not happen when alcohol, sp. gr. 0.815, is employed. But Mr Watts discovered, that by using two parts of acetate of potass to one of sulphate of iron, a permanent tincture may be extracted by rectified spirit. Both modes of preparation are inserted in the Dublin Pharmacopœia. That with rectified spirit contains acetate of potass as well as of iron, for its extract is whitish, from a predominance of the former. A drachm measure gave gr. $\frac{16}{20}$ of prussiate of iron, by precipitation. Dr R. Perceval says it is an elegant, agreeable, and useful chalybeate preparation, of which a tea-spoonful or two may be conveniently taken in asses milk.

Liquor ferri alkalini. *Lond.*
Solution of Alkaline Iron.

Take of
- Iron, two drachms and a half;
- Nitric acid, two fluidounces;
- Distilled water, six fluidounces;
- Solution of subcarbonate of potass, six fluidounces.

Mix the water and acid, and pour them upon the iron. As soon as the effervescence has ceased, pour off the acid solution; add this gradually, and at intervals, to the solution of subcarbonate of potass, shaking it occasionally. until after having become of a dark red colour, no more effervescence be excited. Lastly, let it stand for six hours, and pour off the solution.

This preparation of iron is so entirely different from all others in its nature, that we think the London college right in introducing it into their Pharmacopœia. The chemical nature of the composition has not been accurately ascertained, and the preparation is attended with considerable difficulty and uncertainty. Dr Powell says, that the solution of the iron should be made slowly, and that it ought not to be nearly saturated, but have an excess of acid; that it ought to be clear, and slightly greenish, and if, by excess of iron, it have a reddish-yellow colour, a little acid is to be added, which will bring it to the proper state; that the acid solution should be added gradually to the alkaline, although it will succeed the other way; and that although the proportions are pretty nearly given, they require to be checked by occasional examination, especially by the taste, which should be slightly alkalescent. He also adds, that after standing, nitrate of potass generally crystallizes, from which the clear deep red solution is to be poured off. Mr Phillips, in his

remarks upon this preparation, says, that there is no danger of iron being dissolved in excess, as the acid is capable of dissolving more than twice the quantity of iron ordered; and the solution thus obtained, though so nearly saturated as to excite little effervescence when added to the solution of carbonate of potass, answers perfectly well for making this preparation; but even when the proportions of the college are adopted, the quantity of alkali is too small, and it is necessary to use about one-twelfth more than is directed, in order to dissolve the oxide of iron, although more than requisite to saturate the acid, and to give a decided alkaline taste. Mr Phillips considers it as a solution of peroxide of iron in subcarbonate of potass. Hagen says, that the preparation does not succeed with caustic potass; and that the more the alkali is carbonated, the better.

Mr Phillips remarks, that if five parts of water be added to one of this preparation, in a few minutes the oxide of iron is almost entirely precipitated, frustrating the probable intentions of the preparation, that of exhibiting iron in solution with an alkali; which, however, may be effected by means of the solution of tartarized iron, which is not decomposed by subcarbonate of potass. Dr Powell, on the contrary, praises this preparation much. He considers it as affording a combination of iron distinct from any other, and often applicable to practice; and adds, "If I was to speak individually of its powers, I should consider them as more considerable than those of any other preparation of the metal in many cases attended with debility of stomach, and it has been also prepared in some large shops, and not unfrequently employed."

Chap. X.—MERCURY.

Hydrargyrum purificatum. *Dub.*
Purified Quicksilver.

Take of
Quicksilver, six pounds.
Draw off four pounds by slow distillation.

Lond.

Take of
Quicksilver, six pounds;
Iron filings, one pound.
Rub them together, and distil the quicksilver from an iron retort.

Edin.

Take of
Quicksilver, four parts;
Filings of iron, one part.
Rub them together, and distil from an iron vessel.

THE quicksilver of commerce is often adulterated with lead, tin, or other metals, which render it unfit for internal use, and for many preparations. It therefore becomes necessary to purify it, and, fortunately, its comparatively great volatility supplies us with an easy process. The Dublin college distil it simply without any addition; but, lest towards the end of the process the mercury should elevate any impurities along with it, they draw off but two-thirds. The principal objection to this process is the want of economy; for altho' the remaining third may be used for some purposes, its value is very much depreciated. As iron has a much stronger affinity for almost all the substances with which quicksilver may be adulterated, than quicksilver has, by adding iron-filings we may draw off the whole quicksilver by distillation, without any fear of the impurities rising along with it.

Glass retorts are inadmissible in this distillation; because, when the mercury begins to boil, the concussion is so great, that they would certainly be broken. Iron retorts are the best, although strong earthen ones may also be used. The receiver may be of the same materials, or of glass, if we wish to inspect the progress of the operation; but, in this case, we must interpose an adopter between the retort and receiver, and fill the receiver nearly full of water, that the mercury may not crack it, by falling hot into it. The retort employed should be so large, that the quicksilver should not fill above one-third of it.

ACETIS HYDRARGYRI. *Ed.*
Acetite of Quicksilver.

Take of
Purified Quicksilver, three ounces;
Diluted nitrous acid, four ounces and a half, or a little more than may be required for dissolving the mercury;
Acetite of potass, three ounces;
Boiling water, eight pounds.
Mix the quicksilver with the diluted nitrous acid; and after the effervescence has ceased, digest, if necessary, with a gentle heat, until the quicksilver be entirely dissolved. Then dissolve the acetite of potass in the boiling water, and immediately to this solution, still hot, add the former, and mix them by agitation. Then set the mixture aside to crystallize. Place the crystals in a funnel, and wash

them with cold distilled water; and, lastly, dry them with as gentle a heat as possible.

In preparing the acetate of quicksilver, the whole vessels and funnels used must be of glass.

ACETAS HYDRARGYRI. *Dub.*
Acetate of Quicksilver.

Take of
Purified quicksilver, three ounces, by weight;
Diluted nitrous acid, three ounces, by measure;
Acetate of kali, three ounces;
Boiling distilled water, eight pints.

Add the acid to the quicksilver; and, after the effervescence has ceased, digest upon hot sand, that the metal may be dissolved. Instantly mix the liquor with the boiling water, in which the acetate of kali has been previously dissolved, and filter, as quickly as possible, through double linen. Let it form crystals by cooling, which, after being washed in cold distilled water, are to be dried on paper, with a very gentle heat.

In the whole of this process glass vessels are to be used.

THESE processes are fundamentally the same. They differ chiefly in the proportions. Those of the Edinburgh college were ascertained by very careful experiment; and if its directions be accurately followed, the preparation succeeds perfectly. Nitrate of mercury is decomposed by acetate of potass; and the products are acetate of mercury and nitrate of potass. The nitrate of potass, being much more soluble than the acetate of mercury, remains in solution after the latter is separated by crystallization. Mercury is capable of forming different combinations with nitrous acid. When we employ a sufficient quantity of acid to dissolve the mercury without the assistance of heat, and to retain it in solution, there is always an excess of acid, and therefore it is a solution of supernitrate of mercury. If we evaporate this solution very gently, or, if we add an additional quantity of mercury, and assist the action of the acid by a gentle heat, until nitrous gas begin to escape, we obtain nitrate of mercury, crystallized in various forms. In these, the mercury is in a state of protoxide. But, if we promote the action of the acid by boiling, until nitrous gas ceases to escape, the mercury is converted into peroxide, and a larger quantity is dissolved. This solution is very apt to crystallize, both on cooling, and by the diminution of the quantity of acid during the process; and if we attempt to dilute the solution with water, a copious precipitate of subnitrate of mercury immediately takes place; and the solution contains supernitrate of mercury. If the dilution be made

with cold water, the subnitrate has a white colour, which, by a very slight application of heat, passes to a beautiful yellow, the colour which it has from the first, when separated by boiling water.

For making the acetate of mercury, the nitrate is prepared with a very gentle heat, and with excess of acid, that it may be retained in perfect solution, and that there may be no possibility of any admixture of subnitrate with the acetate formed. A larger proportion of acid is used by the Edinburgh college, than what was used by the London college; but, by accurate experiment, it was ascertained to be necessary for the success of the process. In mixing the solutions, we must be careful to pour the mercurial solution into that of the acetate of potass, because, by adopting the contrary procedure, the subnitrate of mercury will be precipitated undecomposed, if any peroxide be contained in the mercurial solution. For dissolving the acetate of potass, the London college only used as much water as was capable of retaining the nitrate of potass in solution; the acetate of mercury was therefore precipitated, and was purified by again dissolving it in boiling water, and crystallizing it. This part of the process is simplified by the Edinburgh and Dublin colleges, who use as much water for dissolving the acetate of potass as is capable of retaining, so long as it is hot, the acetate of mercury in solution, and of allowing it to crystallize as it cools. In this way, therefore, it is procured at once sufficiently pure. The exsiccation of the acetate of mercury is an operation of great delicacy; for it is so spongy, that it retains the moisture with great obstinacy; and it is decomposed so easily, that heat can scarcely be employed to dry it. It is best dried by compressing it between several folds of bibulous paper.

The Prussian Dispensatory directs acetate of mercury to be prepared by dissolving two ounces of the red oxide of mercury in about seven ounces of concentrated acetic acid, and evaporating the solution to dryness; but this process affords a salt of a very different nature from those prepared according to the directions of the British colleges, the latter containing protoxide, and being crystallizable; and the former the peroxide, and not crystallizable.

Acetate of mercury is scarcely soluble in cold water, but dissolves readily in boiling water. It generally crystallizes in micaceous plates, like boracic acid, and is extremely easy of decomposition.

It is supposed to be a mild preparation of mercury, and was the active ingredient of the celebrated Keyser's pills. In solution, it has also been recommended externally, to remove freckles and cutaneous eruptions.

Murias hydrargyri, olim Mercurius sublimatus corrosivus. *Ed.*
Muriate of Quicksilver, formerly *Corrosive Sublimate.*

Take of
Purified quicksilver, two pounds;
Sulphuric acid, two pounds and a half;
Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, placed in a sand-bath, until the sulphate of quicksilver be dried, which is to be mixed, when cold, in a glass vessel, with the muriate of soda; then sublime in a glass cucurbit, with a heat gradually increased. Lastly, separate the sublimed matter from the scoriæ.

Hydrargyri oxymurias. *Lond.*
Oxymuriate of Quicksilver.

Take of
Purified quicksilver, two pounds;
Sulphuric acid by weight, thirty ounces;
Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, until the sulphate of quicksilver be reduced to dryness; triturate this after it has cooled, in an earthen mortar, with the muriate of soda; then sublime it from a glass cucurbit, with a gradually increased heat.

Murias hydrargyri corrosivum. *Dub.*
Corrosive Muriate of Quicksilver.

Take of
Purified quicksilver, two pounds;
Sulphuric acid, three pounds;
Dried muriate of soda, two pounds and a half.

Dissolve the quicksilver in the acid, and gradually increase the heat, until the mass become perfectly dry; when cold, triturate it in an earthen mortar, with the muriate of soda; then sublime in a proper vessel, with a heat gradually increased.

By boiling the quicksilver to dryness with sulphuric acid, the metal is oxidized by the decomposition of part of the acid, and combines with the rest to form subsulphate of quicksilver. In the second part of the process, this subsulphate is decomposed by dried muriate of soda, muriate of quicksilver sublimes, and sulphate of soda remains behind. In Holland, it is manufactured by subjecting to sublimation a mixture of dried sulphate of iron, nitrate of potass, muriate of soda and

sulphate of iron. Bergman recommends the sublimation of subnitrate of mercury and muriate of soda; and Mr Murray seems inclined to prefer it to the new process. It is prepared also directly, by dissolving red oxide of mercury in muriatic acid.

Muriate of quicksilver crystallizes by sublimation, in prismatic needles, forming a white semi-transparent ponderous mass. Its taste is acrid, styptic, and durable. It is soluble in 20 parts of cold water, and in 2 at 211°. It is also soluble in 3.8 parts of alcohol, at 70°, and in almost an equal weight of boiling alcohol. It gives a green colour to syrup of violets. It is not altered by exposure to the air, and is sublimed unchanged by heat. It is not decomposed by any of the acids, but is soluble, without alteration, in the sulphuric, nitric, and muriatic acids. It is precipitated by all the alkalies and earths, of an orange-yellow colour, which gradually changes to a brick-red; and, by their carbonates, of a permanent yellow colour. Ammonia forms with it an insoluble, white, triple salt. It is also decomposed by several of the metals. It consists, according to Mr Chenevix, of 69.7 quicksilver, combined with 12.3 of oxygen, and 18 muriatic acid; and, according to Mr Zaboada, of 71.5 quicksilver, combined with 8.5 of oxygen, and 20 muriatic acid. Sir H. Davy has a very different opinion of the nature of this salt. He considers it as a compound of metallic mercury and chlorine, without any oxygen, in the proportion of one of mercury to two of chlorine, or 380 to 134, and in his nomenclature should be called *Mercurana*.

Medical use.—Muriate of mercury is one of the most violent poisons with which we are acquainted. Externally, it acts as an escharotic or a caustic; and in solution it is used for destroying fungous flesh, and for removing herpetic eruptions; but even externally it must be used with very great caution. It has, however, been recommended to be given internally by the respectable authorities of Boerhaave and Van Swieten; and it is the active ingredient of all the empirical antivenereal syrups. Were it really capable of curing the venereal disease, or equal in efficacy to the common modes of administering mercury, it would possess many advantages over them in other respects; but that it cannot be depended upon, is almost demonstrated by its use, as an antivenereal, being very much confined to the quacks, and by the testimony of the most experienced practitioners. Mr Pearson says, that it will sometimes cure the primary symptoms of syphilis, especially if it produce considerable soreness of the gums, and

the common effects of mercury; but that it will often fail in removing chancre, and where it has removed it, that the most steady perseverance will not secure the patient from a constitutional affection. It is, on some occasions, however, a useful auxiliary to a mercurial course, in quickly bringing the system under the influence of mercury, and in supporting its action after the use of frictions; and it is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the desquamation of eruptions.

Liquor hydrargyri oxymuriatis. *Lond.*
Solution of Oxymuriate of Quicksilver.

Take of
Oxymuriate of quicksilver, eight grains;
Distilled water, fifteen fluidounces;
Rectified spirit, one fluidounce
Dissolve the oxymuriate of quicksilver in the water, and add to it the spirit.

This solution contains in each fluidounce, half a grain of the oxymuriate of quicksilver. The spirit is added to preserve the solution from spoiling.

Submurias hydrargyri, sive Calomelas. *Ed.*
Submuriate of Quicksilver, or *Calomel.*

Take of
Muriate of quicksilver, ground to powder in a glass mortar, four ounces;
Purified quicksilver, three ounces.
Rub them together in a glass mortar, with a little water, to prevent the acrid powder from rising, until the mercury be extinguished; and having put the powder, after being dried, into an oblong phial, of which it fills only one-third, sublime from warm sand. After the sublimation is finished, having broken the phial, throw away both the red matter found near the bottom of the phial, and the white matter near its neck, and sublime the rest of the mass a second time. Grind this into a very minute powder, which is, lastly, to be washed with boiling distilled water.

Submurias hydrargyri sublimatum, sive Calomelas. *Dub.*
Sublimed Submuriate of Quicksilver, or *Calomel.*

Take of
Corrosive muriate of mercury, one pound;
Purified quicksilver, nine ounces.

Rub them together, until the globules disappear, and sublime with a sufficiently strong heat. Triturate the sublimed matter, and repeat the sublimation. Powder it, and wash with frequent affusions of distilled water, until the liquor poured off is not affected by some drops of water of carbonate of kali. Then dry.

HYDRARGYRI SUBMURIAS. *Lond.*
Submuriate of Quicksilver.

Take of
Oxymuriate of quicksilver, one pound;
Purified quicksilver, nine ounces, by weight.
Rub them together until the globules disappear; then sublime. Take out the sublimed matter, and powder and sublime it a second and a third time. Afterwards triturate the matter into a very subtile powder, as directed for the preparation of chalk.

WHEN quicksilver is triturated with muriate of quicksilver, it abstracts from the oxidized quicksilver of the muriate a part of its oxygen, and the whole mass assumes a blackish-grey colour. When this is exposed to a degree of heat sufficient to convert it into vapour, the action of the different portions of quicksilver upon each other, and upon the muriatic acid, is much more complete; and the whole is converted into a solid white mass, consisting of mercury in a state of less oxidizement, and combined with less acid, than in the muriate, or of about twice the quantity of mercury, with the same quantity of oxygen and acid. According to Sir H. Davy's theory, in the first part of the process, the additional mercury is merely mechanically divided, and by the sublimation twice the quantity of mercury is combined with the same quantity of chlorine.

The trituration of the muriate of mercury is a very noxious operation, as it is almost impossible to prevent the finer particles from rising and affecting the operator's eyes and nostrils. To lessen this evil, the Edinburgh college direct the addition of a little water. In the second part of the process, when the heat is applied, a small portion of quicksilver and undecomposed muriate first arise, and condense themselves in the highest part or neck of the phial; then the submuriate rises, and, being less volatile, condenses in the upper half of the body, while a small quantity of quicksilver, in a state of considerable oxidizement, remains fixed, or near the bottom. The Edinburgh college separates the submuriate from the

other matters, and sublimes it again. The London and Dublin colleges triturate the whole together again, and resublime it twice. As in the first sublimation, a portion of the quicksilver and of the muriate of quicksilver always arise undecomposed, a second sublimation is necessary, especially if we triturate the whole products of the first sublimation together: but any farther repetition of the process is perfectly useless. Lest any portion of muriate should have escaped decomposition, the submuriate must be edulcorated with boiling distilled water, until the water which comes off forms no precipitate with alkalis.

Submuriate of mercury is generally obtained in the form of a white solid mass, but is capable of crystallizing in tetrahedral prisms terminated by pyramids. It has no taste, and is scarcely soluble in water or in alcohol. It is less volatile than muriate of mercury. It is blackened by light, and becomes brown or black when triturated with lime water or the alkalies. It is converted by oxymuriatic acid into muriate of quicksilver. According to Mr Chenevix, it consists of 79 quicksilver, with 9.5 oxygen, and 11.5 muriatic acid; and according to Mr Zaboada, of 85 quicksilver, with 4.4 oxygen, and 10.6 muriatic acid.

From Mr Chenevix's analysis, we should conclude that 54 parts of quicksilver were sufficient to convert 100 of the muriate into submuriate; but, according to Zaboada's, 75 are necessary, which is exactly the proportion directed by the colleges, and is also more conformable to Sir H. Davy's view of their composition; for he considers the muriate, *mercurana*, as consisting of one proportion of mercury 380, and two of chlorine 134, and the submuriate, *mercurane*, of one of mercury 380, and one of chlorine 67; which gives us 73.9 as the quantity of mercury necessary to convert 100 of muriate into submuriate.

Medical use.—The submuriate of quicksilver is one of the best mercurials we possess. By proper management it may be made to increase, in a remarkable manner, almost any of the secretions or excretions. One grain mixed with sugar, and snuffed up the nostrils, is recommended as a powerful errhine in amaurosis. The same mixture is blown into the eye, to remove specks from the cornea. Given in doses of one grain morning and evening, or in larger doses combined with opium, to prevent it from acting as a purgative, it excites ptyalism. In larger doses of five grains and upwards, it is an excellent purgative. Combined with diuretics, it proves diuretic, and with sudorifics, sudorific.

It is one of the preparations of mercury which is capable of curing syphilis in every form. It also produces very powerful and salutary effects in obstructions and chronic inflammations of the viscera, especially of the liver; and, in general, it is applicable to every case in which mercurials are indicated.

SUBMURIAS HYDRARGYRI PRÆCIPITATUS. *Ed.*
Precipitated Submuriate of Quicksilver.

Take of
Diluted nitrous acid,
Purified quicksilver, each eight ounces;
Muriate of soda, four ounces and a half;
Boiling water, eight pounds.

Mix the quicksilver with the diluted nitrous acid, and, towards the end of the effervescence, digest with a gentle heat, frequently shaking the vessel in the meantime. But it is necessary to have added more quicksilver to the acid than it is capable of dissolving, that a perfectly saturated solution may be obtained.

Dissolve at the same time the muriate of soda in the boiling water, and into this solution pour the other while still hot, and mix them quickly by agitation; pour off the saline liquor after the precipitate has subsided, and wash the Submuriate of quicksilver by repeated affusions of boiling water, which is to be poured off each time after the deposition of the submuriate, until the water comes off tasteless.

SUBMURIAS HYDRARGYRI PRÆCIPITATUM. *Dub.*
Precipitated Submuriate of Quicksilver.

Take of
Purified quicksilver, seven ounces, by weight;
Diluted nitrous acid, five ounces, by measure.

Pour the acid upon the quicksilver in a glass vessel; and when the mixture has ceased to effervesce, digest in a moderate heat, with occasional agitation, for six hours. Then increase the heat, until the liquor boil a little, which is to be poured off from the quicksilver which remains, and quickly mixed with a boiling solution already prepared, of
Muriate of soda, four ounces;
Water, ten pounds.

Wash the powder which subsides with warm distilled water, as long as the liquor decanted from it is precipitated by some drops of the liquor of water of carbonate of kali; then dry it.

IN the first part of this process, a perfectly saturated solu-

tion of nitrate of quicksilver is formed. In the second, there is a mutual decomposition of this nitrate, and of the muriate of soda; nitrate of soda is formed, and muriate of quicksilver with excess of oxide: or, according to Sir H. Davy, the chlorine of the sodane combines with the mercury of the nitrate, forming mercurane, while the hydrogen of the muriatic acid and the oxygen of the mercurial oxide combine to form water, nitric acid, and soda. In this preparation, our object is to obtain the insoluble compound which results from the combination of the protoxide of mercury with muriatic acid. In this view, the application of heat, in dissolving the mercury in the nitrous acid, is improper; for a portion at least of the mercury is converted into its peroxide, which occasions, in the first place, the formation of a little subnitrate of mercury, when poured into the saline solution; and, secondly, the formation of a proportion of muriate of mercury (corrosive sublimate), which must be washed away. Accordingly, Mr Murray has found, that more of mild, and less of corrosive muriate of mercury are formed, when the solution is made slowly and in the cold, than when the directions of the colleges are complied with.

In Sir H. Davy's view of the subject, according to which calomel and corrosive sublimates are compounds of metallic mercury, with different proportions of chlorine, the object in this preparation is to get the largest quantity of mercury dissolved in the nitrous acid, so that in decomposing muriate of soda, the smallest qnantity of chlorine may be set at liberty; and as the peroxide contains twice as much oxygen as the protoxide, and acids seem to combine with a certain quantity of oxygen in oxides, whatever be the quantity of metal united with them, the nitrate of the protoxide of mercury will contain twice as much mercury as the nitrate of the peroxide, and will of course give a double proportion of mercury to the chlorine set at liberty by the acid and oxygen.

When properly prepared, the submuriate obtained by precipitation scarcely differs from that obtained by sublimation. Göttling found no other difference than that the precipitated submuriate becomes grey, when triturated with lime-water, whereas the sublimed submuriate becomes black. But he exposed to heat half an ounce of the precipitated submuriate in a subliming apparatus; scarcely a grain of a reddish matter remained fixed; and the sublimed matter now became black when triturated with lime water, and differed in no respect from submuriate prepared in the ordinary way by sublimation. It therefore would seem to be an improve-

ment in the process, to sublime the submuriate after it is precipitated; especially as by that operation it would be most effectually separated from any subnitrate which might be mixed with it.

There is still another way of preparing the submuriate of mercury, which must be noticed. It was contrived by Hermbstædt, and is recommended by Moench, with the confidence derived from experience, as the very best process for preparing the submuriate of quicksilver.

Take of
Pure quicksilver, seven ounces and a half:
Sulphuric acid, four ounces;
Dried muriate of soda, five ounces and a half.
Distil in a glass retort the sulphuric acid, with four ounces of the quicksilver, until they be converted into a dry white mass. Triturate the sulphate of mercury thus formed, with the remaining three ounces and a half of quicksilver, until the globules disappear; then add the muriate of soda; mix them, and sublime. As the product of the first sublimation still contains unoxidized quicksilver, it is to be again triturated and sublimed. The sublimate being washed, is now pure submuriate of quicksilver, and weighs about six ounces.

The theory of this process is the same with that of the formation of the muriate of quicksilver. The difference between the two products arises from the proportion of quicksilver being greater, and that of the muriate of soda employed being less. We are not prepared to state the comparative economy of these three processes described for preparing submuriate of quicksilver; but of the last process, we may observe, that according to Mr Chenevix's analysis, seven ounces and a half of quicksilver should furnish nine ounces and a half of submuriate of quicksilver; and, according to M. Zaboada's, nearly nine: so that there is evidently a considerable loss, which must be owing either to the formation of muriate of quicksilver, or of oxide of quicksilver.

Submurias hydrargyri ammoniatum. *Dub.*
Ammoniated Submuriate of Quicksilver.

Add to the liquor decanted from the precipitated submuriate of quicksilver, as much water of caustic ammonia as is sufficient to precipitate the whole metallic salt. Wash the precipitate with cold distilled water, and dry it on blotting paper.

HYDRARGYRUM PRÆCIPITATUM ALBUM. *Lond.*
White Precipitated Quicksilver.

Take of
Oxymuriate of quicksilver, half a pound;
Muriate of ammonia, four ounces.
Solution of subcarbonate of potass, half a pint;
Distilled water, four pints.

Dissolve first the muriate of ammonia, and afterwards the oxymuriate of quicksilver, in the distilled water, and add to these the solution of subcarbonate of potass. Wash the precipitate until it become insipid, and then dry it.

MURIATE of quicksilver is about thirty times more soluble in a solution of muriate of ammonia than in pure water; and, during the solution, there takes place a considerable increase of temperature Now, as these facts sufficiently prove a reciprocal action of the two salts, and as there is no decomposition, it is evident that they must have combined to form a triple salt; especially as they cannot be again separated either by sublimation or crystallization. This compound may therefore, with propriety, be termed Muriate of Mercury and Ammonia. It is the Sal Alembroth of the alchemists. It is very soluble in water, and is sublimed by heat without decomposition. When to a solution of this salt we add a solution of an alkaline carbonate, either of potass, as directed by the London college, or of soda, as by that of Berlin, there occurs a partial decomposition. The alkali combines with a portion of the muriatic acid, and reduces the muriate of mercury and ammonia to the state of a submuriate, which being insoluble, falls to the bottom of the solution. The proportion of muriate of ammonia has been reduced in edition 1815 to one-half, probably in consequence of a remark of Mr Phillips.

The process of the Dublin college is new and well contrived, as it converts to use the washings of the precipitated submuriate, and thus partly obviates the objection of want of economy in the directions given by the college for preparing it. By the simple addition of ammonia, the whole muriate of mercury contained in the washings is precipitated, in the form of submuriate of mercury and ammonia.

The submuriate of mercury and ammonia thus precipitated, has at first an earthy, and afterwards a metallic taste. It is not soluble in water. It is decomposed by heat, furnishing water, ammonia, and nitrogen gas, while 0.86 of submuriate of mercury remain behind. Sulphuric and nitric acids partially decompose it, and convert it into muriate of mercury,

and triple salts of mercury and ammonia. Muriatic acid dissolves it, and converts it into muriate of quicksilver and ammonia. According to Fourcroy's analysis, it consists of

81 oxide of mercury,
16 muriatic acid,
3 ammonia.

100

It is only used for ointments; and its principal recommendation is its white colour.

Oxidum hydrargyri cinereum. *Ed.*
Ash-coloured Oxide of Quicksilver.

Take of
Purified quicksilver, four parts;
Diluted nitrous acid, five parts;
Distilled water, fifteen parts;
Water of carbonate of ammonia, a sufficient quantity.
Dissolve the mercury in the nitrous acid; then gradually add the distilled water, and pour into the mixture as much water of the carbonate of ammonia as shall be sufficient to precipitate the whole of the oxide of mercury, which is then to be washed with pure water, and dried.

Lond.

Take of
Submuriate of quicksilver, one ounce;
Lime-water, one gallon.
Boil the submuriate of quicksilver in the lime-water, with constant stirring, until the grey oxide subside; wash this with distilled water, and then dry.

Pulvis hydrargyri cinereus. *Dub.*
Ash-coloured Powder of Quicksilver.

Take of
Quicksilver, two ounces, by weight;
Diluted nitrous acid, two ounces, by measure.
Dissolve the quicksilver with a low heat, and dilute the liquor with eight ounces, by measure, of cold distilled water; then drop it into an ounce and a half, by measure, of the water of carbonate of ammonia, or as much as may be sufficient to precipitate the metal, which is to be washed with warm distilled water, until the decanted liquor is not precipitated by some drops of water of sulphuret of ammonia; and afterwards dry it.

These processes, which are essentially the same, are intended to furnish a substitute for the black oxide of quicksilver, on which the efficacy of the mercurials most frequently employed, and most certainly useful, depends. In these, the mercury is oxidized by trituration, in contact with the atmosphere; but the operation is both so tedious and troublesome, that it is often imperfectly performed, or assisted by improper means.

In the processes we are now explaining, it was supposed, that, as ammonia has a stronger affinity for nitric acid than oxide of mercury has, it would separate oxide of mercury from its solution in nitric acid; and, therefore, that the precipitate obtained was oxide of mercury, similar to that formed by trituration. But, since the nature of the triple metallic salts has been better understood, this has been discovered to be an error. The grey precipitate which is formed may, generally speaking, be called a subnitrate of mercury and ammonia; for it consists of oxide of mercury and ammonia, not saturated with nitric acid; but, even to ocular inspection, it does not seem to be homogeneous; and, when it is digested in acetic acid, it is partially dissolved, and the residuum acquires a very pale, or almost white colour. The portion dissolved seems to be black oxide, and the white residuum to be pure subnitrate of mercury and ammonia, which, according to Fourcroy, crystallizes in brilliant polyhedral crystals, without smell, of an extremely styptic taste, scarcely soluble in water; is decomposed by heat, by the sulphuric and muriatic acids, and by lime, potass and soda; and consists of 68.20 oxide of mercury, 16 of ammonia, and 15.80 of nitric acid. According to these observations, this preparation ought not to be called the grey oxide of mercury, and is not identical with the black oxide of mercury prepared by trituration. If, however, it answered the same purposes, the identity would be of little consequence; but, from its never having been introduced into general use, although so much more easily prepared, we may presume that it is not equal in point of efficacy.

Black oxide of mercury may, however, be obtained, according to the direction of Saunders, now adopted by the London college, by triturating with lime-water, and subsequent edulcoration, the sublimed submuriate of mercury, or rather the precipitated submuriate, as proposed by Göttling; and that the decomposition may be more easy and complete, I may suggest, that for this preparation the latter submuriate should not be dried, but should be triturated with the lime-water as soon as it is edulcorated. This simple black oxide certainly merits a fair trial.

This oxide is said, however, by M. Braamcamp and Sigueira Oliva, to be prepared in the greatest purity, by boiling the ash-coloured oxide of the Edinburgh college, long and violently in water, until the triple salt be dissolved or decomposed. The proportion of oxygen, which protoxide of mercury contains, has been very differently estimated by different chemists. Mr Chenevix makes 100 parts of mercury unite with no less than 12 of oxygen, the Portuguese chemists with 8.1, M. Fourcroy with 4.16, M. Sefstrom and Sir H. Davy with 3.95, which last, besides the remarkable coincidence, is the most probable from other reasons.

The Prussian college direct a black oxide of mercury to be prepared, by mixing four ounces of mercury with six ounces of nitrous acid, diluted with two ounces of distilled water, and occasionally agitating them, without heat, until the acid be saturated. The solution is then to be diluted with distilled water, and water of caustic ammonia to be dropt into it, as long as the precipitate formed is black.

Hydrargyrum cum magnesia. *Dub.*
Quicksilver with Magnesia.

Take of
Quicksilver,
Manna, each one ounce;
Magnesia, half an ounce.

Triturate the quicksilver with the manna, in an earthen-ware mortar, adding some drops of water, to give the mixture the consistence of a syrup, until the metallic globules become no longer visible. Then add, with constant trituration, a drachm of the magnesia. After they are thoroughly mixed, add a pint of warm water, and shake the mixture: then let the liquor rest, and decant the fluid from the sediment as soon as it subsides. Repeat this washing twice, that the manna may be totally washed away, and with the sediment still moist, mix the remainder of the magnesia. Lastly, dry the powder on blotting paper.

Hydrargyrum cum creta. *Dub.*
Quicksilver with Chalk,

Is to be prepared in the same manner, only employing precipitated chalk instead of the magnesia.

Lond.

Take of
Purified quicksilver, by weight, three ounces;
Prepared chalk, five ounces.

Triturate them together until the globules disappear.

Quicksilver has a strong affinity for oxygen, and absorbs it slowly from the atmosphere. But the combination may be considerably accelerated by agitation, and still more by triturating quicksilver with any substance which promotes its mechanical division, and thus increases its surface. With this view, quicksilver is triturated with viscid substances, as fats, honey, syrup, &c. or with pulverulent substances, as the chalk in the process of the London college.

The black oxide is the mildest, but, at the same time, the most efficacious, of the preparations of mercury. Combined with magnesia or chalk, it is not in general use; but in the form of the common mercurial pill and ointment, it is more employed than any other preparation of the same metal except calomel.

Oxydum hydrargyri. *Dub.*
Oxyde of Quicksilver.

Take of
Purified quicksilver, any quantity.
Put it into an open glass vessel, with a narrow mouth and wide bottom. Expose this to about the six-hundredth degree of heat, until the metal be converted into red scales.

Hydrargyri oxydum rubrum. *Lond.*
Red Oxyde of Quicksilver.

Take of
Purified quicksilver, by weight, one pound.
Put it into a glass vesel, with a narrow mouth and a broad bottom. Expose this vessel with its mouth open to the six hundredth degree of heat, until the quicksilver be converted into red scales. Then grind them into a very fine powder.

This is an extremely tedious, and therefore expensive, operation, because mercury is incapable of absorbing from the atmosphere the quantity of oxygen necessary to convert it into the red oxide, except when in the state of vapour. But as the form of a vessel which will prevent the dissipation and loss of the mercurial vapour, will, at the same time, hinder the free access and frequent renewal of the air, the operation can only proceed slowly. The vessel most advantageously employed is a wide flat-bottomed matrass, with a very narrow and almost capillary neck. Only so much mercury is introduced into it as will cover the bottom of the matrass; and the vessel is not inserted in the sand deeper than the mercury stands within it. A degree of heat is then applied, sufficient to cause a gentle ebullition in the mercury, which is thus alternately converted

into vapour, and condensed again in the upper part of the vessel. While in the state of vapour, it absorbs the oxygen of the air contained in the vessel, by which means it is gradually changed into a black, and then into a red powder; but a complete conversion into the latter state is not effected in less than several months.

Red oxide of quicksilver, thus prepared, consists of small crystalline grains, of a deep red colour, and very brilliant sparkling appearance. By heat, it may be sublimed in the form of a beautiful ruby-coloured vitrified substance. At a red heat it is decomposed, giving out oxygen gas, while the metal is revived, and is immediately volatilized. It is soluble in several of the acids; and during its solution, it does not decompose them or water. It is easily disoxydized. It consists, according to Chenevix, of 100 of mercury and 17.65 oxygen; Zaboada, 11.11; Fourcroy, 8.69; and M. Sefstrom and Sir H. Davy, 7.9; which last I consider to be the most probable estimate.

Medical use.—It is not only an acrid substance, violently purgative and emetic, but even caustic and poisonous. Its internal use is proscribed; but it is applied externally as an escharotic, being previously triturated to a very fine powder; or it is formed into a stimulating ointment with unctuous substances.

OXIDUM HYDRARGYRI RUBRUM per ACIDUM NITRICUM, olim MERCURIUS PRÆCIPITATUS RUBER. *Ed.*

Red Oxyde of Quicksilver by Nitric Acid, formerly *Red Precipitated Mercury.*

Take of

Purified quicksilver, one pound;
Diluted nitrous acid, sixteen ounces.

Dissolve the quicksilver, and evaporate the solution, with a gentle heat, to a dry white mass; which, after being ground into powder, is to be put into a glass cucurbit, and to have a thick glass plate laid upon its surface. Then, having adapted a capital, and placed the vessel in a sand bath, apply a gradually increased heat, until the matter be converted into very red scales.

HYDRARGYRI NITRICO-OXIDUM. *Lond.*

Nitric Oxide of Quicksilver.

Take of

Purified quicksilver, three pounds by weight;
Nitric acid, one pound and a half by weight;
Distilled water, two pints.

Mix in a glass vessel, and boil until the quicksilver be dissolved, and after the evaporation of the water, a white mass remains. Rub this to powder, and put it into another vessel which must be very shallow; then apply a very gentle heat, and gradually increase it, until red vapours cease to be emitted.

Oxydum hydrargyri nitricum. *Dub.*
Nitric Oxide of Quicksilver.

Take of
Purified quicksilver, ten ounces, by weight;
Diluted nitrous acid, ten ounces, by measure.
Mix them in a glass vessel, and dissolve the quicksilver, with a heat gradually increased; then augment the fire until the matter remaining in the bottom of the vessel be converted into red scales.

In the first part of these processes, a fully saturated nitrate of mercury is formed. In the second part the metal is oxidized to the maximum by the decomposition of the acid. When a sufficient heat is applied, the nitrate of mercury first melts, then exhales nitrous oxide gas, and changes its colour successively to yellow, orange, and brilliant purple red. If well prepared, it should have a crystalline scaly appearance, sublime entirely at a red heat, and be soluble, without any residuum, in nitrous acid. According to Fourcroy, it contains no nitrous acid, unless a sufficient heat has not been applied; but, according to most other chemists, it contains some nitrous acid; and differs from the red oxide prepared by the action of heat alone, in always being more acrid.

This is an extremely difficult operation, and skilful operators not unfrequently fail to obtain it of that brilliant crystalline appearance which is esteemed. M. Paysse, who paid great attention to this preparation in Holland, where it is manufactured in large quantities, gives the following directions:—Dissolve 100 pounds of pure mercury in 140 of pure nitrous acid, of sp. gr. 1.3 to 1.37, promoting their action by a sand bath; evaporate by distillation, and, when the formation of nitrous gas indicates the decomposition of the nitrate of mercury, remove the receiver, and apply a steady and moderate heat for about eight hours, until a match, which has been just blown out, inflames, on being introduced into the matrass, which is a proof that the operation is finished. To its success it is necessary, 1. That the nitrous acid be not mixed with muriatic; 2. That it be sufficiently strong; 3. That the evaporation be conducted with a moderate heat;

4. That the vessel be sufficiently large and flat, so that a large surface be exposed, and the whole equally heated; 5. That the heat be gradually augmented; and, lastly, That it be steadily maintained the whole time. Turf is the fittest fuel.

Medical use.—It is only used as an escharotic, and care must be taken that it is finely levigated, otherwise it only irritates, without destroying the parts to which it is applied. It is a very common application in chancres.

SUBSULPHAS HYDRARGYRI FLAVUS, olim TURPETHUM MINERALE. *Ed.*

Yellow Subsulphate of Quicksilver, formerly *Turpeth Mineral.*

Take of

Purified quicksilver, four ounces;
Sulphuric acid, six ounces.

Put them into a glass cucurbit, and boil them in a sand-bath to dryness. Throw into boiling water the white matter which is left in the bottom, after having reduced it to powder. A yellow powder will immediately be produced, which must be frequently washed with warm water.

OXYDUM HYDRARGYRI SULPHURICUM. *Dub.*

Sulphuric Oxyde of Quicksilver.

Take of

Purified quicksilver, one pound;
Sulphuric acid, a pound and a half.

Dissolve in a glass vessel, with a sufficient heat, which is to be gradually increased until the matter be entirely dried. This, upon pouring on it a very large quantity of warm water, will immediately become yellow, and fall into powder, which is to be well triturated with this water, in an earthenware mortar.

After pouring off the supernatant liquor, wash the powder with warm distilled water, as often as the decanted liquor forms a precipitate, on the addition of some drops of the water of subcarbonate of kali; and, lastly, dry it.

The action of sulphuric acid on mercury has been examined with considerable attention by Fourcroy. In the cold, they have no action on each other; but on the application of heat, the sulphuric acid begins to be decomposed, sulphureous acid gas is extricated, and the metal is oxidized, and combines with the undecomposed acid, forming with it a white saline mass, covered with a colourless fluid. In this state it reddens vegetable blues, is acrid and corrosive, does not become yellow by the contact of the air, and is not decomposed

by water either warm or cold. It is therefore supersulphate of quicksilver, and the proportion of the acid in excess is variable.

By washing the saline mass repeatedly with small quantities of water, it is at last rendered perfectly neutral. It no longer reddens vegetable blues. It is white; it crystallizes in plates, or fine prismatic needles; it is not very acrid; it is not decomposed either by cold or boiling water, but is soluble in 500 parts of the former, and in about 250 of the latter. It is much more soluble in water, acidulated with sulphuric acid. The following estimates of its composition have been made:

	Fourcroy.	Braamcamp and Sigueira.
Quicksilver,	75.	57.42
Oxygen,	8.	6.38
Sulphuric acid,	12.	31.8
Water,	5.	4.4
	100.	100.

But if, instead of removing the excess of acid from the supersulphate of quicksilver, by washing it with water, we continue the action of the heat according to the directions of the colleges, there is a copious evolution of sulphureous acid gas, and the saline residuum is converted into a white mass, which therefore evidently contains both a larger proportion of mercury, and in a state of greater oxidizement, than the salt from which it was formed. But this white saline mass is farther analysed by the affusion of hot water; for one portion of it is dissolved, while the remainder assumes the form of a beautiful yellow powder. The portion dissolved is said to contain excess of acid. The yellow powder is, on the contrary, a subsulphate.

The subsulphate of quicksilver has a bright yellow colour, a considerably acrid taste, is soluble in 2000 parts of cold water, is also soluble in sulphuric acid, slightly diluted, is decomposed by the nitric acid, and forms muriate of quicksilver with the muriatic acid, while the neutral sulphate forms submuriate. It oxidizes quicksilver, and is converted by trituration with it into a black powder. At a red heat it gives out oxygen gas, and the metal is revived. It consists of

	Fourcroy.	Braamcamp and Sigueira.
Quicksilver,	76.	73.23
Oxygen,	11.	8.47
Sulphuric acid,	10.	15.
Water.	3.	.3
	100.	100.

Medical use.—It is a strong emetic, and with this intention operates the most powerfully of all the mercurials that can be safely given internally. Its action, however, is not confined to the primæ viæ; it will sometimes excite salivation, if a purgative be not taken soon after it. It is used in virulent gonorrhœas and other venereal cases, where there is a great flux of humours to the parts. But its chief use, at present, is in swellings of the testicles from a venereal affection; and it seems not only to act as a mercurial, but also, by the severe vomiting it occasions, to perform the office of a discutient, by accelerating the motion of the blood in the parts affected. It is said likewise to have been employed with success, in robust constitutions, against leprous disorders, and obstinate glandular obstructions: the dose is from two grains to six or eight. It may be given in doses of a grain or two as an alterative and diaphoretic. Dr Hope senior found, that in doses of one grain, with a little powder of liquorice root, it forms a very convenient errhine.

This medicine has been recommended as the most effectual preservative against hydrophobia.

On the whole, however, we consider it as a superfluous preparation, whose place may be more safely supplied by other mercurials or emetics.

HYDRARGYRI SULPHURETUM NIGRUM. *Lond.*
Black Sulphuret of Quicksilver.

Take of
Purified quicksilver, one pound, by weight;
Sublimed sulphur, one pound.
Triturate them together until the globules disappear.

SULPHURETUM HYDRARGYRI NIGRUM. *Ed. Dub.*
Black Sulphuret of Quicksilver, formerly *Æthiops Mineral.*
Take of
Purified quicksilver,
Sublimed sulphur, each equal weights.
Grind them together in a glass mortar (an earthen mortar, *Dub.*) with a glass pestle, till the mercurial globules totally disappear.
(It is also prepared with twice the quantity of quicksilver, *Ed.*)

THIS process, simple as it appears, is not, even in the present advanced state of chemistry, perfectly understood. It was formerly imagined, that the quicksilver was merely mechanically divided, and intimately mixed with the sulphur.

But that they are really chemically united is indisputably proved by the insolubility of the compound in nitrous acid. Fourcroy is of opinion, that during the trituration, the mercury absorbs oxygen, and is converted into the black oxide, and that in this state it is slightly combined with the sulphur. The editors of Gren also suppose it to be in the state of black oxide, but that it is combined with hydroguretted sulphur; and they direct a little water to be added during the trituration, that by its decomposition it may facilitate the process.

The black sulphuret of quicksilver, thus prepared by trituration, has a pulverulent form, is insoluble in nitric acid, is totally soluble in solution of potass, and is precipitated unchanged from this solution by acids. It is not altered by exposure to the air; and when heated in an open vessel, it emits sulphureous acid gas, acquires a dark violet colour, and, lastly, sublimes in a brilliant red mass, composed of crystalline needles.

The combination of quicksilver with sulphur may be much more speedily effected by the assistance of heat, by pouring the mercury, previously heated, upon the sulphur in a state of fusion, and stirring them until they cool, and form a consistent mass, which may be afterwards powdered. The sulphuret prepared by fusion differs, however, from that prepared by trituration; for it is not soluble in a solution of potass, but is converted by long ebullition in it into the red sulphuret, and it also reddens spontaneously, in course of time, from the action of the air.

Black sulphuret of mercury may be also prepared in the humid way, as it is called, by precipitation, or even by direct solution. According to Berthollet, mercury agitated with sulphuretted hydroguret of ammonia forms a black sulphuret exactly resembling that prepared by trituration; but if hydroguretted sulphuret of ammonia be used, the black precipitate formed gradually assumes a red colour, and the solution contains sulphuretted hydroguret of ammonia. The same phenomena take place with all the mercurial salts.

As a medicine, black sulphuret of quicksilver possesses no very evident effects. It is principally used as an alterative in glandular affections, and in cutaneous diseases. It has been commonly given in doses of from 5 to 10 grains; but even in doses of several drachms, and continued for a considerable length of time, it has scarcely produced any sensible effect.

SULPHURETUM HYDRARGYRI RUBRUM. *Dub.*
Red Sulphuret of Quicksilver.

Take of
Quicksilver, purified, forty ounces;
Sublimed sulphur, eight ounces.
Mix the quicksilver with the melted sulphur; and if the mixture take fire, extinguish it by covering the vessel; afterwards reduce the mass to powder, and sublime it.

Lond.

Take of
Purified quicksilver, forty ounces;
Sublimed sulphur, eight ounces.
Mix the quicksilver over the fire with the melted sulphur; and as soon as the mass swells up, remove the vessel from the fire, and cover it strongly, to prevent it from catching fire: then powder it and sublime.

As soon as the mercury and sulphur begin to unite, a considerable explosion frequently happens, and the mixture is very apt to take fire, especially if the process be somewhat hastily conducted. This accident the operator will have previous notice of, from the matter swelling up, and growing suddenly consistent; as soon as this happens, the vessel must be immediately close covered.

During the sublimation, care must be had that the matter do not rise into the neck of the vessel, so as to block it up and cause it to burst. To prevent this, a wide-necked bolt-head, or rather an oval earthen jar, coated, should be chosen for the subliming vessel. If the former be employed, it will be convenient to introduce at times an iron-wire, somewhat heated, in order to be the better assured that the passage is not blocking up; the danger of which may be prevented by cautiously raising the vessel higher from the fire.

If the ingredients be pure, there is no residuum. In such cases, the sublimation may be known to be over, by introducing a wire as before, and feeling with it the bottom of the vessel, which will then be perfectly smooth: if any roughness or inequalities be perceived, either the mixture was impure, or the sublimation is not completed; if the latter be the case, the wire will soon be covered over with the rising cinnabar.

M. M. Tuckert and Paysse have described, from actual observation, the process followed in the manufactory of M. Brand at Amsterdam, where 48,000 pounds of cinnabar are annually prepared. 150 pounds of sulphur are mixed with 1080 pounds of mercury, and exposed to a moderate heat in

a bright iron-kettle, one foot deep, and two and a half in diameter. The black sulphuret of mercury, thus produced, is reduced to powder, and put up in earthen pots capable of containing about a quart of water. The subliming apparatus consists of three large coated crucibles, bound with iron, and surmounted with domes of iron, through the top of which the black sulphuret is introduced. These are built into a furnace, in such a manner that two-thirds of each apparatus is exposed to the action of the flame, which circulates freely around them. The fuel made use of is turf, which is found preferable to all others, probably from its affording a steady and moderate heat. The fire is kindled in the evening; and when the crucibles have become red, the pots containing the black sulphuret are emptied into them successively, at first one into each, and afterwards two, three or more, at a time, according to the violence of the inflammation which succeeds. Sometimes the flame rises four, or even six feet above the domes; when its violence is a little abated, the aperture is covered closely up with a lid of iron. In this manner the whole quantity is introduced into the three crucibles in about thirty-four hours. The fire is steadily supported in a proper degree for thirty-six hours, and the sublimation assisted by stirring the matter every quarter of an hour with a triangle of iron, until the whole is sublimed, when the fire is allowed to expire. The colour of the flame changes during the process from a dazzling white to a yellow white, orange yellow, blue and yellow, green, violet, and blue and green. When it acquires a fine sky-blue, or indigo colour, and rises only an inch or two above the aperture, the aperture is closed hermetically, and luted with clay and sand. After the apparatus has cooled, 400 pounds of sublimed red sulphuret of mercury are found in each, so that there is a loss of 30 pounds on the 1230 of materials employed. The process by which cinnabar is converted into vermilion is kept a secret by the Dutch; but M. Paysse discovered, that by keeping some levigated cinnabar in the dark, covered with water, and stirred frequently for a month, it acquires the brilliant colour of Chinese vermilion.

When taken out of the subliming vessels, the red sulphuret of quicksilver is a brilliant crystalline mass, and first acquires its very rich colour when reduced to the form of a fine powder by trituration. It has neither smell nor taste, and is insoluble in water and in alcohol. In close vessels it sublimes entirely unchanged, but requires for this purpose a considerable degree of heat. It is not soluble in any acid, and is only decomposed by the nitro-muriatic, which dissolves the

quicksilver, and separates the sulphur. It is not decomposed by boiling it with solutions of the alkalis, but is decomposed by melting it with potass, soda, lime, iron, lead, copper, antimony, and several other metals. Proust has proved that it consists of 85 quicksilver, and 14 or 14½ sulphur, and that the quicksilver is not oxidized to a maximum, as had been falsely supposed, but is in its metallic state. His analysis is confirmed by the other methods by which cinnabar may be prepared. Thus, the black sulphuret of quicksilver, by fusion, is converted into the red sulphuret, by boiling it in a solution of potass, which can only act by dissolving the sulphuretted hydrogen and superfluous sulphur. Submuriate, or subsulphate of mercury, sublimed with sulphur, furnish red sulphuret of mercury, and muriate or sulphate of mercury.

Medical use.—Red sulphuret of quicksilver is sometimes used in fumigations against venereal ulcers in the nose, mouth, and throat. By inhaling the fumes produced by throwing half a drachm of it on red-hot iron, a violent salivation has been produced. This effect is by no means owing to the medicine as a sulphuret; for, when set on fire, it is no longer such, but mercury resolved into vapour, and blended with the sulphureous acid gas; in which circumstances, this mineral has very powerful effects.

Mr Pearson, from his experiments on mercurial fumigation, concludes, that where checking the progress of the disease suddenly is an object of great moment, and where the body is covered with ulcers, or large and numerous eruptions, and, in general, to ulcers, fungi, and excrescences, the vapour of mercury is an application of great efficacy and utility; but that it is apt to induce ptyalism rapidly, and great consequent debility; and that, for the purpose of securing the constitution against a relapse, as great a quantity of mercury must be introduced into the system by inunction, as if no fumigation had been employed.

Chap. XI.—LEAD.

Acetas plumbi. *Dub.*
Acetate of Lead.

Take of

Subacetate of lead, called ceruse, any quantity;
Distilled vinegar, ten times its weight.

Digest in a glass vessel, until the vinegar become sweet. Having poured this off, add more vinegar, until it cease to become sweet. Filter the liquor, and crystallize by alternate slow evaporation and refrigeration. The crystals are to be dried in the shade.

ACETIS PLUMBI, olim SACCHARUM SATURNI. *Ed.*
Acetite of Lead, formerly *Sugar of Lead.*

Take of
White oxide of lead, any quantity;
Put it into a cucurbit, and pour upon it, of
Distilled acetous acid, ten times its weight.
Let the mixture stand upon warm sand till the acid becomes sweet, which is then to be poured off, and fresh acid added until it cease to become sweet; then evaporate all the liquor, freed from impurities, in a glass vessel, to the consistence of thin honey, and set it aside in a cold place, that crystals may be formed, which are to be dried in the shade. The remaining liquor is again to be evaporated, that new crystals may be formed; and the evaporation is to be repeated until no more crystals concrete.

SUPERACETAS PLUMBI. *Lond.*
Superacetate of Lead.

Take of
Carbonate of lead, one pound;
Acetic acid, one gallon and a half.
Boil the carbonate of lead with the acid, until this be saturated; then filter through paper, and, after evaporation, till a pellicle be formed, set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THE acetate of lead is seldom prepared by the apothecary, as he can procure it at an infinitely cheaper rate from those who manufacture it in large quantities, and render it perfectly fit for medicinal use, by solution and crystallization. The preparation of it, as directed by the colleges, is a case of simple solution. The process frequently fails, from the oxide of lead employed being adulterated with carbonate of lime, or some other earthy substance The acetic acid employed should be as strong as can be procured; for with a weak acid the product of pure salt is small, and the quantity of mother-water is increased. The addition of a small quantity of alcohol to the solution, after it has been duly evaporated, is said to improve the beauty of the crystals. The mother-water (which probably is essentially the same with Goulard's extract of lead),

may also be made to furnish pure crystals, by adding to it a fresh portion of acetic acid; for, without that precaution, it furnishes only a very heavy, yellow, pulverulent mass.

The manufacture of acetate of lead is conducted more economically when the oxide is dissolved in the acid at the same time that it is prepared, which is done by alternately exposing plates of lead to the vapour of acetic acid, and immersing the plates, thus covered with oxide, into the acid itself.

Acetate of lead has a sweet styptic taste. It has a white colour, and crystallizes in flat parallelopipeds, terminated by a wedge, or more commonly in shining needles. It is soluble in water and in alcohol; effloresces slightly in the air, and is decomposed by heat and light. It is decomposed by the alkalies, and most of the earths and acids.

Medical use.—The internal use of acetate of lead, notwithstanding the encomiums some have been rash enough to bestow upon it, is entirely to be rejected. It forms, however, a very valuable external application in superficial and phlegmonic inflammations, bruises, and diseases of the skin. It is always applied in solution, either simply, or by means of cloths soaked in it, or mixed with bread-crumb. A drachm, with five ounces of any distilled water, forms a strong solution, and with ten ounces of water, a weak solution. If common water be used, the addition of about a drachm of acetous acid will be necessary to keep the lead in solution.

Liquor subacetatis lithargyri. *Dub.*
Solution of Subacetate of Litharge.

Take of
Litharge, one pound;
Distilled vinegar, eight pints.
Boil to six pints in a glass vessel, with continual agitation; pour off the liquor after the fæces have subsided, and strain it.

Liquor plumbi subacetatis. *Lond.*
Solution of Subacetate of Lead.

Take of
Semivitrified oxide of lead, two pounds;
Acetic acid, one gallon.
Mix and boil to six pints, constantly stirring, then set it aside, until the fæces have subsided, and strain.

Mr Phillips thinks, that too much litharge is employed by the London college in this preparation, as a gallon of distilled vinegar, sp. gr. 1.007, will dissolve only ten of the twenty-four ounces ordered, and the residuum having its bulk

much increased by the action of the acid, retains much of the solution. When properly prepared, it is of a straw colour, with a slight admixture of green, and has a sp. gr. of 1.22, and it is not, as said by Dr Powell, "a dense solution of a deep brown colour," unless the acid which remains after the distillation of vinegar be employed instead of the distilled vinegar.

Notwithstanding Scheele shewed that a solution of sugar of lead was converted into Goulard by allowing it to act for a day on a plate of lead, yet, until the experiments of Dr Bostock, it was generally believed that these preparations did not differ, except in the accidental variations of strength to which the latter was subject. By his analysis, however, it appears that the constituents in the saturated solution of the sugar of lead, and of the water of acetated litharge, are respectively,

	Former.	Latter.
Oxide of lead, -	16.8	23.1
Acetic acid, -	7.5	5.
Water, -	75.7	71.9
	100.	100.

Thenard obtained the salt in crystallized plates, by boiling 150 parts of litharge in a solution of 100 parts of sugar of lead, and on analysing it, found it to consist of 17 acid, 78 oxide, and 5 water. These experiments, the coincidence of which confirm their accuracy, shew, that in the sugar of lead, 100 parts of acid are combined with 224 of oxide of lead, and in Goulard's extract, with 450 or 460, or somewhat more than twice the quantity of oxide. Now, according to the doctrine of definite proportions, any acid always combines with the same proportion of oxygen in oxides, whatever the proportion of metal may be: it is therefore evident, that the oxygen in the oxide of lead, contained in Goulard's extract, is combined with twice as much lead as it is in the oxide in the sugar of lead; or Goulard's extract is the acetate of the protoxide of lead, and sugar of lead the acetate of the peroxide of lead.

Liquor subacetatis lithargyri compositus. *Dub.*
Compound Solution of Subacetate of Litharge.

Take of
Liquor of acetated litharge, two drachms by weight;
Distilled water, two pints;
Weaker spirit of wine, two drachms by measure;
Mix the spirit and liquor of acetated litharge, then add the
Distilled water.

LIQUOR PLUMBI ACETATIS DILUTUS. *Lond.*
Diluted Solution of Acetate of Lead.

Take of
Solution of subacetate of lead, one fluidrachm;
Distilled water, one pint;
Proof spirit, one fluidrachm.
Mix.

CHAP. XII.—TIN.

STANNI PULVIS. *Dub.*
Powder of Tin.

Take of
Tin, any quantity.
Having melted it over the fire in an iron mortar, agitate it until it be reduced to powder, which is to be passed, when cold, through a sieve.

THE college of Edinburgh do not give this preparation, inserting *Limatura et Pulvis Stanni* in their list of the materia medica.

Med. use.—It is often employed as a remedy against worms, particularly the tænia. The general dose is from a scruple to a drachm; some confine it to a few grains; but Dr Alston assures us, that its success chiefly depends on its being given in much larger quantities. He directs an ounce of the powder to be taken on an empty stomach, mixed with four ounces of molasses; next day, half an ounce; and the day following, half an ounce more; after which a cathartic is administered. He says, the worms are usually voided during the operation of the purge, but that pains of the stomach occasioned by them are removed almost immediately upon taking the first dose of the tin. This practice is sometimes successful in the expulsion of tæniæ, but by no means so frequently as Dr Alston's observations would lead us to hope.

CHAP. XIII.—ZINC.

OXIDUM ZINCI. *Ed.*
Oxide of Zinc.

Let a large crucible be placed in a furnace filled with live coals, so as to be somewhat inclined towards its mouth; and when

the bottom of the crucible is moderately red, throw into it a small piece of zinc, about the weight of a drachm. The zinc soon inflames, and is, at the same time, converted into white flakes, which are to be from time to time removed from the surface of the metal with an iron spatula, that the combustion may be more complete; and at last, when the zinc ceases to flame, the oxide of zinc is to be taken out of the crucible. Having then put in another piece of zinc, the operation is to be repeated, and may be repeated as often as is necessary. Lastly, the oxide of zinc is to be prepared in the same way as the carbonate of lime.

Dub.

Take of

Zinc, broken into pieces, any quantity.

Throw it at different times into a sufficiently deep crucible, heated red hot, and placed with its mouth inclined towards the mouth of the furnace. After each time that any zinc is thrown in, cover the crucible with another inverted over it, but loosely, so that the air may have access to the zinc. Preserve the white and very light sublimed powder for use.

Lond.

Inject successively small pieces of zinc into a large, deep crucible, heated to whiteness. It must be inclined to one side, and covered with another crucible, so that the zinc may be exposed to the action of the air, and may be stirred with an iron spatula. Immediately take out the oxide, which arises from time to time, and pass its white and lighter part through a sieve. Pour water upon this, and reduce it to an impalpable powder, as directed for the preparation of chalk.

This is an instance of simple oxidizement. At a red heat, zinc attracts the oxygen of the atmosphere so strongly, that it is quickly covered with a crust of white oxide, which prevents the air from acting on the metal below; and therefore we are desired to operate only on small pieces at a time, and to place the crucible, so that we may easily take out the oxide formed, and introduce fresh pieces of zinc. As soon as the crust of oxide is broken, or removed, the zinc inflames, and burns with a brilliant white, or greenish blue flame, being at the same time converted into very light flocculi. To save these as much as possible, we are directed to use a very deep and large crucible, and to cover it with an inverted crucible. But as we must not cover it, so as to prevent the access of the air, it

is doubtful whether the latter precaution be of much service. The greater part of the zinc is, however, oxidized in the crucible, without being previously converted into vapour; and as this portion of the oxide is always mixed with particles of zinc, it is necessary to separate them by trituration and elutriation.

The oxide thus obtained is of a pure white colour, without smell or taste, infusible and fixed in the fire, insoluble in water or alcohol, and entirely soluble in acids. The presence of lead in it is detected by sulphuric acid, which forms, in that case, an insoluble sulphate of lead. The white oxide of zinc contains 82.15 zinc, and 17.85 oxygen.

Mr Phillips recommends, instead of this tedious process, an oxide, or rather a subcarbonate prepared by decomposing sulphate of zinc by subcarbonate of potass. "If solutions, consisting of about eight parts of the former and five of the latter, be boiled together for a short time, a very light white precipitate is obtained, containing about 12 *per cent.* of carbonic acid. Should the sulphate of zinc be contaminated with oxide of iron, it may be separated by potash previous to the precipitation of the oxide of zinc by the subcarbonate."

Medical use.—White oxide of zinc is applied externally as a detergent and exsiccant remedy. With twice its weight of axunge, it forms an excellent application to deep chops, or excoriated nipples. But, besides being applied externally, it has also, of late, been used internally. In doses from one to seven or eight grains, it has been much celebrated in the cure of epilepsy, and several spasmodic affections; and there are sufficient testimonies of its good effects, where tonic remedies in those affections are proper.

Carbonas zinci impurus præparatus, olim Lapis calaminaris præparatus. *Ed.*

Prepared Impure Carbonate of Zinc, formerly *Prepared Calamine.*

The impure carbonate of zinc, after being roasted by those who make brass, is prepared in the same way as carbonate of lime.

Lapis calaminaris præparatus. *Dub.*

Prepared Calamine.

Reduce calcined calamine to powder, and separate the impalpable parts in the same manner that is directed in the preparation of chalk.

CALAMINA PRÆPARATA. *Lond.*
Prepared Calamine.

Burn the calamine; then triturate it; lastly, reduce it to an impalpable powder, in the manner directed for the preparation of chalk.

As this oxide of zinc is intended for external application, and often to parts very easily irritated, too much pains cannot be bestowed in reducing it to an impalpable powder.

OXIDUM ZINCI IMPURUM PRÆPARATUM, olim TUTIA PRÆPARATA. *Ed.*
Prepared Impure Oxide of Zinc, formerly *Prepared Tutty.*

It is prepared as carbonate of lime.

THIS oxide is also prepared for external use only.

SULPHAS ZINCI. *Ed.*
Sulphate of Zinc.

Take of
Zinc, cut into small pieces, three ounces;
Sulphuric acid, five ounces;
Water, twenty ounces.

Mix them, and when the effervescence is finished, digest the mixture, for a little, on hot sand; then strain the decanted liquor through paper, and, after proper evaporation, set it apart, that it may crystallize.

Dub.

Take of
Zinc, reduced to powder, in the manner directed for the powder of tin, three ounces;
Sulphuric acid, five ounces;
Water, one pint.

Put the zinc in a glass vessel, and gradually pour on the acid, previously diluted with the water. After the effervescence has ceased, digest a little; and, after due evaporation of the filtered liquor, set it aside to crystallize.

Lond.

Take of
Zinc, broken into bits, three ounces;
Sulphuric acid, five ounces, by weight;
Water, four pints.

Mix in a glass vessel; and after the effervescence has ceased, strain the solution through paper, then evaporate to a pellicle, and set it aside to crystallize.

Sulphate of zinc is chiefly found native in the mines of Goslar, sometimes in transparent pieces, but more commonly in the form of white efflorescences, which are dissolved in water, and afterwards reduced, by evaporation and crystallization, into large masses. But the sulphate of zinc of commerce is never pure, always containing iron, copper, and a little lead. From the mode of its preparation, there is also a deficiency of acid and water of crystallization. The means formerly directed for purifying it by the London college supplied these, but did not separate the foreign metals, except perhaps the lead. If, therefore, a pure sulphate of zinc be wanted, we may, according to the direction of the colleges, dissolve pure zinc in pure sulphuric acid; but we believe this process is very rarely practised, especially as the common sulphate of zinc may be sufficiently purified by exposing it in solution to the air, by which means red oxide of iron is precipitated, and by digesting it upon pure zinc, which precipitates the other metals.

Sulphate of zinc crystallizes in tetrahedral prisms, terminated by pyramids. It has a metallic styptic taste; effloresces slowly when exposed to the air. It is soluble in 2.5 parts of water, at 60°, and in much less boiling water. It is not soluble in alcohol. It is decomposed by the alkalies, earths, and hydro-sulphurets. It consists of 20 oxide of zinc, 40 acid, and 40 water of crystallization.

Medical use.—Sulphate of zinc, in doses from ten grains to half a drachm, operates almost instantly as an emetic, and is at the same time perfectly safe. It is therefore given when immediate vomiting is required, as in cases where poison has been swallowed. By employing it internally, in smaller doses, it acts as a tonic; and some think it, in every case, preferable to the oxide of zinc.

Externally, it is used as a styptic application, to stop hæmorrhagies, diminish increased discharges, as gonorrhœa, and to cure external inflammations, arising from debility and relaxation of the blood-vessels, as in some cases of ophthalmia. Is is often prescribed in injections and collyria.

Solutio sulphatis zinci. *Ed.*
Solution of Sulphate of Zinc.

Take of
Sulphate of zinc, sixteen grains;
Water, eight ounces;
Diluted sulphuric acid, sixteen drops.
Dissolve the sulphate of zinc in the water; then, having added the acid, filter through paper.

The acid is here added to dissolve the excess of oxide of zinc, which the common sulphate often contains. This solution is of a strength proper for injecting into the urethra, in gonorrhœa, or applying to the eyes in chronic ophthalmia.

Liquor aluminis compositus. *Lond.*
Compound Solution of Alum.

Take of
Alum,
Sulphate of zinc, of each half an ounce;
Boiling water, two pints.
Dissolve the alum and sulphate of zinc together in the water, and filter through paper.

This water was long known in our shops, under the title of *Aqua aluminosa Bateana.*

It is used for cleansing and healing ulcers and wounds, and for removing cutaneous eruptions, the part being bathed with it hot three or four times a-day. It is sometimes likewise employed as a collyrium, and as an injection in gonorrhœa and fluor albus, when not accompanied with virulence.

Solutio acetitis zinci. *Ed.*
Solution of Acetite of Zinc.

Take of
Sulphate of zinc, one drachm;
Distilled water, ten ounces.
Dissolve.

Take of
Acetate of lead, four scruples;
Distilled water, ten ounces;
Dissolve.
Mix the solutions; let them stand at rest a little, and then filter the liquor.

Tinctura acetatis zinci. *Dub.*
Tincture of Acetate of Zinc.

Take of
Sulphate of zinc,
Acetate of kali, each one ounce.
Triturate them together, and add one pint of rectified spirit of wine.
Macerate for a week, with occasional agitation, and strain through paper.

This is a case of double elective attraction, the lead combining, and forming an insoluble compound with the sulphu-

ric acid, while the zinc unites with the acetic acid, and remains in solution.

The acetate of zinc may be obtained by evaporation, in talcy crystals. It is soluble in water, and is decomposed by heat. It is not poisonous.

When crystallized acetate of lead and sulphate of zinc are triturated together, the mixture presently becomes moist, which is owing to the new compounds combining with less water of crystallization than the original salts, by which means a portion of the water is disengaged in its fluid form.

Medical use.—The solution of acetate of zinc is, with many practitioners, deservedly much esteemed as an astringent collyrium and injection. The solution in spirit of wine of the Dublin college, is stronger and more stimulant than that in water of the Edinburgh.

Chap. XIV.

ALCOHOL, ETHER, AND ETHEREAL SPIRITS.

Alcohol. *Lond.*
Alcohol.

Take of
Rectified spirit of wine, one gallon;
Subcarbonate of potass, three pounds.

Put one pound of the subcarbonate, previously heated to 300° Fahr. into the spirit, and macerate for twenty-four hours, frequently stirring them; then decant the spirit, and add the remainder of the subcarbonate of potass heated to the same degree; and, lastly, distil off, in a water-bath, the alcohol, which is to be kept in a well-corked bottle.

The specific gravity of alcohol is to that of distilled water as 815 to 1000.

Dub.

Take of
Rectified spirit of wine, one gallon;
Pearl ashes, dried at 300° Fahr. and still warm, one pound;

Caustic kali, in powder, one ounce;
Muriate of lime, dried, half a pound.

Mix the spirit and kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days, in a close vessel, frequently agitating it; then pour off the spirit, mix with it the muriate of lime, and distil with a moderate heat, until the residuum begins to grow thick.

The specific gravity of this spirit is to that of distilled water as 815 to 1000.

The muriate of lime may be conveniently obtained from the residuum left in the preparation of water of caustic ammonia.

The Edinburgh college give no directions for the preparation of a perfectly pure alcohol, as it is never used in pharmacy; but it is perhaps to be regretted, that they have given the title of alcohol to a liquid which is not the alcohol of chemists.

When any ardent spirit is re-distilled to procure alcohol, the water-bath is commonly used, which gives a more equal and temperate heat, and improves the product. Gren says, that the addition of four pounds of well-burnt charcoal and three or four ounces of sulphuric acid, previous to this rectification, destroys entirely the peculiar taste of malt spirit; and that a second rectification, with one pound of charcoal, and two ounces of sulphuric acid, affords an alcohol of very great purity. But the affinity of alcohol for water is so very strong, that it cannot be obtained entirely free from it by simple distillation. We must therefore abstract the water by means of some substance which has a stronger affinity for it than alcohol has. Carbonate of potass was formerly employed; but muriate of lime is preferable, because its affinity for water is not only very great, but by being soluble in alcohol, it comes in contact with every particle of the fluid. For this purpose, one part of muriate of lime, rendered perfectly dry by having been exposed to a red heat, and powdered after it becomes cold, is put into the still. Over this, three parts of highly rectified spirits are to be poured, and the mixture well agitated. By distillation with a very gentle heat, about two-thirds of the spirit will be obtained in the state of perfectly pure alcohol.

Æther sulphuricus. *Ed.*
Sulphuric Æther.

Take of
Sulphuric acid,
Alcohol, each thirty-two ounces.

Pour the alcohol into a glass retort, capable of sustaining a sudden heat, and add to it the acid, in an uninterrupted stream. Mix them by degrees, shaking them gently and frequently, and instantly distil from sand, previously heated for the purpose, into a receiver kept cool with water or snow. The heat must also be so managed, that the liquor shall boil as soon as possible, and continue to boil till sixteen ounces are drawn off, when the retort is to be removed from the sand.

To the distilled liquor add two drachms of potass, and distil from a very high retort, with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If sixteen ounces of alcohol be poured upon the acid remaining in the retort after the first distillation, and the distillation be repeated, more Ether will be obtained; and this may be repeated several times.

Dub.

Take of

Sulphuric ethereal liquor, twenty ounces, by measure;
Subcarbonate of kali, dried and powdered, two drachms.

Mix them and distil, with a very gentle heat, twelve ounces, by measure, from a very high retort into a cooled receiver.

Its specific gravity is 765, water being 1000.

Lond.

Take of

Rectified spirit,
Sulphuric acid, of each one pound and a half.

Put the spirit into a glass retort, and gradually add to it the acid, shaking them frequently, and taking care that the temperature, during the mixture, do not exceed 120° Fahr.

Then cautiously place the retort in a sand-bath, previously heated to 200°, so that the liquor may boil as quickly as possible, and the *ether* may be distilled over into a tubulated receiver, to which a vessel, cooled with snow or ice, is fitted. Continue the distillation until a heavier fluid begin to come over, which is seen in the bottom of the receiver, below the ether.

Pour twelve ounces more of rectified spirit upon the liquor remaining in the retort, and repeat the distillation of ether in the same manner.

Æther rectificatus. *Lond.*
Rectified Ether.

Take of
Sulphuric ether, fourteen fluidounces;
Fused potass, half an ounce;
Distilled water, two fluidounces.
Dissolve the potass first in the water, and add the ether to it, shaking them constantly until they are mixed. Lastly, with a heat of about 120°, distil from a large retort into a cold receiver, twelve fluidounces of rectified ether.

Æther sulphuricus cum alcohole. *Ed.*
Sulphuric Ether with Alcohol.

Take of
Sulphuric ether, one part;
Alcohol, two parts.
Mix them.

Spiritus ætheris sulphurici. *Lond.*
Spirit of Sulphuric Ether.

Take of
Sulphuric ether, half a pint;
Rectified spirit, a pint.
Mix them.

Liquor æthereus sulphuricus. *Dub.*
Sulphuric Ethereal Liquor.

Take of
Rectified spirit of wine,
Sulphuric acid, each thirty-two ounces, by weight.
Put the spirit heated to 120°, into a glass retort, capable of supporting a sudden heat, and pour upon it the acid, in a continued stream. Mix them gradually, and distil into a cooled receiver twenty ounces of liquor, by measure, with a sufficient and quick heat.
If sixteen ounces of rectified spirit of wine be poured upon the acid residuum in the retort, it will again afford, by distillation, sulphuric ethereal liquor.

Oleum æthereum. *Lond.*
Ethereal Oil.

After the distillation of sulphuric ether, continue the distillation with a reduced heat, until a black froth swell up. Immediately remove the retort from the fire, and pour water upon the liquor which remains in the retort. Skim off the

oily matter which swims upon the top of the water, and mix it with as much lime-water as will saturate the acid in it. Shake them together; and, lastly, collect the ethereal oil after it has separated.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. *Lond.*
Compound Spirit of Sulphuric Ether.

Take of
Spirit of sulphuric ether, one pint;
Ethereal oil, two fluidrachms.
Mix them.

LIQUOR ÆTHEREUS OLEOSUS. *Dub.*
Oily Ethereal Liquor.

Take what remains in the retort after the distillation of the vitriolic ether.
Distil to one half, with a moderate heat.

THE products arising from the decomposition of alcohol by the action of the acids are extremely curious and interesting. The theory of their formation was not understood until it was very ingeniously attempted by Fourcroy and Vauquelin, who endeavour to shew that the acid remains unchanged, and that the alcohol is converted into ether, water, and charcoal.

The most convenient way of mixing the ingredients, is to put the alcohol previously heated, into a tubulated retort, and with a long-tubed funnel, reaching down to the bottom of the retort, to pour in the acid. By cautious agitation, the two fluids unite, and heat is produced, which may be taken advantage of in the distillation, if we have a sand-bath previously heated to the same degree, to set the retort into immediately after the mixture is completed; nor is there any occasion for a tubulated receiver, if we immerse the ordinary receiver, which ought to be large, in water, or bury it in broken ice.

The distillation is directed to be performed with an equal and very gentle, but quick heat; but Mr Phillips says erroneously, for when the distillation of 10 ounces of product was completed in three hours, its sp. gr. was 0.791; but when it occupied almost nine hours, its sp. gr. was only 0.782. The juncture of the retort and recipient is to be luted with a paste made of lintseed meal, and further secured by a piece of wet bladder.

Immediately on mixing the acid with the alcohol, there is a considerable increase of temperature, and a slight disengage-

ment of alcohol, somewhat altered, and having an aromatic odour. On placing the retort in the sand-bath, a portion of pure alcohol first comes over; and when the mixture in the retort boils, the ether rises, and is condensed in thin, broad, straight streaks, having the appearance of oil. Until the liquor which passes over into the receiver amounts to about half, or somewhat more than half, of the alcohol operated on, it consists almost entirely of alcohol and ether, and there has been no disengagement of any permanently elastic fluid: but now the production of ether ceases, and sulphureous vapours begin to arise, which condense in irregular streaks, or in drops: we must therefore either put a stop to the process, or change the receiver. In the latter case, the products are sulphureous acid, acetic acid, water, and oil of wine, as it was called, accompanied towards the end by a peculiar species of carburetted hydrogen gas, called by the Dutch chemists Olefiant gas; because, when mixed with oxygenized muriatic acid, it forms oil. At last the matter in the retort, which has now become thick and black, swells up, and prevents us from carrying the process further.

If we stop the process before the sulphureous vapours arise, the whole acid, diluted with a proportion of water, and mixed with charcoal, remains in the retort; but if we allow the process to go on, there is a continual decomposition of the acid, which is therefore diminished in quantity. Mr Phillips has ascertained the sp. gr. of the products at different periods of the distillation. From 16 oz. of acid sp. gr. 1.837, and an equal weight of spirit sp. gr. 0.830, he got 12 ounces of product; 4 of ethereal spirit of sp. gr. 0.779; 4 more of sp. gr. 0.753; then 2½ of yellow sulphureous spirit of sp. gr. 784; and lastly, 1½ of heavy fluid of 0.981.

According to Proust, the sulphuric acid may be obtained from the black residuum in the retort, by diluting it with twice its weight of water, filtering it through linen, and evaporating it till it acquire the specific gravity 1.84, then adding about one five-hundredth part of nitrate of potass, and continuing the evaporation until the acid become perfectly colourless, and acquire the specific gravity of 1.86. The residuum, however, may be more advantageously preserved, as the colleges direct, for preparing more ether, by repeating the process with fresh quantities of alcohol. Proust indeed denies that this residuum is capable of converting more alcohol into ether; but that excellent chemist has somehow fallen into an error; for it is a fact, that was known in the time of that no less excellent chemist Dr Lewis, and inserted in the

first edition of this Dispensatory, published in 1753, and not a recent discovery of Citizen Cadet, as Fourcroy would lead us to believe. If farther confirmation be wanted, we shall instance Göttling, who says, that from three or four pounds of this residuum he has prepared 60 or 70 pounds of the spirit of vitriolic ether, and more than twelve pounds of vitriolic ether, without rectifying the residuum, or allowing the sulphureous vapour to evaporate.

Mr Phillips, from a pound each of acid and of spirit got seven ounces and a half of ether, specific gravity 0.768, and by a second distillation, after eight ounces more of spirit were added to the residuum, eight ounces, of 0.807. The mixture of these gave a specific gravity about 0.788, whereas the former of these products alone constituted the *spiritus ætheris vitriolici* of the late Pharmacopœia. By adding the spirit ordered to convert it into *spiritus ætheris vitriolici*, it acquires specific gravity 0.816, which is much weaker than the liquor of the same name in the former London Pharmacopœia.

The ether may be separated from the alcohol, water, and sulphureous acid, with which it is always mixed, by re-distilling it with a very gentle heat, after mixing it with potass, which combines with the acid, water, and alcohol. The alkali ought to be added in substance according to the directions of the Edinburgh college, not in solution as prescribed by that of London.

Medical use.—The chemical properties of ether have been already noticed. As a medicine taken internally, it is an excellent antispasmodic, cordial, and stimulant. In catarrhal and asthmatic complaints, its vapour is inhaled with advantage, by holding in the mouth a piece of sugar on which ether has been dropt. It is given as a cordial in nausea, and in febrile diseases of the typhoid type; as an antispasmodic in hysteria, and in other nervous and painful diseases; and as a stimulus in soporose and apoplectic affections. Regular practitioners most frequently give only a few drops for a dose; but empirics have sometimes ventured upon much larger quantities, and with incredible benefit. When applied externally, it is capable of producing two very opposite effects, according to its management; for, if it be prevented from evaporating, by covering the place to which it is applied, closely with the hand, it proves a powerful stimulant and rubefacient, and excites a sensation of burning heat. In this way it is frequently used for removing pains in the head or teeth. On the contrary, if it be dropt on any part of the body, exposed freely to the contact of the air, its rapid eva-

poration produces an intense degree of cold; and as this is attended with a proportional diminution of bulk in the part to which it is applied, in this way it has frequently facilitated the reduction of strangulated hernia.

The mixture of ether with alcohol, whether prepared directly by mixing them as the Edinburgh college direct, or in the impure state in which it comes over in the first part of the process for distilling ether, possesses similar virtues with ether, but in an inferior degree.

ÆTHER NITROSUS. *Dub.*
Nitrous Ether.

Take of

Nitrate of kali, dried, and in coarse powder, one pound and a half;

Sulphuric acid, one pound;

Rectified spirit of wine, nineteen ounces, by measure.

Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it gradually, and in different portions, the sulphuric acid and spirit, previously mixed, and allowed to cool after having been mixed. Without any external heat, or only a very slight degree of it (such as the addition of tepid water to the bath), an ethereal liquor will begin to arise, without applying fire under it. In a short time, the heat will spontaneously increase in the retort, and a remarkable ebullition will take place, which are to be moderated, by cooling the bath with cold water. The receiver ought also to be cooled with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture, with very great force, if the heat should accidentally become too high) through a pound of rectified spirit of wine, placed in a cooled phial.

Put the ethereal liquor, which has distilled spontaneously, into a phial with a ground glass-stopper, and gradually add (closing the phial after each addition) as much very dry subcarbonate of kali in powder, as shall be sufficient to saturate the superabundant acid, according to the test of litmus. This commonly takes place on the addition of about a drachm of the salt; and in a short time, the nitrous ether will swim on the surface, and is to be separated by means of a funnel.

If it be required very pure, re-distil the ether from a water-bath, at about 140°, to one-half.

Its specific gravity is 900.

When alcohol and nitrous acid are mixed in the proportion necessary for the formation of nitrous ether, the utmost precautions must be taken to diminsh their action on each other. Dr Black contrived a very ingenious method of doing this, by rendering their mixture extremely slow. On two ounces of strong nitrous acid, put into a phial, having a conical ground glass-stopper, and a weak spring fitted to keep the stopper in its place, pour slowly and gradually about an equal quantity of water, which, by being made to trickle down the sides of the phial, will float on the surface of the acid, without mixing with it; then add, in the same cautious manner, three ounces of alcohol, which, in its turn, will float on the surface of the water. By this means the three fluids are kept separate, on account of their different specific gravities, and a stratum of water is interposed between the acid and spirit. The phial is now to be set in a cool place, and the acid will gradually ascend, and the spirit descend, through the water; this last acting as a boundary to restrain their action on each other. When this commences, bubbles of gas rise through the fluids, and the acid gets a blue colour, which it again loses in the course of a few days, and a yellow nitrous ether begins to swim on the surface. As soon as the formation of air-bubbles ceases, it is time remove the ether formed; for if allowed to remain, its quantity decreases. By this method, nitrous ether is formed, without the danger of producing any explosion. The residuum of this process is still capable of forming a spirit of nitrous ether, with an additional quantity of alcohol.

By adding the acid to the alcohol in very small quantities, and at considerable intervals, Mr Dehne procured from two pounds of alcohol, and one pound ten ounces and three drachms of nitrous acid, one pound nine ounces and three drachms of ether; the residuum weighed one pound twelve ounces. There was therefore a loss of five ounces. Mr Dehne put the alcohol into a tubulated retort, to which a receiver was luted, and poured the acid through the tubulature, and the ether passed over into the receiver, without the application of any heat. The action of the acid on the alcohol did not begin until six ounces and a half were added, and was found to be exhausted, when, on adding more acid, it fell to the bottom in the form of green drops. By using Mr Dehne's precaution, of adding the acid gradually, I prepared nitrous ether in a Woulfe's apparatus, with perfect ease and safety, although Fourcroy represents it as a most dangerous operation. I introduced the acid gradually through a funnel luted into the tubulature of the retort. The tube of the fun-

nel was very long, and its extremity was immersed in the alcohol in the retort. This simple contrivance not only enabled me to add to the acid as I pleased, but also acted as a tube of safety.

The method of forming nitrous ether, now directed by the Dublin college, is indeed said to be preferable to those mentioned. It was first practised by M. Voigt.

When alcohol is converted into ether by the action of nitrous acid, the change produced on it is nearly the same with that produced by sulphuric acid; but, in the latter case, it is effected by the affinities which form water, and charcoal is precipitated; and in the former, by the affinities which form carbonic acid, and no water is produced.

Nitrous ether seems to differ from sulphuric ether only in being combined with nitric oxide, at least it is highly inflammable, pungent, volatile, and is not soluble in water, while it gives a deep olive colour to green salts of iron, and has a considerable specific gravity. When simply washed with water, I found its sp. gr. to be 0.912; when the acid which it evidently contained was removed, by saturating it with potass, it became 0.896; and when rectified, by redistilling it, it became 0.866, but recovered decidedly acid properties, probably from the nitric oxide being acidified by the air of the apparatus.

Spiritus ætheris nitrosi. *Ed.*
Spirit of Nitrous Ether.

Take of

Alcohol, three pounds;
Nitrous acid, one pound.

Pour the alcohol into a capacious phial, placed in a vessel full of cold water, and add the acid by degrees, constantly agitating them. Let the phial be slightly covered, and placed for seven days in a cool place; then distil the liquor, with the heat of boiling water, into a receiver kept cool with water or snow, till no more spirit comes over.

Spiritus ætherеus nitrosus. *Dub.*
Nitrous Ethereal Spirit.

Add to the matter which remains after the distillation of the nitrous ether, the rectified spirit of wine, which was employed in that operation for condensing the elastic vapours, and distil, with the greatest heat of a water-bath, to dryness. Mix the distilled liquor with the alkaline liquor which remained after the separation of the nitrous ether,

and also add as much very dry subcarbonate of kali as shall be sufficient to saturate the predominant acid, according to the test of litmus. Lastly, distil by the medium heat of a water-bath as long as drops come over.

The specific gravity of this liquor is 850.

Spiritus ætheris nitrici. *Lond.*
Spirit of Nitrous Ether.

Take of

Rectified spirit of wine, two pints;
Nitric acid, three ounces, by weight.

Pour the acid gradually upon the spirit, and mix them, taking care that the heat do not exceed 120°, and distil with a gentle heat twenty-four fluidounces.

The action of alcohol and nitrous acid upon each other is much influenced by their proportions. If we use a small proportion of alcohol, or pour alcohol into nitrous acid, there immediately takes place a great increase of temperature, and a violent effervescence and disengagement of red fumes. On the contrary, by placing the phials containing the alcohol and acid in cold, or rather iced water, they may be mixed, without danger, in the proportions directed by the colleges; and if the acid be added in small quantities at a time, and each portion thoroughly mixed with the alcohol by agitation, I find that no action takes place until heat be applied. It is therefore unnecessary to keep the mixture for seven days; but we may immediately proceed to the distillation, which must be performed with a very slow and well-regulated fire; for the vapour is very apt to expand with so much violence as to burst the vessels; and the heat must at no time exceed 212°, otherwise a portion of undecomposed acid will pass over, and spoil the product. By performing this operation carefully in a Woulfe's apparatus, I got in the receiver, from three ounces of alcohol, specific gravity 0.841, and one ounce of nitrous acid, two ounces four drachms of spirit of nitrous ether, specific gravity 0.887. Eight ounces of alcohol, contained in the first phial connected with the receiver, gained one drachm and a half, and acquired specific gravity 0.873, and eight ounces of water in the second, 18 grains: the residuum weighed seven drachms and a half. There was therefore a loss of 2 drachms 42 grains of permanently elastic fluids. The first portion of these that was examined seemed to be the air of the apparatus: In the next, the candle burnt with an enlarged and brightened flame: was it nitrous oxide? and all that passed afterwards was a

mixture of carbonic acid and the etherized nitrous gas first described by the Dutch chemists. When recently prepared, this gas is inflammable, and does not form red fumes on coming into contact with atmospheric air: but when attempted to be kept over water, the water becomes acidulous, the gas is diminished in bulk about two-thirds, loses its inflammability, and is now converted into red vapours on the admission of atmospheric air. It therefore appears to consist of nitric oxide gas, holding ether in chemical solution. I have formed a similar gas, by admitting a few drops of ether to nitrous oxide gas over mercury.

The Edinburgh college directs the distillation to be continued till no more spirit comes over. But how is this to be ascertained? After having drawn off about two-thirds, according to the directions of the London college, I again applied heat to the retort; and examining the air, which began to come over into the pneumatic apparatus, by carelessly approaching a lighted candle to the extremity of the tube, it kindled, and burst the whole with a violent explosion.

When only 24 fluidounces are drawn off, a perfectly colourless and very slightly acid product is obtained, of sp. gr. 0.834, but immediately afterwards the spirit becomes coloured and very acid. Hence the quantity, which was 26 ounces in Phar. 1809, has been reduced.

The spirit of nitrous ether, thus obtained, is a colourless fluid, of a fragrant odour, lighter than water, extremely volatile and inflammable, possessing properties in general analogous to the spirit of sulphuric ether, but of considerably greater specific gravity, striking a deep olive, with a solution of green sulphate of iron, and often, if not always acid. By age and exposure to the air, it is gradually decomposed, and gives rise to the reproduction of nitrous acid. When this change has taken place, it may be rectified, by saturating the acid with lime-water, and re-distilling the ethereal fluid.

In all probability, spirit of nitrous ether is a mixture of nitrous ether and alcohol; for, by diminishing the quantity of alcohol employed, we obtain a fluid having a similar relation to the spirit of nitrous ether that sulphuric ether has to the spirit of sulphuric ether. By adding alcohol to the residuum of nitrous ether, the Dublin college prepare their spirit of nitrous ether, in the same way as spirit of sulphuric ether is prepared from the residuum of sulphuric ether: and by mixing nitrous ether with alcohol, we obtain a fluid exactly resembling spirit of nitrous ether.

Medical use.—Spirit of nitrous ether has been long deser-

vedly held in great esteem. It quenches thirst, promotes the natural secretions, expels flatulencies, and moderately strengthens the stomach. It may be given in doses of from twenty drops to a drachm, in any convenient vehicle. Mixed with a small quantity of spiritus ammoniæ aromaticus, it proves a mild, yet efficacious diaphoretic, and often remarkably diuretic, especially in some febrile cases, where such a salutary evacuation is wanted. A small proportion of this spirit added to malt spirits, gives them a flavour approaching to that of French brandy.

Chap. XV.—VEGETABILIA. *Lond.*

Vegetables.

Vegetables are to be gathered in their native soil and situation, and in a dry season, when they are neither wet with showers nor dew; they are to be collected every year, and what are older must be thrown away.

Roots, for the most part, are to be dug up before they shoot up their leaves or stalks.

Barks ought to be gathered when they can be separated most easily from the wood.

Leaves are to be plucked after the flowers have faded, and before the seeds are ripe.

Flowers are to be gathered when just opened.

Seeds are to be collected when ripe, and before they fall, and are to be kept in their proper coverings.

Vegetabilium præparatio. *Lond.*

Preparation of Vegetables.

Vegetables, soon after they are gathered, except those which are used fresh, are to be loosely spread out, and dried as quickly as possible, with a heat so low as not to alter the colour. They are then to be preserved from the action of light and moisture in proper situations or vessels.

Roots, which are directed to be preserved fresh, are to be buried in sand. The Squill, before drying it, is to have its arid coats peeled off, and to be cut transversely into thin slices.

Herbarum et florum exsiccatio. *Ed.*
The Drying of Herbs and Flowers.

Herbs and flowers are to be dried by the gentle heat of a stove or common fire, in such quantities only at a time, that the process may be finished as quickly as possible: for by this means their powers are best preserved; the test of which is the perfect preservation of their natural colour.

The leaves of hemlock *(conium maculatum)*, and of other plants containing a subtile volatile matter, must be immediately reduced to powder, after being dried, and afterwards kept in glass phials well corked.

Dub.

Put the fresh leaves of the herb, when in flower, into paper bags, and expose them to a low degree of heat for an hour; then spread them lightly upon a sieve, and dry them as quickly as possible, taking care that the green colour be not injured by too great a degree of heat: but if the herbs are to be used in the form of powder, they are to be powdered immediately, and preserved in small opaque phials well corked.

Herbs and flowers, from which waters or oils are to be distilled, should be dried as soon as they are gathered.

Pulvis scillæ. *Dub.*
Powder of Squills.

Cut the squills, after having removed their membranaceous integuments, into transverse slices; dry these on a sieve with a gentle heat, and reduce them to powder, which is to be kept in phials with ground glass-stoppers.

Scilla maritima exsiccata. *Ed.*
Dried Sea Squill.

Cut the root of the sea-squill, after having removed its external coat, transversely into thin slices, and dry it by a gentle heat. The sign of its being properly dried is, that although rendered friable, it retains its bitterness and acrimony.

By this method, the squill dries much sooner than when its several coats are only separated; the internal part being here laid bare, while, in each of the entire coats, it is covered with a thin skin, which impedes the exhalation of the moisture. The root loses in this process four-fifths of its original weight; the parts which exhale with a moderate heat appear to be merely watery: hence six grains of the dry root are equiva-

lent to half a drachm of it when fresh;—a circumstance to be particularly regarded in the exhibition of this medicine. But if too great heat has been employed in drying it, it becomes almost inert, and it also loses its virtues by long keeping in the state of powder.

Dried squills furnish us with a medicine, sometimes advantageously employed as an emetic, often as an expectorant, and still more frequently as a powerful diuretic.

PULVIS SPONGIÆ USTÆ. *Dub.* SPONGIA USTA. *Lond.*
Powder of Burnt Sponge.

Cut the sponge in pieces, and bruise it, so as to free it from small stones (foreign matters adhering to it *Lond.*); burn it in a covered iron vessel, until it becomes black and friable; afterwards reduce it to a very fine powder.

THIS medicine has been in use for a considerable time, and employed against bronchocele, scrofulous disorders, and cutaneous foulnesses, in doses of a scruple and upwards. Its virtues probably depend on the presence of a little alkali. It also contains charcoal, and its use may be entirely superseded by these substances, which may be obtained in other manners at a much cheaper rate.

PULVIS QUERCUS MARINÆ. *Dub.*
Powder of Yellow Bladder Wrack.

Take of

Yellow bladder wrack, in fruit, any quantity.

Dry and clean it; then expose it to the fire in an iron pot or crucible, covered with a perforated lid, until, after the vapours cease, the mass becomes of a dull red. Powder the carbonaceous mass which remains.

THIS charcoal was formerly known under the name of *Æthiops Vegetabilis*. It is analogous to the preceding article.

CHAP. XVI.—EXPRESSED JUICES.

THE juices of succulent plants are obtained by expression. They are of a very compound nature, consisting of the sap, the secreted fluids, and fecula, mixed together. When first procured, they are very high coloured, turbid, and loaded with parenchymatous matter. They may be purified by rest,

filtration, heat, and clarification. Rest may be employed with juices, which are very fluid, do not contain volatile matter, and are not susceptible of alteration, and with subacid juices, as that of lemon. By rest these undergo a kind of slight fermentation, and all their mucilaginous, and other viscid parts, separate. Filtration is perhaps the most perfect means of defecation, but it is tedious, and applicable only to very fluid juices. In many instances it may be facilitated by the addition of water. The action of heat is more expeditious, and is employed for juices which are very alterable, or which contain volatile matter. It is performed by introducing the juice into a matrass, and immersing it in boiling water for some minutes. The fecula are coagulated, and easily separated by filtration. Clarification by white of egg can only be used for very viscid mucilaginous juices, which contain nothing volatile. The white of two eggs may be allowed to each pint of juice. They are beat to a fine froth, the juice gradually mixed with them, and the whole brought to ebullition. The albumen coagulating envelopes all the parenchymatous and feculent matters, and the juice now passes the filter readily. By this process, juices are rendered sufficiently fine; but the heat employed deepens their colour, and manifestly alters them, so that it is not merely a defecating but a decomposing process. When depurated, juices are yellow or red, but never green.

The fluids thus extracted from succulent fruits, whether acid or sweet, from most of the acrid herbs, as scurvy-grass and water cresses, from the acid herbs, as sorrel and wood-sorrel, from the aperient lactescent plants, as dandelion and hawkweed, and from various other vegetables, contain great part of the peculiar taste and virtues of the respective subjects. The juices, on the other hand, extracted from most of the aromatic herbs, have scarcely any thing of the flavour of the plants, and seem to differ little from decoctions of them made in water boiled till the volatile odorous parts have been dissipated. Many of the odoriferous flowers, as the lily, violet, and hyacinth, not only impart nothing of their fragrance to their juice, but have it totally destroyed by the previous bruising. From want of sufficient attention to these particulars, practitioners have been frequently deceived in the effects of preparations of this class: juice of mint has been often prescribed as a stomachic, though it wants those qualities by which mint itself and its other preparations operate.

There are differences as great in regard to their preserving

those virtues, and this independently of the volatility of the active matter, or its disposition to exhale. Even the volatile virtue of scurvy-grass may, by the above method, be preserved almost entire in its juice for a considerable time; while the active parts of the juice of the wild cucumber quickly separate and settle to the bottom, leaving the fluid part inert. Juices of arum root, iris root, bryony root, and other vegetables, in like manner, allow their medicinal parts to settle at the bottom.

If juices are intended to be kept for any length of time, about one-fortieth part of their weight of good spirit of wine may be added, and the whole suffered to stand as before: a fresh sediment will now be deposited, from which the liquor is to be poured off, strained again, and put into small bottles which have been washed with spirit and dried. A little oil is to be poured on the surface, so as very nearly to fill the bottles, and the mouths closed with leather, paper, or stopped with straw, as the flasks are in which Florence oil is brought to us: this serves to keep out dust, and suffers the air to escape, which, in process of time, arises from all vegetable liquors, and which would otherwise endanger the bursting of the glasses; or being imbibed afresh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in sand. By this method some juices may be preserved for a year or two; and others for a much longer time, though, whatever care be taken, they are found to answer better when fresh; and from the difficulty of preserving them, they have of late been very much laid aside, especially since we have been provided with more convenient and useful remedies. The following is the only composition of the kind retained in our Pharmacopœias.

SUCCUS COCHLEARIÆ COMPOSITUS. *Ed.*
Compound Juice of Scurvy-grass.

Take of
Juice of Scurvy-grass,
Water-cresses expressed from fresh gathered herbs,
Seville oranges, of each two pounds;
Spirit of nutmegs, half a pound.
Mix them, and let them stand till the fæces have subsided, then pour off the clear liquor.

COMPOSITIONS of this kind are of considerable use for the purposes expressed in the title: the orange-juice is an excellent assistant to the scurvy-grass, and other acrid antiscorbutics, which, when thus mixed, have been found from expe-

rience to produce much better effects than when employed by themselves. They may be taken in doses from an ounce or two to a quarter of a pint, two or three times a-day: they generally increase the urinary secretion, and sometimes induce a laxative habit.

Chap. XVII.—INSPISSATED JUICES.

This is a very convenient form for the exhibition of those substances which are sufficiently succulent to afford a juice by expression, and whose virtues do not reside in any very volatile matter. By inspissation, the bulk of the requisite dose is very much diminished; they are reduced to a form convenient for making up into pills; and they are much less apt to spoil than the simple expressed juices. The mode of their preparation is not yet, however, reduced to fixed principles. Some direct the juices to be inspissated as soon as they are expressed; others allow them previously to undergo a slight degree of fermentation; some defecate them before they proceed to inspissate them; and, lastly, Baumé prepares his elaterium by inspissating the defecated juice of the wild cucumber, while our colleges give the same name to the matter which subsides from it. The nature of the soil, of the season, and many other circumstances, must materially alter the quantity or nature of the product. In moist years, Baumé got from thirty pounds of alder berries, four or five pounds of inspissated juice, and in dry years only two, or two and a half. From hemlock he got, in October 1769, 7.5 *per cent.* of inspissated juice, and in May of the same year only 3.7; on the contrary, in August 1768, 4 *per cent.* and in May 1770, 6.5; but, in general, the product in the autumn months was greatest.

Succus spissatus aconiti napelli. *Ed.*

Inspissated Juice of Wolfsbane.

Bruise the fresh leaves of wolfsbane, and, including them in a hempen bag, compress them strongly till they yield their juice, which is to be evaporated in flat vessels heated with boiling water, saturated with muriate of soda, and immediately reduced to the consistence of thick honey.

After the mass has become cold, let it be put up in glazed earthen vessels, and moistened with alcohol.

SUCCUS SPISSATUS CICUTÆ. *Dub.*
Inspissated Juice of Hemlock.

Express the leaves of hemlock, gathered when the flowers are just appearing, and allow the juice to stand six hours, until the fæces subside; then reduce the decanted juice to the thickness of an extract, with a moderate heat.

IN this manner prepare

SUCCUS SPISSATUS ATROPÆ BELLADONÆ. *Ed.*	*The inspissated juice of Deadly Nightshade*, from the leaves.
ACONITI NAPELLI. *Ed.*	*Wolfsbane*, from the leaves.
CONII MACULATI. *Ed.* / CICUTÆ. *Dub.*	*Hemlock*, from the leaves, when it is about to flower.
HYOSCIAMI NIGRI. *Ed.* / HYOSCIAMI. *Dub.*	*Henbane*, from the leaves.
LACTUCÆ VIROSÆ. *Ed.*	*Poisonous lettuce*, from the leaves.
SAMBUCI. *Dub.*	*Elder Berries.*

EXTRACTUM ACONITI. *Lond.*
Extract of Monkshood.

Take of
Monkshood leaves, fresh, one pound.
Bruise them in a stone mortar, sprinkling a little water upon them: then express the juice, and evaporate it without separating the sediment, to a proper thickness.

IN the same manner are prepared,

EXTRACTUM BELLADONÆ. *Lond.*
Extract of Bittersweet.

EXTRACTUM CONII. *Lond.*
Extract of Hemlock.

EXTRACTUM HYOSCIAMI. *Lond.*
Extract of Henbane.

THESE are not properly extracts, but inspissated juices. It is, however, necessary to observe, that the mode of preparation directed by the London college differs from that of the others, in not separating the feculent matter which always is deposited from expressed juices, before they are evaporated. What the effect of this feculum is upon the virtues, consistency, or durability, of the inspissated juices, is not well ascertained.

SUCCUS SPISSATUS SAMBUCI NIGRI, vulgo ROB SAMBUCI. *Ed.*
Inspissated Juice of Elder Berries, commonly called *Elder Rob.*

Take of
Juice of ripe elder berries, five pounds;
Refined sugar, one pound.
Evaporate with a gentle heat, to the consistence of pretty thick honey.

THESE inspissated juices contain the virtues of the respective vegetables in a very concentrated state. Those of the elder, black currant, and lemon, are acidulous, cooling, and laxative, and may be used in considerable quantities, while those of the wolfsbane, hemlock, deadly nightshade, henbane, and poisonous lettuce, are highly narcotic and deleterious, and must be given only in very small doses.

FECULA.

SUCCUS SPISSATUS MOMORDICÆ ELATERII. *Ed.*
Inspissated Juice of the Wild Cucumber.

Slice ripe wild cucumber, express the juice very gently, and strain it through a very fine hair-sieve; then boil it a little, and set it aside some hours, until the thicker part has subsided. Pour off the thinner supernatant fluid, and separate the rest by filtering. Cover the thicker part, which remains after filtration with a linen cloth, and dry it with a gentle heat.

ELATERIUM. *Dub.*
Elaterium.

Slice ripe wild cucumbers, express the juice very gently, and strain it through a very fine hair-sieve, into a glass vessel. Then set it aside for some hours until the thicker part subside. Reject the supernatant liquor, and dry with a moderate heat the feculum, laid upon and covered with a linen cloth.

EXTRACTUM ELATERII. *Lond.*
Extract of Elaterium.

Slice ripe wild cucumbers, express the juice very gently, and filter it through a very fine hair-sieve, into a glass vessel; then let it rest for some hours, until the thicker part subside. Throw away the thinner supernatant fluid, and dry the thicker part with a gentle heat.

This is not properly an inspissated juice, but a deposition from the expressed juice. Such depositions have long been called Fecula, and the denomination has been confirmed in modern times. Its application, however, appears to us to be too extended; for fecula is applied both to mild and nutritious substances, such as that of which we are now treating. Besides, if it possessed exactly the same chemical properties as starch, it would be converted into a gelatinous mass by the boiling directed by the Edinburgh college, and would not separate; whereas the boiling is intended to promote the separation.

Common filtration through paper does not succeed here: the grosser parts of the juice, falling to the bottom, form a viscid cake upon the paper, which the liquid cannot pass through. The separation is to be effected by draining the fluid from the top, by placing one end of some moistened stripes of woollen cloth, skeins of cotton, or the like, in the juice, and laying the other end over the edge of the vessel, so as to hang down lower than the surface of the liquor.

Medical use.—Elaterium is a very violent hydragogue cathartic. In general, previous to its operation, it excites considerable sickness at stomach, and frequently produces severe vomiting. It is therefore seldom employed till other remedies have been tried in vain. But in some instances of ascites, it will produce a complete evacuation of water, where other cathartics have had no effect. Two or three grains are, in general, a sufficient dose, although perhaps the best mode of exhibiting it is by giving it only to the extent of half a grain at a time, and repeating that dose every hour, till it begins to operate.

PULPS.

Pulparum extractio. *Ed.*
Extraction of Pulps.

Boil unripe pulpy fruits, and ripe ones, if they be dry, in a small quantity of water, until they become soft; then press out the pulp through a hair-sieve, and afterwards boil it down to the consistence of honey, in an earthen vessel, over a gentle fire, taking care to stir the matter continually, to keep it from burning.

The pulp of *Cassia fistularis* is, in like manner, to be boiled out from the bruised pod, and reduced afterwards to a proper consistence, by evaporating the water.

The pulps of fruits that are both ripe and fresh are to be expressed through the sieve, without any previous boiling.

Dub.

Fruits, whose pulps are to be extracted, if they be unripe, or ripe and dry, are to be boiled in a little water until they become soft. Then the pulps, expressed through a hair-sieve, are to be evaporated to a proper degree of thickness.

Lond.

Set *pulpy fruits*, if they be unripe, or ripe and dry, in a moist place, that they may become soft; then press the pulps through a hair-sieve: afterwards boil them with a gentle heat, and stir them frequently; and, lastly, evaporate the water in a water-bath, until the pulps acquire the proper consistency.

Pour boiling water on the bruised pods of the *Cassia*, so as to wash out the pulp; which is then to be pressed, first through a coarse sieve, and afterwards through a hair-sieve; lastly, evaporate the water in a water-bath, so as to reduce the pulp to a proper consistency.

Express the pulps of ripe and recent fruits through a sieve, without boiling them.

When these fruits are not sufficiently juicy to afford a pulp by simple expression, the decoction ordered by the Edinburgh and Dublin college is much more certain, and in every respect preferable to exposing them to a moist air, which is not only often inefficacious, but is apt to render them spoilt and mouldy. On the other hand, the precaution used by the London college, of finishing the evaporation in a water-bath, is highly proper, as otherwise they are extremely apt to become empyreumatic.

The pulps expressed from recent substances, without coction, are less mucilaginous, are more apt to allow their fluid parts to separate, when left at rest, than when they have been previously boiled. Very succulent vegetables, such as apples, pears, and lily roots, may be roasted in hot ashes, instead of being boiled.

Chap. XVIII.—FIXED OILS.

These oils are commonly denominated Expressed Oils, an appellation which is manifestly improper, as, in some instances, they are obtained without expression, and, in others, expression is employed to obtain volatile oils. The Edinburgh college have therefore distinguished these different classes of oils by the terms Fixed and Volatile, which accurately characterise them.

Fixed oil is formed in no other part of vegetables than in their fruit. Sometimes, although very rarely, it is contained in the parenchyma of the fruit. Of this the best known example is the olive. But it is most commonly found in the seeds of dicotyledonous vegetables, sometimes also in the fruit of monocotyledonous plants, as the cocos butyracea. It has various degrees of consistency, from the tallow of the croton sebiferum of China, and the butter of the butter-tree of Africa, to the fluidity of olive oil.

Fixed oils are either

1. Fat, easily congealed, and not inflammable by nitric acid, such as oil of olives, almonds, rapeseed, and ben.
2. Drying, not congealable, inflammable by nitric acid, such as oil of linseed, nut, and poppy.
3. Concrete, such as palm oil, &c.

Fixed oil is separated from the fruits and seeds which contain it, either by expression or decoction. Heat, by rendering the oil more limpid, increases very much the quantity obtained by expression; but as it renders it less bland, and more apt to become rancid, heat is not used in the preparation of oils which are to be employed in medicine. When obtained by expression, oils often contain a mixture of mucilage, starch, and colouring matter; but part of these separate in course of time, and fall to the bottom. When oils become rancid, they are no longer fit for internal use, but are then said to effect the killing of quicksilver, as it is called, more quickly. Decoction is principally used for the extraction of the viscid and consistent oils, which are melted out by the heat of the boiling water, and rise to its surface.

Those who prepare large quantities of the oil of almonds

blanch them, by steeping them in very hot water, which causes their epidermis to swell and separate easily. After peeling them, they dry them in a stove, then grind them in a mill like a coffee-mill, and, lastly, express the oil from the paste, inclosed in a hempen bag. By blanching the almonds, the paste which remains within the bag is sold with greater advantage to the perfumers, and the oil obtained is perfectly colourless. But the heat employed disposes the oil to become rancid, and the slight colour the oil acquires from the epidermis does not injure its qualities. For pharmaceutical use, therefore, the almonds should not be blanched, but merely rubbed in a piece of coarse linen, to separate, as much as possible the brown powder adhering to the epidermis. Sixteen ounces of sweet almonds commonly give five ounces and a half of oil. Bitter almonds afford the same proportion, but the oil has a pleasant bitter taste.

OLEUM AMYGDALÆ COMMUNIS. *Ed.*
Oil of Almonds.

Take of
Fresh almonds, any quantity.
After having bruised them in a stone mortar, put them into a hempen bag, and express the oil, without heat.

In the same manner prepare from the seeds,

OLEUM LINI USITATISSIMI. *Ed.*
Oil of Linseed.

OLEUM AMYGDALARUM. *Dub.*
Oil of Almonds.

Bruise fresh almonds in a mortar, and express the oil in a press, without heat.

OLEUM LINI. *Dub.*
Oil of Linseed,

Is expressed in the same way from the seeds.

OLEUM AMYGDALARUM. *Lond.*
Oil of Almonds.

Macerate almonds, either sweet or bitter, in cold water, for twelve hours, and bruise them. Then express the oil, without heat.

OLEUM LINI. *Lond.*
Oil of Linseed.

Bruise the seeds of common flax, and express the oil, without heat.

OLEUM RICINI. *Lond.*
Castor Oil.

Bruise the peeled seeds, and express the oil without heat.

THE chemical properties of these oils have been already mentioned; and an account of the medical virtues of each will be found in their respective places in the Materia Medica.

CHAP. XIX.—OILY PREPARATIONS.

OLEUM AMMONIATUM, vulgo LINIMENTUM VOLATILE. *Ed.*
LINIMENTUM AMMONIÆ. *Dub.*
Ammoniated Oil, commonly called *Volatile Liniment*. *Liniment of Ammonia.*

Take of
Olive oil, two ounces;
Water of ammonia, two drachms.
Mix them together.

LINIMENTUM AMMONIÆ FORTIUS. *Lond.*
Stronger Liniment of Ammonia.

Take of
Water of ammonia, one fluidounce;
Olive oil, two fluidounces.
Shake them together until they mix.

LINIMENTUM AMMONIÆ SUBCARBONATIS. *Lond.*
Liniment of Subcarbonate of Ammonia.

Take of
Solution of subcarbonate of ammonia, one fluidounce;
Olive oil, three fluidounces.
Shake them together till they are mixed.

THE most commonly adopted generic name for the combination of oil with alkalies is soap, and the species are distinguished by the addition of the name of the alkali they contain. On these principles, volatile liniment should be called Soap of Ammonia, as hard soap is soap of soda, and soft soap, soap of potass.

The ammonia used in the two first of these preparations,

combines much more easily and intimately with the oil than the carbonate of ammonia used in the last. If the carbonate be employed with the view of rendering the preparation less stimulating, the same end will be more scientifically obtained, by increasing the proportion of oil mixed with pure ammonia. The two first of these liniments differ greatly in point of strength, the proportion of water of ammonia in the first being as 1 to 8, and the second as 1 to 2.

Medical use.—They are frequently used externally as stimulants and rubefacients. In inflammatory sore throats, a piece of flannel moistened with these soaps, applied to the throat, and renewed every four or five hours, is one of the most efficacious remedies. By means of this warm stimulating application, the neck, and sometimes the whole body, is put into a sweat, which, after bleeding, either carries off or lessens the inflammation. When too strong, or too liberally applied, they sometimes occasion inflammation, and even excite blisters. Where the skin cannot bear their acrimony, a larger proportion of oil may be used.

But the first of these preparations is even sometimes used internally, made into a mixture with syrup and some aromatic water. A drachm or two taken in this manner, three or four times a-day, is a powerful remedy in some kinds of catarrh and sore throat.

Linimentum aquæ calcis, sive Oleum lini cum calce. *Ed.*

Linimentum calcis. *Dub.*

Liniment of Lime Water, or *Linseed Oil with Lime.*

Take of

Linseed oil (olive oil, *Dub.*),

Lime-water, of each equal parts (three ounces by measure, *Dub.*).

Mix them (by shaking them together, *Dub.*)

This liniment, commonly called Carron Oil, is extremely useful in cases of scalds or burns, being singularly efficacious in preventing, if applied in time, the inflammation subsequent to these; or even in removing it, after it has come on.

It is also a species of soap, and might be called Soap of Lime, although it probably contains a great excess of oil.

Oleum camphoratum. *Ed. Dub.*

Camphorated Oil.

Take of

Olive oil, two ounces, (by measure, *Dub.*);

Camphor, half an ounce.

Mix them, so that the camphor may be dissolved, (triturate them together, *Dub.*).

This is a simple solution of camphor in fixed oil, and is an excellent application to local pains, from whatever cause, and to glandular swellings.

Oleum sulphuratum. *Ed.*
Sulphuretted Oil.

Take of

Olive oil, eight ounces;

Sublimed sulphur, one ounce.

Boil them together in a large iron pot, stirring them continually till they unite.

Lond.

Take of

Washed sulphur, two ounces.

Olive oil, a pint.

Gradually project the sulphur upon the oil, heated in a very large iron vessel, and stir constantly with a spatula, till they unite.

Göttling directs the oil to be heated in an iron pot, and the sulphur to be gradually added, while the solution is promoted by constant stirring with an iron spatula. The pot must be sufficiently large, as the mixture swells and boils up very much; and as it is apt to catch fire a lid should be at hand to extinguish it by covering up the pot.

Medical use.—Sulphuretted oil was formerly strongly recommended in coughs, consumptions, and other disorders of the breast and lungs: but the reputation which it had in these cases does not appear to have been derived from any fair trial or experience. It is manifestly hot, acrimonious, and irritating, and should therefore be used with the utmost caution. It has frequently been found to injure the appetite, offend the stomach and viscera, parch the body, and occasion thirst and febrile heats. The dose of it is from ten to forty drops. It is employed externally for cleansing and healing foul running ulcers; and Boerhaave conjectures, that from its effects in these cases, the virtues ascribed to it, when taken internally, were deduced by a false analogy.

Chap. XX.—VOLATILE OILS.

Substances which differ in volatility, may be separated from each other by applying a degree of heat capable of converting the most volatile into vapour, and by again condensing this vapour in a proper apparatus. Water is converted into vapour at 212°, and may be separated by distillation from the earthy and saline matters which it always contains in a natural state. But it is evident, that if any substances which are as volatile as water, be exposed to the same degree of heat, either by immersing them in boiling water, or exposing them to the action of its steam, they will rise with it in distillation. In this way the camphor and volatile oils of vegetable substances are separated from the more fixed principles.

Volatile oils are obtained only from odoriferous substances; but not equally from all of this class, nor in quantity proportional to their degree of odour. Some, which, if we were to reason from analogy, should seem very well fitted for this process, yield extremely little oil, and others none at all. Roses and chamomile flowers, whose strong and lasting smell promises abundance, are found to contain but a small quantity of oil; the violet and jessamine flower, which perfume the air with their odour, lose their smell upon the gentlest coction, and do not afford any oil on being distilled, unless immense quantities are submitted to the operation at once: while savin, whose disagreeable scent extends to no great distance, gives out the largest proportion of volatile oil of almost any vegetable known.

Nor is the same plant equally fit for this operation, when produced in different soils or seasons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as sage, afford the largest quantity when young, before they have sent forth any flowers; and others, as thyme, when the flowers have just appeared. All fragrant herbs yield a larger proportion of oil, when produced in dry soils, and in warm summers, than in opposite circumstances. On the other hand, some of the disagreeable strong-scented plants, as wormwood, are said to contain most oil in rainy seasons, and when growing in moist rich grounds.

Several chemists have been of opinion, that herbs and flowers, moderately dried, yield a greater quantity of volatile oil, than if they were distilled when fresh. It is, however, highly improbable, that the quantity of volatile oil will be increased by drying; on the contrary, part of it must be dissipated and lost. But drying may sometimes be useful in other ways, either by diminishing the bulk of the subject to be distilled, or by causing it to part with its oil more easily; and aromatic waters, distilled from the dry herb, are more fragrant than from the fresh. But the directions of the London college to dry the herb used in the distillation of volatile oils, would be extremely inconvenient, as large quantities of the oils of lavender, peppermint, spearmint, and pennyroyal, are annually distilled in this country from the fresh herb; and the oils of aniseed, chamomile, caraway, juniper, origanum, rosemary and pimento, are usually imported.

The choice of proper instruments is of great consequence for the performance of this process to advantage. There are some oils which pass freely over the swan neck of the head of the common still: others, less volatile, cannot easily be made to rise so high. For obtaining these last, we would recommend a large low head, having a rim or hollow canal round it: in this canal, the oil is detained in its first ascent, and thence conveyed at once into the receiver, the advantages of which are sufficiently obvious.

We cannot separate the volatile oil from aromatic substances by distilling them alone, because the proportion of these oils is so small, that they could not be collected; and besides, it would be impossible to regulate the heat so as to be sufficient, and yet not to burn the subject, and destroy the product. Hence it is necessary to distil them with a proportion of water, which answers extremely well, as the oils are all more volatile in water, and soluble in it only to a certain extent.

With regard to the proportion of water to be employed; if whole plants, moderately dried, are used, or the shavings of woods, as much of either may be put into the vessel as, lightly pressed, will occupy half its cavity; and as much water may be added as will fill two-thirds of it. When fresh and juicy herbs are to be distilled, thrice their weight of water will be fully sufficient; but dry ones require a much larger quantity. In general, there should be so much water, that after all intended to be distilled has come over, there may be liquor enough left to prevent the matter from burning to the still. The water and ingredients, altogether, should never take up

more than three-fourths of the still; there should be liquor enough to prevent any danger of empyreuma, but not so much as to be in danger of boiling over into the receiver.

The subject of distillation should be macerated in the water until it be perfectly penetrated by it. To promote this effect, woods should be thinly shaved across the grain, or sawn, roots cut transversely into thin slices, barks reduced into coarse powder, and seeds slightly bruised. Very compact and tenacious substances require the maceration to be continued a week or two, or longer; for those of a softer and looser texture, two or three days are sufficient, while some tender herbs and flowers not only stand in no need of maceration, but are even injured by it. The fermentation which was formerly prescribed in some instances, is always hurtful.

The fire ought to be quickly raised, and kept up during the whole process; but to such a degree only, that the oil may freely distil; otherwise the oil will be exposed to an unnecessary heat; a circumstance which ought, as much as possible, to be avoided. Fire communicates to all these oils a disagreeable impregnation, as is evident from their being much less grateful when newly distilled, than after they have stood for some time in a cool place; and the longer the heat is continued, the greater alteration it produces in them.

The greater number of oils require for their distillation the heat of water strongly boiling; but there are many also which rise with a heat considerably less; such as those of lemon and citron peel, of the flowers of lavender and rosemary, and of almost all the more odoriferous kinds of flowers. We have already observed, that these flowers have their fragrance much injured, or even destroyed, by beating and bruising them; it is impaired also by the immersion in water in the present process, and the more so in proportion to the continuance of the immersion and the heat; hence oils, distilled in the common manner, prove much less agreeable in smell than the subjects themselves. For the distillation of substances of this class, another method has been contrived: instead of being immersed in water, they are exposed only to its vapour. A proper quantity of water being put into the bottom of the still, the odoriferous herbs or flowers are laid lightly in a basket, of such a size that it may enter into the still, and rest against its sides, just above the water. The head being then fitted on, and the water made to boil, the steam, percolating through the subject, imbibes the oil, without impairing its fragrance, and carries it over into the receiver. Oils thus obtained, possess the odour of the subject in an exquisite degree, and

have nothing of the disagreeable scent perceivable in those distilled by boiling them in water in the common manner.

Plants differ so much, according to the soil and season of which they are the produce, and likewise according to their own ages, that it is impossible to fix the quantity of water to be drawn from a certain weight of them to any invariable standard. The distillation may always be continued as long as the liquor runs well flavoured off the subject, but no longer.

The mixture of water and oil which comes over may either be separated immediately, by means of a separatory, or after it has been put into large narrow-necked bottles, and placed in a cool place, that the portion of oil which is not dissolved in the water may rise to the top, or sink to the bottom, according to its specific gravity. It is then to be separated, either by a separatory, (Plate I. fig. 10.); or by means of a small glass syringe; or by means of a filter of paper; or, lastly, by means of a woollen thread, one end of which is immersed in the oil, and the other lower end in a phial: the oil will thus pass over into the phial by capillary attraction, and the thread is to be squeezed dry.

The water employed in the distillation of volatile oils always imbibes some portion of the oil, as is evident from the smell, taste, and colour, which it acquires. It cannot, however, retain above a certain quantity; and hence, such as has been already used, and, therefore, almost saturated, may be advantageously employed, instead of common water, in a second, or any future distillation of the same subject.

After the distillation of one oil, particular care should be had to clean the worm perfectly before it be employed in the distillation of a different substance. Some oils, those of wormwood and aniseeds for instance, adhere to it so tenaciously, as not to be melted out by heat, or washed off by water; the best way of removing these, is to run a little spirit of wine through it.

Volatile oils, after they are distilled, should be suffered to stand for some days, in vessels loosely covered with paper, till they have lost their disagreeable fiery odour, and become limpid: then put them up in small bottles, which are to bekept quite full, and closely stopped, in a cool place. With these precautions, they will retain their virtues in perfection for many years.

Most of the oils mentioned above are prepared by our chemists in Britain, and are easily procurable in a tolerable degree of perfection: but the oils from the more expensive spices, though still introduced among the preparations in the

foreign Pharmacopœias, are, when employed among us, usually imported from abroad.

These are frequently so much adulterated, that it is not easy to meet with such as are at all fit for use: nor are these adulterations easily discoverable. The grosser abuses, indeed, may be readily detected. Thus, if the oil be mixed with alcohol, it will turn milky on the addition of water; if with expressed oils, alcohol will dissolve the volatile, and leave the other behind; if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its smell. But the more subtile artists have contrived other methods of sophistication, which elude all trials of this kind.

Some have looked upon the specific gravity of oils as a certain criterion of their genuineness. This, however, is not to be absolutely depended on; for the genuine oils, obtained from the same subjects, often differ in gravity as much as those drawn from different ones. Cinnamon and cloves, whose oils usually sink in water, yield, if slowly and carefully distilled, oils of great fragrancy, which are specifically lighter than the aqueous fluid employed in their distillation; whilst, on the other hand, the last runnings of some of the lighter oils prove sometimes so ponderous as to sink in water.

As all volatile oils agree in the general properties of solubility in spirit of wine, sparing solubility in water, miscibility with water, by the intervention of certain intermedia, volatility in the heat of boiling water, &c. it is plain that they may be variously mixed with each other, or the dearer sophisticated with the cheaper, without any possibility of discovering the abuse by any trials of this kind: and, indeed, it would not be of much advantage to the purchaser, if he had infallible criteria of the genuineness of every individual oil. It is of as much importance that they be *good*, as that they be *genuine*; for genuine oils, from inattentive distillation, and long and careless keeping, are often weaker, both in smell and taste, than the common sophisticated ones.

The smell and taste seem to be the only certain tests of which the nature of the thing will admit. If a bark should have in every respect the appearance of good cinnamon, and should be proved indisputably to be the genuine bark of the cinnamon tree; yet if it want the cinnamon flavour, or has it but in a low degree, we reject it; and the case is the same with the oil. It is only from use and habit, or comparisons with specimens of known quality, that we can judge of the goodness, either of the drugs themselves, or of their oils.

Most of the volatile oils, indeed, are too hot and pungent to be tasted with safety: and the smell of the subject is so much concentrated in them, that a small variation in this respect is not easily distinguished; but we can readily dilute them to any assignable degree. A drop of the oil may be dissolved in spirit of wine, or received on a bit of sugar, and dissolved by that intermedium in water. The quantity of liquor which it thus impregnates with its flavour, or the degree and quality of flavour which it communicates to a certain determinate quantity of liquor, will be the measure of the degree of goodness of the oil.

Olea volatilia. *Ed.*
Volatile Oils.

Volatile oils are prepared nearly in the same manner as the distilled waters, except that less water is to be added. Seeds and woody substances are to be previously bruised or rasped. The oil comes over with the water, and is afterwards to be separated from it, according as it may be lighter than the water, and swim upon its surface, or heavier, and sink to the bottom.

Besides, in preparing these distilled waters and oils, it is to be observed, that the goodness of the subject, its texture, the season of the year, and similar causes, must give rise to so many differences, that no certain or general rule can be given to suit accurately each example. Therefore many things are omitted, to be varied by the operator according to his judgment, and only the most general precepts are given.

Olea distillata. *Lond.*
Distilled Oils.

The seeds of anise and caraway, the flowers of chamomile and lavender, the berries of juniper and allspice, the tops of rosemary, and the dried herbs of other articles, are to be used.

Each of these is to be put into an alembic, and covered with water, and the oil drawn off by distillation into a large refrigeratory.

The water which comes over with the oils of caraway, peppermint, mint, allspice, and pennyroyal, in distillation, is to be kept for use.

Dub.

Let the oil be extracted, by distillation, from the subject previously macerated in water, with the addition of as much water as may be sufficient to prevent empyreuma.

In distilling fennel, peppermint, spearmint, pennyroyal, and pimento, the liquor which comes over along with the oil is to be preserved for use in the manner directed in the chapter on Distilled Waters.

According to these directions, prepare

Oleum volatile. *Ed.*	Volatile, or distilled
Oleum distillatum. *Lond. Dub.*	oil of
Carui. *Dub. Lond.*	Caraway, *from the seeds.*
Fœniculi dulcis. *Dub.*	Fennel, *from the seeds.*
Juniperi communis. *Ed.* / Juniperi. *Lond. Dub.*	Juniper, *from the berries.*
Juniperi sabinæ. *Ed.* / Sabinæ. *Dub.*	Savine, *from the leaves.*
Lauri sassafras. *Ed.* / Sassafras. *Dub.*	Sassafras, *from the root, bark, and wood.*
Lavandulæ spicæ. *Ed.* / Lavandulæ. *Lond. Dub.*	Lavender, *from the flowering spikes.*
Anthemidis. *Lond.*	Chamomile, *from the flowers.*
Menthæ piperitæ. *Ed. Lond.* / Menthæ piperitidis. *Dub.*	Peppermint, *from the herb in flower.*
Menthæ sativæ. *Dub.* / Menthæ viridis. *Lond.*	Spearmint, *from the herb in flower.*
Myrti pimentæ. *Ed.* / Pimento. *Dub.* Pimentæ. *Lond.*	Pimento, *from the fruit or berry.*
Origani. *Dub. Lond.*	Origanum, *from the herb in flower.*
Pimpinellae anisi. *Ed.* / Anisi. *Lond. Dub.*	Aniseed, *from the seeds.*
Pulegii. *Lond. Dub.*	Pennyroyal, *from the herb in flower.*
Rorismarini officinalis. *Ed.* / Rorismarini. *Dub.* / Rosmarini. *Lond.*	Rosemary, *from the flowering tops.*
Rutæ. *Dub.*	Rue, *from the herb in flower.*

Medical use.—Volatile oils, medicinally considered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the subjects from which they are obtained, the oil being the direct principle in which the virtues, or at least a considerable part of the virtues of the several subjects reside. Thus, the carminative virtue of the warm seeds, the diuretic of juniper berries, the emmenagogue of savine, the nervine of rosemary, the stomachic of mint, the cordial of aromatics, &c. are supposed to be concentrated in their oils.

There is another remarkable difference in volatile oils, the foundation of which is less obvious, that of the degree of their

pungency and heat. These are by no means in proportion, as might be expected, to those of the subject they were drawn from. The oil of cinnamon, for instance, is excessively pungent and fiery; in its undiluted state it is almost caustic; whereas cloves, a spice which, in substance, is far more pungent than the other, yields an oil which is much less so. This difference seems to depend partly upon the quantity of oil afforded, cinnamon yielding much less than cloves, and consequently having its active matter concentrated into a smaller volume, partly upon a difference in the nature of the active parts themselves; for though volatile oils contain always the specific odour and flavour of their subjects, whether grateful or ungrateful, they do not always contain the whole pungency: this resides frequently in a more fixed matter, and does not rise with the oil. After the distillation of cloves, pepper, and some other spices, a part of their pungency is found to remain behind; a simple tincture of them in alcohol is even more pungent than their pure essential oils.

The more grateful oils are frequently made use of for reconciling to the stomach medicines of themselves disgustful. It has been customary to employ them as correctors for the resinous purgatives; an use to which they do not seem to be well adapted. All the service they can here be of is, to make the resin sit more easily at first on the stomach; far from abating the irritating quality upon which the violence of its operation depends, these pungent oils superadd a fresh stimulus.

Volatile oils are never given alone, on account of their extreme heat and pungency; which in some is so great, that a single drop let fall upon the tongue produces a gangrenous eschar. They are readily imbibed by a piece of dry sugar, and in this form may be conveniently exhibited. Ground with eight or ten times their weight of sugar, they become soluble in aqueous liquors, and thus may be diluted to any assigned degree. Mucilages also render them miscible with water into an uniform milky liquor. They dissolve likewise in alcohol; the more fragrant in an equal weight, and almost all of them in less than four times their own weight. These solutions may be either taken on sugar, or mixed with syrups, or the like. On mixing them with water, the liquor grows milky, and the oil separates.

The more pungent oils are employed externally against paralytic complaints, numbness, pains, and aches, cold tumours, and in other cases where particular parts require to be heated or stimulated. The toothach is sometimes relieved by a drop of these almost caustic oils, received on cotton, and cautiously introduced into the hollow tooth.

Oleum terebinthinæ. *Dub.*
Oil of Turpentine.

Take of
Common turpentine, five pounds;
Water, four pints.
Distil the turpentine with the water in a copper alembic. After the distillation of the oil, what remains in the retort is *yellow resin.*

Oleum volatile pini purissimum; olim Oleum terebinthinæ purissimum. *Ed.* Oleum terebinthinæ rectificatum. *Lond. Dub.*
Rectified Oil of Turpentine.

Take of
Oil of turpentine, one pint, (two pints, *Dub.*);
Water, four pints, (four pints, *Dub.*)
Distil, *Lond.* (a pint and a half of oil, *Dub.*) (as long as any oil comes over, *Ed.*)

This rectified oil, which, in many Pharmacopœias, is styled Ethereal, is said not to have its specific gravity, smell, taste, or medical qualities, much improved by this process, which is both tedious and accompanied with danger. It must be conducted with very great care; for the vapour, which is apt to escape through the junctures of the vessel, is very inflammable.

Medical use.—The spirit of turpentine, as this essential oil has been styled, is frequently taken internally as a diuretic and sudorific; and it has sometimes a considerable effect when taken to the extent of a few drops only. It has, however, been given in much larger doses, especially when mixed with honey. Recourse has principally been had to such doses in cases of chronic rheumatism, particularly in those modifications of it which are termed sciatica and lumbago; but sometimes they induce bloody urine. Of its singularly beneficial and almost specific effects in tænia, we have already spoken at considerable length in the Materia Medica.

Oil of turpentine, melted with as much ointment of yellow resin as is sufficient to give it the consistence of a liniment, constitutes the application to recent burns, so strongly recommended by Mr Kentish. He first bathes the part with heated oil of turpentine, alcohol, or tincture of camphor, and then covers it up with rags dipped in the liniment, which are to be renewed one at a time, once a-day. As the inflammation subsides, less stimulating applications are to be used; and when the secretion of pus commences, the parts are then to be co-

vered with powdered chalk, heated to the temperature of the body. In this way, he assures us that he cured very many extensive burns in a few weeks, which, under the use of cooling applications, would have required as many months, or would have been altogether incurable.

Chap. XXI.—DISTILLED WATERS.

In the distillation of volatile oils, the water, as was observed in a foregoing section, imbibes always a part of the oil. The distilled liquors here treated of, are nothing but water thus impregnated with the essential oil of the subject; whatever smell, taste, or virtue is communicated to the water, or obtained in the form of watery liquor, being found in a concentrated state in the oil.

All those vegetables, therefore, which contain an essential oil, will give over some virtue to water by distillation: but the degree of the impregnation of the water, or the quantity of water which a plant is capable of saturating with its virtue, are by no means in proportion to the quantity of its oil. The oil saturates only the water that comes over at the same time with it: if there be more oil than is sufficient for this saturation, the surplus separates, and concretes in its proper form, not miscible with the water that arises afterwards. Some odoriferous flowers, whose oil is in so small quantity, that scarcely any visible mark of it appears, unless fifty or an hundred pounds or more are distilled at once, give nevertheless as strong an impregnation to water as those plants which abound most with oil.

Many have been of opinion, that distilled waters may be more and more impregnated with the virtues of the subject, and their strength increased to any assigned degree, by *cohobation*, that is, by re-distilling them repeatedly from fresh parcels of the plant. Experience, however, shews the contrary. A water skilfully drawn in the first distillation, proves, on every repeated one, not stronger, but more disagreeable. Aqueous liquors are not capable of imbibing above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one, as well as by any number of distillations: the oftener the process is repeated, he ungrateful impression which they generally receive from the fire, even at the first time, becomes greater and greater.

Those plants, which do not yield at first waters sufficiently strong, are not proper subjects for this process.

Most distilled waters, when first prepared, have a somewhat unpleasant smell, which, however, they gradually lose: it is therefore advisable to keep them for some days after their preparation in vessels but slightly covered; and not to cork them up until they lose that smell.

That the waters may keep the better, about one-twentieth part their weight of proof-spirit may be added to each after they are distilled. I have been informed by a respectable apothecary, that if the simple distilled waters be rectified by distilling them a second time, they will keep for several years without the addition of any spirit, which always gives an unpleasant flavour, and is often objectionable for other reasons.

Distilled waters are employed chiefly as grateful diluents, as suitable vehicles for medicines of greater efficacy, or for rendering disgustful ones more acceptable to the palate and stomach; few of them are depended on, with any intention of consequence, by themselves.

To the chapter on Simple Distilled Waters, the London college have annexed the following remarks:

The waters are to be distilled from the dried herbs, unless otherwise ordered, because they are not to be had fresh at all times of the year. Whenever they are used fresh, the weights are to be doubled.

To every gallon of these waters add five fluidounces of proof-spirit, to preserve them.

The Edinburgh and Dublin colleges order half an ounce of proof-spirit to every pound of the water, which is nearly the same proportion.

AQUA DISTILLATA. *Lond.*
Distilled Water.

Take of
Water, ten gallons.
Draw off by distillation, first, four pints; which being thrown away, draw off four gallons, which is to be kept in a glass bottle.

Dub.

Take of
Spring water, twenty pints.
Put it into a glass retort, and having thrown away the first pint which comes over, draw off one gallon by distillation with a gentle heat.

Ed.

Let water be distilled in very clean vessels, until about two-thirds have come over.

WATER is never found pure in a state of nature; and as it is absolutely necessary, particularly for many chemical operations, that it should be perfectly so, we must separate it from all heterogeneous matters by distillation. The first portion that comes over should be thrown away, not so much from the possibility of its being impregnated with volatile matters contained in the water, as from the probability that it will be contaminated with impurities it may have contracted in its passage through the worm in the refrigeratory. The distillation is not to be pushed too far, lest the water should acquire an empyreumatic flavour.

Although distilled water be necessary for many purposes, we apprehend that the London college, from a desire of extreme elegance, in their former edition, fell into a very considerable error, in ordering it to be employed for many purposes, such as infusions and decoctions, for which good spring water answers just as well, and for which, we will venture to say, that distilled water never is employed by the apothecary. The consequence was, that the apothecary having no rule to direct him, when it was absolutely necessary, and when it might be dispensed with, dispensed with it oftener than was proper. In the present edition they have taken care not to subject themselves to this criticism.

AQUA CITRI AURANTII. *Ed.*
Orange-peel Water.

Take of
Fresh orange-peel, two pounds.
Pour upon it as much water as shall be sufficient to prevent any empyreuma, after ten pounds have been drawn off by distillation. After due maceration, distil ten pounds.

AQUA ANETHI. *Lond.*
Dill Water.

Take of
Dill seeds, bruised, one pound.
Pour upon them so much water, that after the distillation enough may be left to prevent empyreuma.
Draw off one gallon.

Aqua foeniculi dulcis. *Dub.*
Fennel Water.

Take of
The bruised seeds of sweet fennel, one pound.
Water, as much as may be sufficient to prevent empyreuma.
Distil one gallon.

In the same manner, and in the same quantity, prepare

Aqua	Water of
Anethi. *Lond.*	Dill, *from one pound of the seeds bruised.*
Carui. *Lond.*	Caraway, *from one pound of the seeds bruised.*
Citri aurantii. *Ed.*	Orange-peel, *from two pounds fresh.*
Citri medicæ. *Ed.*	Lemon-peel, *from two pounds of the fresh peel.*
Foeniculi. *Lond.*	Fennel, *from one pound of the bruised seeds.*
Foeniculi dulcis. *Dub.*	Sweet Fennel, *from one pound of the seeds bruised.*
Lauri cassiæ. *Ed.*	Cassia, *from one pound of the bark bruised.*
Lauri cinnamomi. *Ed.*	Cinnamon, *from one pound of the bark bruised.*
Cinnamomi. *Lond.*	Cinnamon, *from one pound of the bark bruised, and macerated for twenty-four hours in a pint of water.*
Cinnamomi. *Dub.*	Cinnamon, *from one pound of the bark bruised, and macerated for a day.*
Menthæ piperitæ. *Ed.*	Peppermint, *from three pounds of the herb in flower.*
Menthæ piperitidis. *Dub.* Menthæ piperitæ. *Lond.*	——— *from one and a half.*
Menthæ pulegii. *Ed.*	Pennyroyal, *from three pounds of the herb in flower.*
Pulegii. *Lond. Dub.*	——— *one and a half.*
Menthæ sativæ. *Dub.* ——— viridis. *Lond.*	Spearmint, *one pound and a half.*
Myrti pimentæ. *Ed.*	Pimento, *half a pound bruised.*
Pimento. *Dub.*	Pimento, *from half a pound bruised and macerated for a day.*
Pimentæ. *Lond.*	Pimento, *from half a pound bruised, and macerated for twenty-four hours in a pint of water.*

Aqua	Water of
Rosæ centifoliæ. *Ed.*	Rose, *from six pounds of the recent petals.*
Rosæ. *Dub.*	Rose, *from six pounds of the recent petals of the Damask rose.*
Rosæ. *Lond.*	Rose, *from eight pounds of the petals of the hundred-leaved rose.*

The virtues of all these waters are nearly alike; and the peculiarities of each will be easily understood, by consulting the account given in the materia medica of the substance from which they are prepared. Mr Nicholson mentions, that as rose-water is exceedingly apt to spoil, the apothecaries generally prepare it in small quantities at a time from the leaves, preserved by packing them closely in cans with common salt. This, we understand, is not the practice in Edinburgh; and, indeed, cannot succeed with the petals of the damask rose; for they lose their smell by drying. The London apothecaries, therefore, probably use the red rose. The spoiling of some waters is owing to some mucilage carried over in the distillation; for, if rectified by a second distillation, they keep perfectly well for any length of time.

Chap. XXII.

EMPYREUMATIC VOLATILE OILS.

Empyreumatic oils agree in many particulars with the volatile oils already treated of, but they also differ from them in several important circumstances. The latter exist ready formed in the aromatic substances from which they are obtained, and are only separated from the fixed principles by the action of a heat not exceeding that of boiling water. The former, on the contrary, are always formed by the action of a degree of heat considerably higher than that of boiling water, and are the product of decomposition, and a new arrangement of the elementary principles of substances, containing at least oxygen, hydrogen and carbon. Their production is therefore always attended with the formation of other

new products. In their chemical properties they do not differ very remarkably from the volatile oils, and are principally distinguished from them by their unpleasant pungent empyreumatic smell, and rough bitterish taste. They are also more apt to spoil by the contact of the air, and the oftener they are re-distilled, they become more limpid, less coloured, and more soluble in alcohol; whereas the essential oils, by repeated distillations, become thicker and less soluble in alcohol.

Their action on the body is exceedingly stimulant and heating.

Oleum succini purissimum. *Ed.*
Purified Oil of Amber.

Distil oil of amber in a glass retort, with six times its quantity of water, till two-thirds of the water have passed into the receiver; then separate this very pure volatile oil from the water, and preserve it in close shut vessels.

Oleum succini. *Lond.*
Oil of Amber.

Put amber into an alembic, and distil from it in a sand-bath, with a gradually increased heat, an acid liquor, oil and salt impregnated with oil. Then re-distil the oil twice.

Dub.

Take of
The oil which rises in the preparation of succinic acid, one pound;
Water, six pints;
Distil until two-thirds of the water have come over; then separate the oil.

The rectified oil has a strong bituminous smell, and a pungent acrid taste. Given in a dose of ten or twelve drops, it heats, stimulates and promotes the fluid secretions; it is chiefly celebrated in hysterical disorders, and in deficiencies of the uterine purgations. Sometimes it is used externally, in liniments, for weak or paralytic limbs, and rheumatic pains.

Moschus artificialis.
Artificial Musk.

By treating one part of oil of amber with four of nitrous acid, added in small portions at a time, and stirring them together with a glass rod, the oil is at last converted into a yellow resin, having the smell of musk, and known in Ger-

many by the name of Artificial musk, where it is often used as a substitute for that expensive drug.

OLEUM CORNU CORVINI RECTIFICATUM. *Dub.*
Rectified Oil of Hartshorn.

Take of
The oil which ascends in the distillation of the volatile liquor of hartshorn, three pounds;
Water, six pints.
Distil the oil, and re-distil it with the water, until it becomes limpid. It ought to be kept in a dark place, and in small phials, completely filled and well-corked.

ANIMAL OIL, thus rectified, is thin and limpid, of a subtile, penetrating, not disagreeable, smell and taste.

Medical use.—It is strongly recommended as an anodyne and antispasmodic, in doses of from 13 to 30 drops. Hoffman reports, that it procures a calm and sweet sleep, which continues often for 20 hours, without being followed by any languor or debility, but rather leaving the patient more alert and cheerful than before: that it procures likewise a gentle sweat, without increasing the heat of the blood: that, given to twenty drops or more, on an empty stomach, six hours before the accession of an intermittent fever, it frequently removes the disorder: and that it is likewise a very general remedy in inveterate and chronic epilepsies, and in convulsive motions, especially if given before the usual time of the attack, and preceded by proper evacuations. How far empyreumatic oils possess the virtues that have been ascribed to them, has not yet been sufficiently determined by experience, their tedious and troublesome rectification having prevented their coming into general use, or being often prepared. They are liable also to a more material inconvenience in regard to their medicinal use, namely, precariousness in their quality; for how perfectly soever they may be rectified, they gradually lose, on keeping, the qualities they had received from that process, and return more and more towards their original fetid state.

CHAP. XXIII.—DISTILLED SPIRITS.

THE flavour and virtues of distilled waters are owing, as observed in a preceding chapter, to their being impregna-

ted with a portion of the volatile oil of the subject from which they are drawn. Alcohol, considered as a vehicle for these oils, has this advantage above water, that it keeps all the oil that rises with it perfectly dissolved into an uniform limpid liquor.

Nevertheless, many substances, which, on being distilled with water, impart to it their virtues in great perfection, if treated in the same manner with alcohol, scarcely give over to it any smell or taste. The cause of this difference is, that alcohol is not susceptible of so great a degree of heat as water. It is obvious, therefore, that some substances may be volatile enough to rise with the heat of boiling water, but not with that of boiling alcohol.

Thus, if cinnamon, for instance, be committed to distillation with a mixture of alcohol and water, or with proof-spirit, which is no other than a mixture of about equal parts of the two, the alcohol will rise first, clear, colourless and transparent, and almost without any taste of the spice; but, as soon as the more ponderous watery fluid begins to arise, the oil comes freely over with it, so as to render the liquor highly odorous, sapid, and of a milky hue.

The proof-spirit usually met with in the shops is very rarely pure, or free from all unpleasant flavour, which, though concealed by means of certain additions, plainly discovers itself when employed for the preparation of distilled spirits. This nauseous flavour does not begin to arise till after the alcohol has come over, which is the very time that the virtues of the ingredients begin also to arise most plentifully; and hence the liquor receives an ungrateful taint. To this cause principally is owing the general complaint, that the cordials of the apothecary are less agreeable than those of the same kind prepared by the distiller; the latter being extremely curious in rectifying and purifying the spirits, which he uses for what he calls fine goods, from all unpleasant flavour.

Spiritus cari carui. *Ed.*
Spirit of Caraway.

Take of
Caraway seeds, bruised, half a pound;
Diluted alcohol, nine pounds.
Macerate for two days in a close vessel; then pour on as much water as will prevent empyreuma, and draw off, by distillation, nine pounds.

Spiritus carui. *Dub.*
Spirit of Caraway.

Take of
Caraway seeds, bruised, half a pound;
Proof-spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off one gallon.

Lond.

Take of
Bruised caraway seeds, one pound and a half;
Proof-spirit, one gallon;
Water, enough to prevent empyreuma.
Macerate for twenty-four hours; and, with a slow heat, distil one gallon.

In this manner, prepare in the same quantity from

PIRITUS

Lauri cinnamomi. *Ed.* Cinnamomi. *Lond. Dub.*	*Cinnamon*, bruised, one pound.
Menthæ piperitæ. *Ed.*	*Peppermint*, dried in flower, one pound and a half.
——————— *Lond.*	*Peppermint* dried, one pound and a half.
Menthæ viridis. *Lond.*	*Spearmint*, dried, one pound and a half.
Pulegii. *Lond.*	*Pennyroyal*, dried, one pound and a half.
Myristicæ. *Lond.* Myristicæ moschatæ. *Ed.* Nucis moschatæ. *Dub.*	*Nutmeg*, bruised, two ounces.
Myrti pimentæ. *Ed.*	*Pimento*, bruised, half a pound.
Pimento. *Dub.*	three ounces.
Pimentæ. *Lond.*	two ounces.
Rosmarini. *Lond.*	*Rosemary* tops, fresh, two pounds.
Anisi. *Lond.*	*Aniseed*, bruised, half a pound.

Spiritus lavandulæ spicæ. *Ed.*
Spirit of Lavender.

Take of
Flowering spikes of lavender, fresh, two pounds;
Alcohol, eight pounds.
Draw off, in a water-bath, seven pounds.

SPIRITUS LAVANDULÆ. *Lond.*
Spirit of Lavender.

Take of
Fresh lavender flowers, two pounds;
Rectified spirit, one gallon;
Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, and, with a slow fire, draw off one gallon.

Dub.

Take of
Fresh tops of lavender, one pound and a half;
Proof-spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off, by a moderate heat, five pints.

By these directions, and in the same quantity, is prepared,

SPIRITUS RORISMARINI OFFICINALIS. *Ed.* } *Rosemary*, two pounds.
SPIRITUS RORISMARINI. *Dub.* ——— a pound and a half.

It is unnecessary to make particular observations on each of these simple spirits, as their virtues are the same with those of the substances from which they are extracted, united to the stimulus of the alcohol. The alcohol in the spirits of lavender and rosemary is almost pure; in the others, it is diluted with about an equal weight of water.

SPIRITUS ANISI COMPOSITUS. *Dub.*
Compound Spirit of Aniseed.

Take of
Aniseed,
Angelica seed, of each, bruised, half a pound;
Proof-spirit, one gallon;
Water, sufficient to prevent empyreuma.
Draw off one gallon by distillation.

THIS compound spirit, like the simple ones, is an agreeable cordial; indeed they are too agreeable, for by some they are so often resorted to, on the slightest sensation of flatulence in the stomach, that their use is attended with all the pernicious consequences of dram-drinking.

SPIRITUS JUNIPERI COMPOSITUS. *Ed.*
Compound Spirit of Juniper.

Take of
Juniper berries, bruised, one pound;

Caraway seeds,
Sweet fennel seeds, each, bruised, one ounce and a half;
Diluted alcohol, nine pounds.
Macerate for two days, and having added as much water as will prevent empyreuma, draw off, by distillation, nine pounds.

Lond.

Take of
Juniper berries, bruised, one pound;
Caraway seeds,
Fennel seeds, of each, bruised, one ounce and a half;
Proof-spirit, a gallon;
Water, enough to prevent empyreuma.
Macerate for twenty-four hours, and distil, with a gentle heat, one gallon.

Dub.

Take of
Juniper berries, bruised, one pound;
Caraway seeds,
Sweet fennel seeds, of each, bruised, an ounce and a half;
Proof-spirit, a gallon.
Macerate for two days, and then add as much water as will prevent empyreuma, and draw off one gallon.

The good and bad effects of this spirit exactly coincide with those of gin. The Edinburgh and Dublin colleges macerate only in the spirit; the London in the spirit and water.

Spiritus raphani compositus. *Dub.*
Compound Spirit of Horse-Radish.

Take of
Fresh horse-radish root,
Dried outer rind of Seville oranges, each two pounds;
Fresh herb of garden scurvy-grass, four pounds;
Bruised nutmegs, one ounce;
Proof-spirit, two gallons;
Water, sufficient to prevent empyreuma.
Draw off two gallons.

Spiritus armoraciæ compositus. *Lond.*
Compound Spirit of Horse-Radish.

Take of
Fresh horse-radish root, sliced,
Dried orange-peel, of each one pound;

Nutmegs, bruised, half an ounce;
Proof-spirit, one gallon;
Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours; and distil, with a slow fire, one gallon.

THIS is an aromatic acrid spiritous liquor, but has no pretensions to the specific antiscorbutic properties formerly ascribed to it.

ALCOHOL AMMONIATUM FŒTIDUM. *Ed.*
Fœtid Ammoniated Alcohol.

Take of
Ammoniated alcohol, eight ounces;
Assa fœtida, half an ounce.
Digest, in a close vessel, for twelve hours; then distil off, with the heat of boiling water, eight ounces.

SPIRITUS AMMONIÆ FŒTIDUS. *Lond.*
Fœtid Spirit of Ammonia.

Take of
Spirit of ammonia, two pints;
Assa fœtida, two ounces.
Macerate for twelve hours; and distil, with a slow fire into a cooled receiver, one pint and a half.

Dub.

Take of
Spirit of ammonia, two pints;
Assa fœtida, an ounce and a quarter.
Digest, in a close vessel, for three days, with occasional agitation. Pour off the clear liquor, and distil a pint and a half.

VOLATILE spirits, impregnated with different fœtids, have been usually kept in the shops, as anti-hysterics: the ingredient here chosen is the best calculated of any for general use. The spirit is pale when newly distilled, but acquires a considerable tinge by keeping.

ALCOHOL AMMONIATUM AROMATICUM. *Ed.*
Aromatic Ammoniated Alcohol.

Take of
Ammoniated alcohol, eight ounces;
Volatile oil of rosemary, one drachm and a half;

Volatile oil of lemon-peel, one drachm.
Mix them, that the oils may be dissolved.

SPIRITUS AMMONIÆ AROMATICUS. *Dub.*
Aromatic Spirit of Ammonia.

Take of
Spirit of ammonia, two pints;
Essential oil of lemon, two drachms;
Nutmegs, bruised, half an ounce.
Digest in a close vessel, for three days, with occasional agitation, and draw off a pint and a half.

Lond.

Take of
Cinnamon bark, bruised;
Cloves, bruised, of each two drachms;
Lemon-peel, four ounces;
Subcarbonate of potass, half a pound;
Muriate of ammonia, five ounces;
Rectified spirit, four pints;
Water, one gallon.
Mix, and draw off six pints.

MEDICINES of this kind might be prepared extemporaneously, by dropping any proper volatile oil into ammoniated alcohol, which will readily dissolve the oil, if the ammonia in the solvent be caustic; for, if it be carbonated, such as it was when prepared according to the former directions of the London college, it does not dissolve the oils here ordered, and is therefore totally unfit for this preparation.

Mr Phillips says, that the oils as imported are commonly adulterated with fixed oil, which renders the aromatic spirit coloured and turbid, and that it is therefore the usual practice of chemists to distil the mixture of oils and spirit.

Medical use.—Ammonia, thus united with aromatics, is not only more agreeable in flavour, but likewise more acceptable to the stomach, and less acrimonious, than when uncombined. The dose is from five to six drops to sixty or more.

SPIRITUS AMMONIÆ SUCCINATUS. *Lond.*
Succinated Spirit of Ammonia.

Take of
Mastiche, three drachms;
Rectified spirit, nine fluidrachms;
Oil of lavender, fourteen minims;

Oil of amber, four minims;
Solution of ammonia, ten fluidounces.
Macerate the mastiche in the alcohol, until it be dissolved. Pour off the clear tincture; then add the other ingredients, and mix them by shaking.

This preparation is intended as a substitute for Eau de Luce, which was formerly imported entirely from Paris. It is now, we believe, prepared also by the chemists and druggists in London; but without some peculiar manipulation, which is kept secret, the above formula does not succeed in giving the liquor that permanent milky opacity, which is deemed essential to good Eau de Luce; for it becomes more or less transparent by keeping. This fancied perfection is, however, in a medical point of view, immaterial; and, whether it be milky or transparent, it is an excellent analeptic remedy, and may be used in the same circumstances, and in the same doses, as the spirit of ammonia itself.

Chap. XXIV.—INFUSIONS.

We have already explained the sense in which we employ the term infusion. We confine it to the action of a menstruum, not assisted by ebullition, on any substance consisting of heterogeneous principles, some of which are soluble, and others insoluble in that menstruum. The term is generally used in a more extensive, but, we are inclined to think, a less correct, sense: thus, lime-water and the mucilages, which are commonly classed with the infusions, are instances of simple solution, and the chalk mixture is the mechanical suspension of an insoluble substance. When the menstruum used is water, the solution is termed simply an Infusion; but when the menstruum is alcohol, it is called a Tincture; when wine or vinegar, a Medicated Wine or Vinegar. Infusions in water are extremely apt to spoil, and are generally extemporaneous preparations.

Aqua calcis composita. *Dub.*
Compound Lime Water.

Take of
Guaiac wood, in shavings, half a pound;
Liquorice root, sliced and bruised, an ounce;

Sassafras bark, bruised, half an ounce;
Coriander seeds, three drachms;
Lime-water, six pints.
Macerate, without heat, for two days, and filter.

This, notwithstanding the name, may be considered as an equivalent for the compound decoction of guaiac, as the lime water cannot fail to be decomposed during the preparation.

Aqua picis liquidæ. *Dub.*
Tar-Water.

Take of
Tar, two pints;
Water, one gallon.
Mix, by stirring them with a wooden rod, for a quarter of an hour, and after the tar has subsided, strain the liquor, and keep it in well-corked phials.

Tar-water should have the colour of white wine, and a sharp empyreumatic taste. It is, in fact, a solution of empyreumatic oil, effected by means of acetic acid. It was at one time much extolled as a panacea, but has of late been little employed. It acts as a stimulant, raising the pulse, and increasing the discharge by the skin and kidneys. It may be drunk to the extent of a pint or two in the course of a-day.

Infusum anthemidis. *Lond.*
Infusion of Chamomile.

Take of
Chamomile flowers, two drachms;
Boiling water, half a pint.
Macerate, for ten minutes, in a vessel loosely covered, and filter.

This is a very common extemporaneous prescription under the title of *chamomile tea*. It is a good stomachic.

Infusum armoraciæ compositum. *Lond.*
Compound Infusion of Horse-Radish.

Take of
Fresh horse-radish root, sliced,
Mustard seed, bruised, of each one ounce;
Boiling water, one pint.
Macerate for two hours, in a loosely covered vessel, and strain; then add of
Compound spirit of horse-radish, one fluidounce.

This is a pungent and stimulant infusion.

INFUSUM AURANTII COMPOSITUM. *Lond.*
Compound Infusion of Orange-peel.

Take of
Orange-peel, dried, two drachms;
Lemon-peel, fresh, one drachm;
Cloves, bruised, half a drachm;
Boiling water, half a pint.
Macerate for ten minutes, in a loosely covered vessel, and strain.

A stomachic infusion.

INFUSUM CALUMBÆ. *Lond.*
Infusion of Columbo.

Take of
Columbo root, sliced, one drachm;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

A stomachic bitter.

INFUSUM CARYOPHYLLORUM. *Lond.*
Infusion of Cloves.

Take of
Cloves, bruised, one drachm;
Boiling water, half a pint.
Macerate for two hours in a vessel loosely covered, and strain.

AN aromatic stimulant.

INFUSUM CASCARILLÆ. *Lond.*
Infusion of Cascarilla.

Take of
Cascarilla root, bruised, half an ounce;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

AN aromatic stimulant.

INFUSUM CINCHONÆ OFFICINALIS. *Ed.*
Infusion of Cinchona Bark.

Take of
Peruvian bark, in powder, one ounce;
Water, one pound.
Macerate for twenty-four hours, and filter.

INFUSUM CINCHONÆ. *Lond.*
Infusion of Cinchona.

Take of
The bark of lance-leaved cinchona, bruised, half an ounce;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

INFUSUM CINCHONÆ SINE CALORE. *Dub.*
Cold Infusion of Cinchona.

Take of
Peruvian bark, in coarse powder, one ounce;
Cold water, twelve ounces, by measure.
Triturate the bark with a little of the water, and add the remainder during the trituration. Macerate for twenty-four hours, and decant the pure liquor.

THIS is a very elegant form of exhibiting the active principles of cinchona bark, and that in which it will sit lightest on weak and delicate stomachs. The trituration directed by the Dublin college will promote the solution. The residuum of the cold infusion may be afterwards employed in making other preparations, especially the extract, for its virtues are by no means exhausted. But it must never be dried, and sold, or exhibited in substance, for that would be a culpable fraud.

INFUSUM CUSPARIÆ. *Lond.*
Infusion of Angustura.

Take of
Angustura bark, bruised, two drachms;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

A stimulant febrifuge.

INFUSUM DIGITALIS. *Lond.*
Infusion of Foxglove.

Take of
Foxglove leaves, dried, one drachm;
Boiling water, half a pint.
Macerate for four hours, in a loosely covered vessel, and strain; then add
Spirit of cinnamon, half a fluidounce.

INFUSUM DIGITALIS PURPUREÆ. *Ed.*
Infusion of Foxglove.

Take of
Dried leaves of foxglove, one drachm;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate for four hours, and filter.

THIS is the infusion so highly recommended by Withering. Half an ounce or an ounce of it may be taken twice a-day in dropsical complaints. The spirit of cinnamon is added to improve its flavour, and to counteract its sedative effects.

INFUSUM GENTIANÆ COMPOSITUM. *Ed.*
Compound Infusion of Gentian.

Take of
Gentian root, sliced, half an ounce;
Dried peel of Seville oranges, bruised, one drachm;
Coriander seeds, bruised, half a drachm;
Diluted alcohol, four ounces;
Water, one pound.
First pour on the alcohol, and, three hours thereafter, add the water; then macerate without heat, for twelve hours, and strain.

Lond.

Take of
The root of gentian, sliced,
Dried orange-peel, each one drachm;
Fresh lemon-peel, two drachms;
Boiling water, twelve fluidounces.
Macerate for an hour in a loosely covered vessel, and strain.

Dub.

Take of
Bruised gentian root, two drachms;
Fresh lemon-peel, half an ounce;
Dried peel of Seville oranges, a drachm and a half;
Proof-spirit, four ounces, by measure.
Boiling water, twelve ounces, by measure.
First pour on the spirit, and after three hours, the water. Lastly, after macerating two days, filter.

THESE formulæ are all essentially the same. The Edinburgh college employ the largest proportion of gentian; but they infuse it in cold water, which does not extract the bitter

principle so quickly or so fully as boiling water, although it dissipates less of the flavour of the aromatics. The alcohol is a useful addition, both in promoting the extraction of the virtues of all the ingredients, and in preserving the infusion longer from spoiling.

Medical use.—Gentian is the strongest and purest of the European bitters, and readily imparts its virtues to water. These infusions are in very common use as stomachic and tonic.

Infusum lini. *Lond.*
Infusion of Linseed.

Take of
Linseed, bruised, an ounce;
Liquorice root, sliced, half an ounce;
Boiling water, two pints.
Macerate for four hours near the fire, in a loosely covered vessel, and strain.

This is a mucilaginous emollient liquor, much used in gonorrhœas, strangury, and in pectoral complaints.

Infusum menthæ compositum. *Dub.*
Compound Infusion of Mint.

Take of
The leaves of spearmint, dried, two drachms;
Boiling water, as much as will afford six ounces of the infusion, when filtered.
Digest for half an hour, in a covered vessel; strain the liquor when cold, and then add of
Double refined sugar, two drachms;
Oil of spearmint, three drops, dissolved in
Compound tincture of cardamoms, half an ounce. Mix.

This infusion is slightly stimulating and diaphoretic, and forms a very agreeable herb-tea, which may be used in any quantity in diet, or as a vehicle for more active remedies.

Infusum mimosæ catechu. *Ed.*
Infusion of Catechu.

Take of
Extract of catechu, in powder, two drachms and a half;
Cinnamon, bruised, half a drachm;
Boiling water, seven ounces;
Simple syrup, one ounce.
Macerate the extract and cinnamon in the water, in a co-

vered vessel, for two hours; then strain it, and add the syrup.

INFUSUM CATECHU COMPOSITUM. *Lond.*
Compound Infusion of Catechu.

Take of
Extract of catechu, two drachms and a half;
Cinnamon, bruised, half a drachm;
Boiling water, half a pint.
Macerate for an hour, in a loosely covered vessel, and strain.

As this preparation will not keep above a day or two, it must always be made extemporaneously. The long maceration, therefore, becomes very often extremely inconvenient; but it may be prepared in a few minutes, by boiling, without in the least impairing the virtue of the medicine.

Medical use.—Extract of catechu is almost pure tannin. This infusion is therefore a powerfully astringent solution. The cinnamon and syrup render it sufficiently agreeable; and it will be found serviceable in diarrhœas proceeding from a laxity of the intestines. Its dose is a spoonful or two every other hour, or after every loose stool.

INFUSUM QUASSIÆ. *Lond.*
Infusion of Quassia.

Take of
Quassia shavings, a scruple;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

ONE of the most intense and purest bitters.

INFUSUM RHEI PALMATI. *Ed.*
Infusion of Rhubarb.

Take of
Rhubarb, bruised, half an ounce;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate the rhubarb in a close vessel with the water for twelve hours; then add the spirit, and strain the infusion.

INFUSUM RHEI. *Lond.*
Infusion of Rhubarb.

Take of
Rhubarb, sliced, a drachm;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

This appears to be one of the best preparations of rhubarb, when not designed as a purgative; water extracting its virtues more effectually, than either vinous or spirituous menstrua.

Infusum rosæ gallicæ. *Ed.*
Infusion of Roses.

Take of
The petals of red roses, dried, two ounces;
Boiling water, five pounds;
Sulphuric acid, one drachm;
White sugar, two ounces.
Macerate the petals with the boiling water in an earthen vessel, which is not glazed with lead, for four hours, then add the acid, strain the liquor, and dissolve the sugar in it.

Infusum rosæ. *Lond.*
Infusion of Roses.

Take of
Dried petals of red roses, half an ounce;
Boiling water, two pints and a half;
Diluted sulphuric acid, three fluidrachms;
Double refined sugar, an ounce and a half.
First pour the water on the petals in a glass vessel, then add the diluted sulphuric acid, and macerate for half an hour. Strain the liquor, and add the sugar.

Dub.

Take of
The petals of red rose buds, dried and heeled, half an ounce;
Diluted sulphuric acid, three drachms, by weight;
Boiling water, three pints.
Double refined sugar, an ounce and a half.
First pour the water on the petals in a glass vessel, then add the acid, and digest for half an hour; filter the liquor when cold, and add the sugar.

The differences in the directions for preparing this infusion are immaterial. In fact, the rose leaves have very little effect, except in giving the mixture an elegant red colour. Its sub-acid and astringent virtues depend entirely on the sulphuric acid. Altogether, however, it is an elegant medicine, and forms a very grateful addition to juleps in hæmorrhagies, and in all cases which require mild coolers and sub-astringents: it is sometimes taken with boluses or electuaries of the bark, and likewise makes a good gargle.

INFUSUM SENNÆ. *Lond.*
Infusion of Senna.

Take of
Senna leaves, an ounce and a half;
Ginger root, sliced, one drachm;
Boiling water, one pint.
Macerate them for an hour, in a loosely covered vessel, and strain.

INFUSUM SENNÆ. *Dub.*
Infusion of Senna.

Take of
Senna, three drachms;
Lesser cardamon seeds, husked and bruised, half a drachm;
Boiling water, as much as will yield a filtered infusion of six ounces.
Digest for an hour, and filter when cold.

THIS is a well-contrived purgative infusion, the aromatic correcting the drastic effects of the senna. But the quantity ordered to be prepared at one time, by the London college, is much too large; for an ounce or two is a sufficient dose. It is of advantage that it should be used fresh prepared, as it is apt to spoil very quickly.

INFUSUM TAMARINDI CUM SENNA. *Ed.*
Infusion of Tamarinds and Senna.

Take of
Preserved tamarinds, one ounce;
Senna, one drachm;
Coriander seeds, bruised, half a drachm;
Brown sugar, half an ounce;
Boiling water, eight ounces.
Macerate for four hours, with occasional agitation, in a close earthen vessel, not glazed with lead, and strain the infusion.
It may also be made with double, triple, &c. the quantity of senna.

INFUSUM SENNÆ CUM TAMARINDIS. *Dub.*
Infusion of Senna with Tamarinds,
Is made as the infusion of senna, by adding, before the water is poured on, an ounce of tamarinds; then strain.

THIS forms a mild and useful purge, excellently suited for delicate stomachs, and inflammatory diseases. The taste of the senna is well covered by the acidity of the tamarinds.

INFUSUM SIMAROUBÆ. *Lond.*
Infusion of Simarouba.

Take of
Simarouba bark bruised, half a drachm;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

A bitter aromatic.

INFUSUM TABACI. *Lond.*
Infusion of Tobacco.

Take of
Tobacco leaves, a drachm;
Boiling water, a pint.
Macerate for an hour in a loosely covered vessel, and strain.

THIS is a narcotic diuretic, which was used with much success in dropsies by Dr Fowler.

INFUSUM VALERIANÆ. *Dub.*
Infusion of Valerian.

Take of
Valerian root, in coarse powder, two drachms;
Boiling water, seven ounces, by measure;
Digest for half an hour, and strain when cold.

VALERIAN tea is a very excellent antispasmodic, and often proves serviceable in hysteric cases, where the stomach will not bear the powder in substance.

CHAP. XXV.—DECOCTIONS.

DECOCTIONS differ from infusions only in the action of the menstruum being assisted by a boiling heat. At the same time, however, that the increase of temperature facilitates and expedites the solution of some fixed principles, it gives others a tendency to decomposition, and dissipates all volatile matters. Decoction, therefore, can only be used with advantage for the extraction of principles which are neither volatilized nor altered by a boiling heat.

To promote the action of the menstruum, infusion is sometimes premised to decoction.

In compound decoctions, it is sometimes convenient not to

put in all the ingredients from the first, but in succession, according to their hardness, and the difficulty with which their virtues are extracted; and if any aromatic, or other substances, containing volatile principles, enter into the composition, the boiling decoction is to be simply poured upon them, and covered up until it cool.

Decoctions should be made in vessels sufficiently large to prevent any risk of boiling over, and should be continued without interruption, and gently.

Decoctum aloes compositum. *Lond.*
Compound Decoction of Aloes.

Take of
- Extract of liquorice, half an ounce;
- Subcarbonate of potass, two scruples;
- Extract of spiked aloes, in powder,
- Myrrh, in powder,
- Saffron, of each one drachm;
- Water, one pint.

Boil down to twelve fluidounces, and strain, then add of
- Compound tincture of cardamoms, four fluidounces.

This is intended as a simplification and improvement of the *Baume de Vie de la Lièvre.* It is in fact a saponaceous solution of aloes, the subcarbonate of potass rendering its resin soluble in water; and in many cases of stomach complaints, the combination of an alkali with a bitter purgative may be advantageous. In the dose of two or three tea-spoonfuls it is slightly purgative. The original *Baume de vie*, which, however, contained no alkali, was much employed externally as a detersive application to recent wounds, and to prevent suppuration.

Decoctum althææ officinalis. *Ed.*
Decoction of Marshmallows.

Take of
- Dried marshmallow roots, bruised, four ounces;
- Raisins of the sun, stoned, two ounces;
- Water, seven pounds.

Boil down to five pounds; strain the decoction, and after the fæces have subsided, pour off the liquor.

Marshmallow roots contain nothing soluble in water, except mucilage, which is very abundant in them. This decoction is therefore to be considered merely as an emollient, rendered more pleasant by the acidulous sweetness of the raisins.

DECOCTUM ANTHEMIDIS NOBILIS; vulgo, DECOCTUM CHAMÆMELI *sive* COMMUNE. *Ed.*

Common Decoction, or *Decoction of Chamomile.*

Take of
Chamomile flowers, dried, one ounce;
Caraway seeds, bruised, half an ounce;
Water, five pounds.
Boil for a quarter of an hour, and strain.

DECOCTUM CHAMÆMELI COMPOSITUM. *Dub.*

Compound Decoction of Chamomile.

Take of
Chamomile flowers, dried, half an ounce;
Sweet fennel seeds, two drachms;
Water, one pint.
Boil a little, and strain.

DECOCTUM MALVÆ COMPOSITUM. *Lond.*

Compound Decoction of Mallow.

Take of
The leaves of mallow, dried, one ounce;
Chamomile flowers, dried, half an ounce;
Water, one pint.
Boil for fifteen minutes, and strain.

THESE decoctions are merely solutions of bitter extractive, combined, in the third with mucilage, and in the others with aromatics. In making them, the aromatic substances should not be added until the decoction is nearly completed; for, otherwise, their flavour would be entirely dissipated.

It must, however, be acknowledged, that these impregnations are for the most part unnecessary for the purpose of glysters; and, in general, the bulk and warmth of these produce a discharge before these medicines can have any effect.

As fomentations, their virtues also depend, in a great measure, on the warm water, of which they principally consist; and when the herbs themselves are applied, they act only as retaining heat and moisture for a longer time; and are a less convenient, and not more useful fomentation, than cloths wrung out of hot water.

DECOCTUM CINCHONÆ OFFICINALIS. *Ed.*

Decoction of Cinchona Bark.

Take of
Cinchona bark, in powder, one ounce;

Water, one pound and a half.
Boil for ten minutes in a covered vessel, and strain the liquor while hot.

Decoctum cinchonæ. *Lond.*
Decoction of Cinchona.

Take of
Lance-leaved Cinchona bark, bruised, one ounce;
Water, one pint.
Boil for ten minutes in a loosely covered vessel, and strain the liquor while hot.

Decoctum corticis cinchonæ. *Dub.*
Decoction of Cinchona Bark.

Take of
Peruvian bark, in coarse powder, one ounce;
Water, one pint.
Boil for ten minutes in a vessel almost covered, and strain the liquor while hot, through linen.

Cinchona bark readily yields its active principles to the action of boiling water, and in greater quantity than cold water is capable of retaining dissolved; therefore, when a saturated decoction cools, it becomes turbid, and there is always a deposition of a yellowish or reddish powder, while the supernatant liquor is reduced to the strength of a saturated cold infusion. Decoction therefore presents us with an easy means of obtaining immediately an active preparation of cinchona bark, and with one of greater strength, than a cold, or even a warm infusion, provided it be drunk while tepid, and before it forms any deposition, or if the precipitate be diffused by agitation, after it is formed. As the precipitate contains no woody fibre, or other inert matter, it is extremely probable that, in very small doses, it would prove, if dried, a very powerful preparation of cinchona bark.

Formerly it was supposed that the strength of a decoction of cinchona bark, and similar substances, was increased by continuing the boiling for a great length of time; but this is now known to be a mistake, because water, at different temperatures, is capable of dissolving only a determinate proportion of its active principles; and therefore, as soon as it is saturated, any farther decoction is unnecessary. But, moreover, these principles, when dissolved in water, are liable to be decomposed, and become inert, by the absorption of atmospheric oxygen; and this decomposition is increased

by increase of temperature; and as boiling constantly presents new surfaces to the action of the air, it is evidently hurtful when protracted longer than what is just necessary to saturate the water. Ten minutes is now supposed by the colleges to be sufficient for that purpose.

Decoctum daphnes mezerei. *Ed.*
Decoction of Mezereon.

Take of
The bark of mezereon root, two drachms;
Liquorice root, bruised, half an ounce;
Water, three pounds.
Boil, with a gentle heat, down to two pounds, and strain the decoction.

From four to eight ounces of this decoction may be given four times a-day, in some obstinate syphiloid and rheumatic affections. It operates chiefly by perspiration.

Decoctum digitalis. *Dub.*
Decoction of Foxglove.

Take of
Foxglove leaves, dried, one drachm;
Water, as much as will furnish a strained decoction of eight ounces, by measure.
Place the vessel upon a slow fire, and, as soon as the liquor boils, remove it; then digest for a quarter of an hour, and strain.

This decoction, according to the proportions employed, is twenty times weaker than that so much praised by Dr Darwin; but with a medicine of so great activity, it is an advantage to be able to regulate the doses easily; and it is probable that the strength of decoctions is not increased in proportion as the quantity of the menstruum is diminished.

Decoctum geofrææ inermis. *Ed.*
Decoction of Cabbage-tree Bark.

Take of
Bark of the cabbage-tree, powdered, one ounce;
Water, two pounds.
Boil, with a gentle fire, down to one pound, and strain the decoction.

This is a powerful anthelmintic. It may be given in doses of one table-spoonful to children, and four to adults. If dis-

agreeable symptoms should arise from an over-dose, or from drinking cold water during its action, we must immediately purge with castor oil, and dilute with acidulated fluids.

DECOCTUM GUAIACI COMPOSITUM; vulgo DECOCTUM LIGNORUM. *Ed.*

Compound Decoction of Guaiacum, commonly called *Decoction of the Woods.*

Take of
Guaiacum raspings, three ounces;
Raisins, two ounces;
Sassafras root, sliced,
Liquorice root, bruised, each one ounce;
Water, ten pounds.

Boil the guaiacum and raisins with the water, over a gentle fire, down to five pounds, adding, towards the end, the sassafras and liquorice, and strain the decoction, without expression.

THIS decoction is of use in some rheumatic and cutaneous affections. It may be taken by itself, to the quantity of a quarter of a pint, twice or thrice a-day, or used as an assistant in a course of mercurial or antimonial alteratives; the patient, in either case, keeping warm, in order to promote the operation of the medicine.

DECOCTUM DULCAMARÆ. *Lond.*

Decoction of Bittersweet.

Take of
Twigs of bittersweet, sliced, one ounce;
Water, one pint and a half.

Boil to a pint, and strain.

FOR the virtues of this decoction, I must refer to what is said in the Materia Medica.

DECOCTUM HORDEI DISTICHI. *Ed.* DECOCTUM HORDEI. *Dub.*

Decoction of Barley. Barley Water.

Take of
Pearl barley, two ounces;
Water, five pounds.

First wash off the mealy matter which adheres to the barley with some cold water; then extract the colouring matter, by boiling it a little with about half a pint of water. Throw this decoction away, and put the barley thus purified into

five pints of boiling water, which is to be boiled down to one half, and strain the decoction.

Decoctum hordei. *Lond.*
Decoction of Barley.

Take of
Pearl barley, two ounces;
Water, four pints and a half.
First wash off all foreign matters from the barley with cold water; then add half a pint of the water, and boil a little. Throw this water away, and pour on, the remaining water boiling hot; boil down to two pints, and strain.

Decoctum hordei compositum. *Dub.*
Compound Decoction of Barley.

Take of
The decoction of barley, four pints;
Raisins, stoned, two ounces;
Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
During the boiling, add first the raisins, and then the figs, and, lastly, the liquorice, a short time before it is finished, when the strained decoction ought to measure two pints.

Lond.

Take of
Decoction of barley, two pints;
Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
Raisins, stoned, two ounces;
Water, one pint.
Boil down to two pints and strain.

These liquors are to be used freely, as diluting drinks, in fevers and other acute disorders; hence it is of consequence that they should be prepared so as to be as elegant and agreeable as possible: for this reason they are inserted in the Pharmacopœia, and the several circumstances which contribute to their elegance set down; for if any one of them be omitted, the beverage will be less grateful. As, however, they are much oftener prepared by nurses and servants than by the apothecary, these receipts might, with great advantage, be substituted for the ridiculous, and often dangerous, specifics with which domestic cookery books abound. However trivial medicines of this class may appear to be, they are of greater importance in the cure of acute diseases than many more elaborate preparations.

Decoctum lichenis islandici. *Dub.*
Decoction of Iceland Moss.

Take of
Iceland moss, half an ounce;
Boiling water, a pint.
Digest for two hours in a close vessel; then boil for a quarter of an hour, and strain the liquor while hot.

Decoctum lichenis. *Lond.*
Decoction of Iceland Moss.

Take of
Iceland moss, one ounce;
Water, an ounce and a half.
Boil to a pint, and strain.

I have already given my opinion of the nature and effects of this mucilage. As in the present preparation the bitter principle is not removed, it may have some action as a tonic; but it renders it at the same time too nauseous to be used in sufficient quantity to have much effect as an article of diet.

Decoctum papaveris. *Lond.*
Decoction of Poppies.

Take of
White poppy heads, sliced, four ounces;
Water, four pints.
Boil for a quarter of an hour and strain.

This is in very common use, as an anodyne fomentation.

Decoctum polygalæ senegæ. *Ed.*
Decoction of Seneka.

Take of
Seneka root, one ounce;
Water, two pounds.
Boil down to sixteen ounces, and strain the decoction.

Decoctum senegæ. *Lond.*
Decoction of Snake Root.

Take of
Snake root, one ounce;
Water, two pints.
Boil to one pint, and strain.

The virtues of this decoction will be easily understood from those of the root from which it is prepared. The dose in hydropic cases, and rheumatic or arthritic complaints, is two ounces, three or four times a-day, according to its effect. It

is also recommended, in affections of the lungs, attended with debility, and inordinate secretion.

Decoctum quercus. *Lond.*
Decoction of Oak Bark.

Take of
Oak bark, one ounce;
Water, two pints.
Boil to one pint, and strain.

This is a very powerful astringent, and may be used on all occasions where astringents are indicated. It is particularly serviceable as a gargle in sore throats and hoarseness, attended with relaxation of the parts.

Decoctum smilacis sarsaparillæ. *Ed.*
Decoction of Sarsaparilla.

Take of
The root of sarsaparilla, sliced, six ounces;
Water, eight pounds.
Digest for two hours, with a heat of about 195°; then take out the root, and bruise it; when bruised, put it back into the same liquor, boil down to four pints, then press out, and strain the decoction.

Decoctum sarsaparillæ. *Dub.*
Decoction of Sarsaparilla.

Take of
Sarsaparilla root, sliced, an ounce and a half;
Boiling water, two pints.
Digest in a moderate heat, for two hours, then take out the sarsaparilla and bruise it; when bruised, put it back into the liquor, and repeat the digestion for two hours; then express the liquor, after it has been reduced to one half, through linen, and strain it.

Lond.

Take of
Sarsaparilla sliced, four ounces;
Boiling water, four pints.
Macerate for four hours in a loosely covered vessel, at the side of the fire; then take out the sarsaparilla root, and bruise it. When bruised put it again into the liquor; macerate for two hours more, then boil down to two pints, and strain.

Its diaphoretic effects are probably owing to its being

drunk warm. It is totally incapable of curing genuine syphilis; but by some it is thought useful in the sequelæ of that disease, and in syphiloid affections its good effects are generally allowed.

Decoctum sarsaparillæ compositum. *Dub.*
Compound Decoction of Sarsaparilla.

Take of
- Sarsaparilla, sliced and bruised, an ounce and a half;
- Shavings of guaiacum wood,
- Bark of the root of sassafras,
- Liquorice root, bruised, of each two drachms;
- Bark of mezereon root, one drachm;
- Boiling water, three pints.

Macerate in the water, with a gentle heat, for six hours, the sarsaparilla, guaiac, and sassafras; then boil it down to one half, adding, towards the end of the boiling, the liquorice and mezereon, and strain the liquor.

Lond.

Take of
- Decoction of sarsaparilla, boiling hot, four pints;
- Sassafras root, sliced,
- Guaiac raspings,
- Liquorice root, bruised, of each an ounce;
- The bark of mezereon root, three drachms.

Boil for a quarter of an hour, and strain.

This compound decoction is said to be an improved mode of preparing the once highly celebrated Lisbon diet-drink, which, after its first introduction into Britain, was so long kept a secret.

It operates as a diaphoretic, and may be given with advantage in rheumatic cases, and in some of the sequelæ of syphilis. Three or four ounces may be taken four times a-day.

Decoctum ulmi. *Lond. Dub.*
Decoction of Elm.

Take of
- The fresh inner bark of elm, bruised, four ounces;
- Water, four pints.

Boil to two pints, and strain.

Under this form the elm bark has been highly celebrated for the cure of certain cutaneous eruptions; but undeservedly, according to the experience of the most judicious practitioners.

DECOCTUM VERATRI. *Lond.*
Decoction of White Hellebore.

Take of
The root of white hellebore, in powder, one ounce;
Water, two pints;
Rectified spirit of wine, two fluidounces.
Boil the water with the root to one pint, and strain; after the liquor is cold, add to it the spirit.

THIS decoction is only used externally as a wash in tinea capitis, lepra, psora, &c. When the skin is very tender and irritable, it should be diluted with an equal quantity of water.

CHAP. XXVI.—MUCILAGES.

MUCILAGO AMYLI. *Ed. Dub.*
Mucilage of Starch.

Take of
Starch, half an ounce;
Water, one pint.
Triturate the starch, gradually adding the water; then boil them a little.

Lond.

Take of
Starch, three drachms;
Water, one pint.
Triturate the starch with the water, gradually added, and boil, till it become a mucilage.

THE mucilage thus formed is very useful in those cases where a glutinous substance is required; it is often successfully employed as a glyster, in diarrhœas depending on acrimony in the intestines.

MUCILAGO ASTRAGALI TRAGACANTHÆ. *Ed.*
Mucilage of Gum Tragacanth.

Take of
Gum tragacanth, in powder, one ounce;
Boiling water, eight ounces.
Macerate for twenty-four hours, then triturate carefully, that

the gum may be dissolved; and press the mucilage through a linen cloth.

MUCILAGO GUMMI TRAGACANTHÆ. *Dub.*
Mucilage of Gum Tragacanth.

Take of
Gum tragacanth, in powder, two drachms;
Water, eight ounces, by measure.
Macerate in a close vessel, till the gum be dissolved; then strain the mucilage through linen.

GUM TRAGACANTH is difficultly soluble in water. When macerated in it, it swells, but does not dissolve. To effect the solution, it must be beaten into a paste with some of the water, and the rest of the water must be added gradually, and incorporated with the paste, by beating them together. Gum tragacanth is a very tenacious substance, and requires a very large proportion of water to form a fluid mucilage. That of the Edinburgh college, which is made with eight parts of water to one of the gum, is a paste rather than a mucilage. The Dublin is made with thirty-two.

MUCILAGO MIMOSÆ NILOTICÆ. *Ed.*
Mucilage of Gum Arabic.

Take of
Gum Arabic, in powder, one part;
Boiling water, two parts.
Digest with frequent agitation until the gum be dissolved; then press the mucilage through linen.

MUCILAGO ACACIÆ. *Lond.*
Mucilage of Acacia.

Take of
Gum Arabic in powder, four ounces;
Boiling water, half a pint.
Triturate the gum with the water, gradually added until it be dissolved.

MUCILAGO GUMMI ARABICI. *Dub.*
Mucilage of Gum Arabic.

Take of
Gum Arabic, in coarse powder, four ounces;
Boiling water, eight ounces by measure.
Digest with frequent agitation till the gum be dissolved, then strain the mucilage through linen.

IT is very necessary to pass the mucilage through linen, in order to free it from pieces of wood and other impurities

which always adhere to the gum: the linen may be placed in a funnel.

Mucilage of gum arabic is very useful in many operations in pharmacy; it is also much used for properties peculiar to substances of its own class; and of all the gums, it seems to be the purest.

Decoctum cydoniæ. *Lond.*
Decoction of Quince-seed.

Take of
Quince-seeds, two drachms;
Water, one pint.
Boil, with a slow fire, for ten minutes, and strain.

This mucilage, though sufficiently agreeable, is perfectly superfluous, especially as it is apt to spoil, from being mixed with the other principles of the seeds soluble in water. It is, besides, never so transparent as mucilage carefully prepared from gum arabic, is not cheaper, and is unfit for many purposes, being coagulated by acids.

Chap. XXVII.—SYRUPS.

Syrupi. *Dub.*
Syrups.

In making syrups, where neither the weight of the sugar, nor the manner in which it should be dissolved, are directed, the following rule is to be followed:

Take of
Double refined sugar, in fine powder, twenty-nine ounces;
The liquor prescribed, one pint.
Gradually add the sugar, and digest, with frequent agitation, in a close vessel, and in a moderate heat, until it be dissolved; then set it aside for twenty-four hours; take off the scum, and pour off the syrup from the fæces, if there be any.

Lond.

Syrups are to be kept in a place whose temperature never exceeds 50° Fahr.

Syrups are solutions of sugar in any watery fluid, whether simple or medicated. Simple syrup is nutritious and demulcent. When made of fine sugar, it is transparent and colourless. If necessary, it is easily clarified, by beating to a froth the white of an egg, with three or four ounces of water, mixing it with the syrup, and boiling the mixture for a few seconds, until the albumen coagulates, and enveloping all heterogeneous matters, forms a scum, which may be easily taken off, or separated by filtration. When, instead of simple water, any other fluid is used for dissolving the sugar, the syrup is then said to be medicated. Medicated syrups are prepared with expressed juices, infusions, decoctions, or saline fluids. The object of forming these into syrups is either to render them agreeable to the palate, or to preserve them from fermentation. In the latter case, the quantity of sugar added becomes a matter of great importance; for, if too much be employed, the sugar will separate by crystallization; and, if too little, instead of preventing fermentation, it will accelerate it. About two parts of sugar to one of fluid are the proportions directed by the British colleges with this view. But, as in some instances a larger quantity of fluid is added, and afterwards reduced to the proper quantity by decoction, it will not be superfluous to point out some circumstances, which shew the evaporation to be carried far enough. These are the tendency to form a pellicle on its surface, when a drop of it is allowed to cool: the receding of the last portion of each drop, when poured out drop by drop, after it is cold; and what is most to be relied on, its specific gravity when boiling hot, being about 1.3; or 1.385, when cold. The syrup which remains, after all the crystallizable sugar has been separated from it, has been much, and probably justly, recommended by some for the preparation of medicated syrups and electuaries, although its pharmaceutical superiority is actually owing to its impurity.

Syrupus simplex sive communis. *Ed.*
Simple or *Common Syrup.*

Take of

Double refined sugar, in powder, fifteen parts;
Water, eight parts.

Let the sugar be dissolved by a gentle heat in the water, and boiled a little, so as to form a syrup.

Syrupus simplex. *Lond.*
Simple Syrup.

Take of
Refined sugar, two pounds and a half;
Water, one pint.
Dissolve the sugar in the water, in a water-bath; let it stand for twenty-four hours, then skim it, and decant off the pure syrup from the fæces, if there be any.

Simple syrup should have neither flavour nor colour, and is more convenient in extemporaneous prescriptions than sugar undissolved.

Syrupus althææ officinalis. *Ed.*
Syrup of Marshmallow.

Take of
Fresh marshmallow roots, sliced, one pound;
Water, ten pounds;
Refined sugar, four pounds.
Boil down the water with the roots, to one-half, and strain the liquor, with strong expression. Set aside the strained decoction till the fæces have subsided; add the sugar to the depurated decoction, and boil so as to make a syrup.

Syrupus althææ. *Lond.*
Syrup of Marshmallow.

Take of
Fresh root of marshmallow, bruised, half a pound;
Refined sugar, two pounds;
Water, four pints.
Boil the water with the marshmallow root to one-half, and press out the liquor when cold. Set it at rest for twenty-four hours; and after the fæces have subsided, pour off the decoction. Add the sugar, aad boil it to a proper consistence.

This is merely a mucilaginous syrup, and is chiefly used in nephritic cases, for sweetening emollient decoctions, and the like.

Syrupus dianthi caryophylli. *Ed.*
Syrup of Clove July-flower.

Take of
Clove July-flowers, fresh gathered and freed from the heels, one pound;
Boiling water, four pounds;
Refined sugar, seven pounds.

Macerate the petals in the water for twelve hours; and dissolve in the filtered infusion the sugar in powder, by a gentle heat, so as to form a syrup.

Syrupus caryophylli rubri. *Dub.*
Syrup of Clove July-flower.

Take of

The petals of fresh clove July-flowers, without the heels, two pounds;

Boiling water, six pints.

Macerate for twelve hours in a glass vessel; and in the strained liquor dissolve refined sugar, so as to form a syrup.

As the beauty of the colour is principally attended to in this syrup, no force should be used in expressing the infusion from the flowers.

Some have substituted to it one easily prepared at seasons when the flowers are not to be procured: An ounce of spice-cloves is infused for some days in twelve ounces of white wine, the liquor strained, and with the addition of twenty ounces of sugar, boiled to the proper consistence of a syrup, to which a little cochineal gives a colour exactly similar to that prepared from the clove July-flower; and its flavour is of the same kind, though not so pleasant. The counterfeit may be readily detected, by adding to a little of the syrup some alkaline salt or ley; which will change the genuine syrup to a green colour; but, in the counterfeit, it will make no such alteration, only varying the shade of the red.

Syrupus croci. *Lond*
Syrup of Saffron.

Take of

Saffron, one ounce;

Boiling water, one pint;

Refined sugar, two pounds and a half.

Macerate the saffron in the water for twelve hours, in a loosely covered vessel; and dissolve the sugar in the strained liquor.

Saffron is very well fitted for making a syrup. It is said to be a pleasant cordial, and gives a fine colour to juleps.

SYRUPUS TOLUIFERÆ BALSAMI; vulgo SYRUPUS BALSAMICUS. *Ed.*

Syrup of Balsam of Tolu, formerly *Balsamic Syrup*.

Take of

Common syrup, two pounds;
Tincture of balsam of Tolu, one ounce.

With the syrup just prepared, and when it has almost grown cold, after having been removed from the fire, gradually mix the tincture with constant agitation.

SYRUPUS TOLUTANUS. *Lond.*

Syrup of Tolu.

Take of

The balsam of Tolu, one ounce;
Boiling water, one pint;
Refined sugar, two pounds.

Boil the balsam in the water for half an hour, in a covered vessel, stirring it occasionally; strain the liquor when cold, and add the sugar as in making simple syrup.

THE intention of the contrivers of the two foregoing processes seems to have been somewhat different. In the latter, which is certainly the most elegant, the benzoic acid of the balsam alone is contained; the other syrup contains the whole substance of the balsam in larger quantity. They are both moderately impregnated with the agreeable flavour of the balsam.

SYRUPUS VIOLÆ ODORATÆ. *Ed.*

Syrup of Violets.

Take of

Fresh violets, one pound;
Boiling water, four pounds;
Refined sugar, seven pounds and a half.

Macerate the violets in the water, for twenty-four hours, in a covered glass or glazed earthen vessel; then strain without expression, and to the strained infusion add the sugar powdered, so as to form a syrup.

SYRUPUS VIOLÆ. *Dub.*

Syrup of Violets.

Take of

The fresh petals of the violet, two pounds;
Boiling water, five pints.

Macerate for twenty-four hours; afterwards strain the liquor, without expression, through thin linen. Add double refined sugar, that it may be made a syrup.

This syrup has a very agreeable flavour; and, in the quantity of a spoonful or two, proves to children gently laxative. It is apt to lose, in keeping, the elegant blue colour, for which it is chiefly valued; and hence, some have been induced to counterfeit it, with materials whose colour is more permanent, and which are more easily obtained. If the syrup be genuine, acids will change it red, and alkalies green; but if counterfeit, these changes will not happen. From this mutability of colour, the syrup of violet forms an excellent test of the presence of acids and alkalies; and it is also obvious, that a prescriber would be deceived, if he should expect, by means of it, to give a blue tinge to acidulated or alkalized juleps or mixtures.

Syrupus rosæ gallicæ. *Ed.*
Syrup of Red Roses.

Take of
The dried petals of red roses, seven ounces;
Refined sugar, six pounds;
Boiling water, five pounds.
Macerate the roses in the water, for twelve hours; then boil a little, and strain the liquor; add to it the sugar, and boil again for a little, so as to form a syrup.

This syrup is supposed to be mildly astringent, but is principally valued on account of its red colour.

Syrupus rosæ centifoliæ. *Ed.*
Syrup of Hundred-leaved Roses.

Take of
The fresh petals of the hundred-leaved rose, one pound;
Boiling water, four pounds;
Refined sugar, three pounds.
Macerate the petals in the water for twelve hours; then to the strained infusion add the sugar, and boil them into a syrup.

Syrupus rosæ. *Lond.*
Syrup of Roses.

Take of
The dried petals of the hundred-leaved rose, seven ounces;
Refined sugar, six pounds;
Boiling water, four pints.
Macerate the roses in the water for twelve hours, and strain. Evaporate the strained liquor, in a water-bath, to two pints and a half, and add the sugar, as directed for making syrup.

This syrup is an agreeable and mild purgative for children, in the dose of half a spoonful, or a spoonful. It likewise proves gently laxative to adults; and with this intention may be of service in costive habits.

Syrupus sennæ. *Dub.*
Syrup of Senna.

Take of
Manna,
Refined sugar, each one pound;
Senna, half an ounce;
Boiling water, a pint.
Macerate the senna in the water, in a covered vessel, for twelve hours; then, with the strained liquor, mix the manna and the sugar, so that they may be dissolved.

Lond.

Take of
Senna leaves, two ounces;
Fennel seeds, bruised, one ounce:
Manna, three ounces;
Refined sugar, one pound;
Boiling water, a pint.
Macerate with a gentle heat the senna leaves and seeds in the water for twelve hours. Strain the liquor, and mix with it the manna and sugar, then boil to a proper thickness.

This preparation, which is intended to be an officinal substitute for an excellent nursery purgative, is a proof of the impropriety of colleges sanctioning prescriptions which they have not brought to the test of experiment. Mr Phillips found, that the proportions as given by the Dublin college yielded, instead of a fluid syrup, a substance so thick, that it could not even be shaked out of an inverted vessel, owing to the crystallization of the manna. Treacle is the best addition for forming infusion of senna into a syrup, as it has no tendency to crystallize, and covers its taste so completely, that children take it readily.

Syrupus rhamni cathartici. *Ed.*
Syrup of Buckthorn.

Take of
The juice of ripe buckthorn berries, depurated, two parts;
Refined sugar, one part.
Boil them so as to form a syrup.

SYRUPUS RHAMNI. *Lond.*
Syrup of Buckthorn.

Take of
The fresh juice of buckthorn berries, four pints;
Ginger, sliced,
Pimento, powdered, each half an ounce;
Refined sugar, three pounds and a half.

Set aside the juice for three days that the fæces may subside, and then strain it. To one pint of the defæcated juice, add the ginger and pimento; then macerate with a gentle heat for four hours, and filter. Boil away the rest of the juice to one pint and a half; mix the liquors, and add the sugar as directed for making Syrup.

BOTH these preparations, in doses of three or four spoonfuls, operate as brisk cathartics. The principal inconveniencies attending them are, their being very unpleasant, and their occasioning a thirst and dryness of the mouth and fauces, and sometimes violent gripes; these effects may be prevented by drinking liberally of water gruel, or other warm liquids during the operation.

SYRUPUS CITRI AURANTII. *Ed.*
Syrup of Orange-peel.

Take of
The fresh outer rind of Seville oranges, six ounces;
Boiling water, three pounds;
Refined sugar, four pounds.

Macerate the rind in the water for twelve hours; then add to the filtered liquor the sugar, in powder, and, with a gentle heat, form a syrup.

SYRUPUS AURANTII. *Dub.*
Syrup of Orange-peel.

Take of
Fresh outer rind of Seville oranges, eight ounces;
Boiling water, six pints.

Macerate for twelve hours, in a close vessel; and, in the strained liquor, dissolve refined sugar to make a syrup.

SYRUPUS AURANTIORUM. *Lond.*
Orange Syrup.

Take of
Fresh orange rind, two ounces;
Boiling water, one pint;
Refined sugar, three pounds.

Macerate the rind in the water in a loosely covered vessel, for twelve hours; then pour off the liquor, and add to it the sugar.

In making this syrup, it is particularly necessary that the sugar be previously powdered, and dissolved in the infusion, with as gentle a heat as possible. to prevent the exhalation of the volatile parts of the peel. With these cautions, the syrup proves a very elegant and agreeable one, possessing a great share of the fine flavour of the orange-peel.

Syrupus citri medici; olim Syrupus limonum. *Ed.*
Syrup of Lemons.

Take of
Juice of lemons, filtered after the fæces have subsided, three parts;
Double refined sugar, five parts.
Dissolve the sugar in the juice, so as to make a syrup.

Syrupus limonis. *Dub.*
Syrup of Lemons.

Take of
Strained lemon juice, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice as directed for syrup.

Syrupus limonum. *Lond.*
Lemon Syrup.

Take of
Lemon juice, strained, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice, in the same manner as directed for the formation of simple syrup.

Syrupus mori. *Lond.*
Syrup of Mulberry.

Take of
Mulberry juice strained, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the mulberry juice, as directed for syrup.

These are very pleasant cooling syrups; and with this intention they are occasionally used in draughts and juleps, for quenching thirst, abating heat, &c. in bilious or inflammatory distempers. They are sometimes, likewise, employed in gargarisms for inflammations of the mouth and tonsils.

Syrupus acidi acetosi. *Ed.*
Syrup of Acetous Acid.

Take of
Acetous acid, two pounds and a half;
Refined sugar, three pounds and a half;
Boil them, so as to form a syrup.

This is to be considered as simple syrup merely acidulated, and is by no means unpleasant. It is employed in mucilaginous mixtures, and the like; and, on account of its cheapness, it is often preferred to syrup of lemons.

Syrupus allii. *Dub.*
Syrup of Garlic.

Take of
Garlic, sliced, one pound;
Boiling water, two pints.
Macerate the garlic in the water, in a covered vessel, for twelve hours; then add the sugar to the strained liquor, and form a syrup.

This is a very disagreeable syrup; but when we wish to extract the virtues of garlic by a watery menstruum, it is the best means we can employ.

Syrupus scillæ maritimæ. *Ed.*
Syrup of Squills.

Take of
Vinegar of squills, two pounds;
Refined sugar, in powder, three pounds and a half.
Dissolve the sugar with a gentle heat, so as to form a syrup.

This syrup is used chiefly in doses of a spoonful or two, for promoting expectoration, which it does very powerfully. It is also given as an emetic to children.

Syrupus colchici autumnalis. *Ed.*
Syrup of Colchicum.

Take of
Colchicum root, fresh, cut into thin slices, one ounce;
Vinegar, sixteen ounces;
Refined sugar, twenty-six ounces.
Macerate the root in the vinegar for two days, occasionally shaking the vessel; then strain the infusion with gentle expression. To the strained infusion add the sugar, and boil a little so as to form a syrup.

This syrup seems to be the best preparation of the colchi-

cum. We must take care to gather this root in the proper season: and, from errors in this particular, we are to ascribe the uncertainty in the effects of this medicine as found in the shops.

It is chiefly employed as a diuretic, and may be taken from a drachm or two to the extent of an ounce or more.

SYRUPUS PAPAVERIS SOMNIFERI. *Ed.*
Syrup of White Poppy.

Take of
White poppy heads, dried, and freed from the seeds, two pounds;
Boiling water, thirty pounds;
Refined sugar, four pounds.

Macerate the sliced heads in the water for twelve hours; boil the infusion till only one-third part of the liquor remain; then strain the decoction with strong expression. Boil the strained decoction to one-half, and strain again; lastly, add the sugar, and boil a little, so as to form a syrup.

SYRUPUS PAPAVERIS. *Lond.*
Syrup of Poppy.

Take of
The heads of white poppies, dried and bruised, without the seeds, fourteen ounces;
Refined sugar, two pounds;
Boiling water, two gallons and a half.

Macerate the capsules in the water for twelve hours; boil them to one gallon in a water-bath, and strongly press out the decoction. Boil this down, after being strained, to two pints, and strain it while hot; set it aside for twelve hours that the fæces may subside. Boil the liquor, poured off from the fæces, to one pint, and dissolve the sugar in it, in the manner directed for making syrup.

SYRUPUS PAPAVERIS ALBI. *Dub.*
Syrup of White Poppy.

Take of
White poppy-heads, gathered unripe, dried, and emptied of their seeds, one pound;
Boiling water, three pints.

Slice and bruise the heads, then pour on the water, and macerate for twelve hours; express the liquor, and evaporate in a moderate heat to one pint; strain through thin flannel, and set aside for six hours, to allow the fæces to sub-

side: to the decanted liquor add the sugar, and make into a syrup.

This syrup, impregnated with the narcotic matter of the poppy-heads, is given to children, in doses of two or three drachms, and to adults, of half an ounce to an ounce and upwards, for easing pain, procuring rest, and answering the other intentions of mild opiates. Particular care is requisite in its preparation, that it may be always made, as nearly as possible, of the same strength; and accordingly the colleges have been very minute in their description of the process, although, as Mr Phillips remarks, the use of a water-bath in forming the decoction, as directed by the London College, is unnecessary.

Syrupus opii. *Dub.*
Syrup of Opium.

Take of
Watery extract of opium, eighteen grains;
Boiling water, eight ounces by measure.
Macerate until the opium be dissolved, then add sugar so as to make a syrup.

This syrup is an elegant substitute for the former. It is made with infinitely less trouble, and is always of an uniform strength. It contains about two grains and a half of opium in the ounce.

Syrupus papaveris erratici. *Dub.*
Syrup of Red Poppy.

Take of
The fresh petals of the red poppy, one pound;
Boiling water, twenty ounces, by measure.
Put the flowers by degrees into the boiling water. After this, the vessel being removed from the fire, and taken out of the bath, macerate for twelve hours; then press out the liquor, and set it apart, that the fæces may subside. Lastly, make it into a syrup with refined sugar.

Syrupus rhœados. *Lond.*
Syrup of Red Poppy.

Take of
Fresh petals of red poppy, one pound;
Boiling water, one pint and two fluidounces;
Refined sugar, two pounds and a half.
Gradually put the petals into the water, heated in a water-bath, stirring it occasionally, then having removed the ves-

sel from the fire, macerate for twelve hours; express the liquor, and set it aside to let the impurities settle at the bottom: then add the sugar, as directed for syrup.

THE design of putting the flowers into boiling water in a water-bath is, that they may be a little scalded, so as to shrink enough to be all immerged in the water: without this precaution they can scarce be all got in; but they are to be continued no longer over the fire than till this effect is produced, lest the liquor become too thick, and the syrup be rendered ropy.

As a medicine it is perfectly insignificant.

SYRUPUS AMOMI ZINGIBERIS. *Ed.*
Syrup of Ginger.

Take of
Ginger in powder, three ounces;
Boiling water, four pounds;
Refined sugar, seven pounds and a half.
Macerate the ginger in the water, in a close vessel, for twenty-four hours: strain the infusion, and form a syrup, by adding the sugar.

SYRUPUS ZINGIBERIS. *Dub.*
Syrup of Ginger.

Take of
Ginger, bruised, four ounces;
Boiling water, three pints.
Macerate for twenty-four hours, and strain; then add the refined sugar, and make into a syrup.

Lond.

Take of
Ginger, sliced, two ounces;
Boiling water, one pint;
Refined sugar, two pounds.
Macerate the ginger in the water for four hours, and strain; then add the sugar as directed for making syrup.

THIS is an agreeable and moderately aromatic syrup, impregnated with the flavour and virtues of the ginger.

Chap. XXVIII.—MEDICATED HONEYS.

Mel despumatum. *Dub. Lond.*
Clarified Honey.

Melt the honey in a water-bath, and remove the scum as it rises.

In this simple process, the honey is rendered so liquid by the heat of the boiling water, that the wax and other lighter impurities which it commonly contains rise to the surface, in the form of a scum, which is easily removed. At the same time, sand, or any heavy mixture of that kind, sinks to the bottom.

Honey was supposed to be peculiarly balsamic, and was therefore at one time much used in pharmacy. But as its saccharine matter is absolutely of the same nature with that of sugar, and as the extraneous matters which it always contains make it disagree with the stomachs of many individuals, the number of medicated honeys has been much diminished, and their place in some instances supplied by syrups. Medicated honeys are known to be of a proper consistence, by allowing a small quantity to cool on a plate, if, when divided by the edge of a spoon, the portions do not immediately reunite, or if the specific gravity, when hot, be 1.26, or 1.31, when cold.

Oxymel. *Dub.*
Oxymel.

Take of
Honey, two pounds;
Distilled vinegar, one pint.
Boil in a glass vessel, with a gentle fire, to the consistency of a syrup, skimming it.

Oxymel simplex. *Lond.*
Simple Oxymel.

Take of
Clarified honey, two pounds;
Acetic acid, one pint.
Boil down with a gentle fire, in a glass vessel, to a proper thickness.

This syrup is now rarely prepared by the apothecary, but is a favourite and useful domestic remedy in colds, and slight sore throats.

Mel boracis. *Lond.*
Honey of Borax.

Take of

Subborate of soda, powdered, one drachm;
Clarified honey, an ounce.

Mix them.

This is an useful formula, much employed as a detergent in aphthæ and ulcers of the mouth.

Oxymel colchici. *Dub.*
Oxymel of Meadow Saffron.

Take of

The fresh root of meadow saffron, cut into thin slices, one ounce;
Distilled vinegar, one pint;
Clarified honey, two pounds, by weight.

Macerate the root of meadow saffron with the vinegar, in a glass vessel, with a gentle heat, for forty-eight hours. Strain the liquor, pressed out strongly from the root, and add the honey. Lastly, boil the mixture, frequently stirring it with a wooden spoon, to the thickness of a syrup.

This is an active preparation, but its use may be entirely superseded by the syrup of the same root.

Mel rosæ. *Dub.*
Honey of Roses.

Take of

The petals of red rose buds, previously dried, with the heels cut off, four ounces;
Boiling water, three pints;
Honey, five pounds.

Macerate the rose leaves in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the thickness of a syrup, removing the scum.

Lond.

Take of

Red rose petals, dried, four ounces;
Boiling water, three pints;
Clarified honey, five pounds.

Macerate the petals in the water for six hours; then add the honey to the filtered liquor, and boil down to a proper consistence in a water-bath.

This preparation is not unfrequently used as a mild, cooling detergent, particularly in gargles for ulcerations and inflammation of the mouth and tonsils. The rose-buds here used should be hastily dried, that they may the better preserve their astringency.

The Dublin college, in making this and some similar preparations, used unclarified honey, with the idea, probably, that it may be equally well clarified in the course of the preparation itself. This is no doubt true; but as we do not know what effect the clarification may have on the active substances added to the honey, we think that the use of clarified honey, as directed by the London college, is preferable.

Oxymel scillæ. *Lond. Dub.*
Oxymel of Squills.

Take of
Clarified honey, three pounds;
Vinegar of squills, two pints.
Boil them in a glass vessel, with a slow fire, to the thickness of a syrup, (a proper thickness, *Lond.*)

Oxymel of squills is a useful aperient, detergent, and expectorant, and of great service in humoral asthmas, coughs, and other disorders where thick phlegm abounds. It is given in doses of two or three drachms, along with some aromatic water, as that of cinnamon, to prevent the great nausea which it would otherwise be apt to excite. In large doses, it proves emetic.

Oxymel æruginis. *Dub.*
Oxymel of Verdegris.

Linimentum æruginis. *Lond.*
Liniment of Verdegris.

Take of
Prepared verdegris, one ounce;
Vinegar, seven ounces, by measure;
Clarified honey, fourteen ounces, by weight.
Dissolve the verdegris in the vinegar, and strain it through linen; then add the honey, and boil the whole to a proper thickness.

When properly diluted with water, this preparation has

been recommended in venereal ulcerations of the mouth and tonsils; although from the risk of a portion of it being swallowed, other detergent gargles are to be preferred. Externally it is applied, mixed with any digestive ointment, to destroy fungous flesh, and to excite unhealthy ulcers.

Chap. XXIX.—Emulsions and Mixtures.

In this chapter we comprehend those mixtures in which oils, and other substances, insoluble in water, are mixed with, and suspended in watery fluids, by means of viscid substances, such as mucilage and syrups.

Mistura amygdalarum. *Lond.*
Almond Mixture.

Take of
Almond confection, two ounces;
Distilled water, one pint.
Triturate the confection with the water gradually added to it, until they mix; then strain.

Lac amygdalæ. *Dub.*
Almond Milk.

Take of
Sweet almonds, blanched, an ounce and a half;
Refined sugar, half an ounce;
Water, two pints and a half;
Triturate the almonds with the sugar, adding the water by degrees, and strain.

Emulsio amygdalæ communis. *Ed.*
Almond Emulsion.

Take of
Sweet almonds, one ounce;
Water, two pounds and a half.
Beat diligently the blanched almonds, in a stone mortar, gradually pouring on them the water; then strain the liquor.

EMULSIO MIMOSÆ NILOTICÆ; vulgo EMULSIO ARABICA. *Ed.*
Arabic Emulsion,

Is made in the same manner as the almond emulsion, only adding, while beating the almonds,
Mucilage of gum arabic, two ounces.

EMULSIO ARABICA. *Dub.*
Arabic Emulsion.

Take of
Gum arabic, in powder, two drachms;
Sweet almonds, blanched,
Refined sugar, each half a drachm;
Decoction of barley, one pint.
Dissolve the gum in the warm decoction, and when it is almost cold, pour it upon the almonds, previously well beaten with the sugar, and at the same time triturate them together, so as to form an emulsion, and then filter.

ALL these emulsions may be considered as possessing nearly the same qualities. They are merely mechanical suspensions of oil of almonds in watery fluids, by means either of the mucilage with which it is naturally combined in the almonds by itself, or assisted by the addition of gum arabic and sugar. Therefore, on standing for some days, the oily matter separates and rises to the top, not in a pure form, but like thick cream. By heat the same decomposition is immediately effected.

Great care should be taken that the almonds have not become rancid by keeping, which not only renders the emulsion extremely unpleasant, a circumstance of great consequence in a medicine that requires to be taken in large quantities, but likewise gives it injurious qualities.

The almonds are blanched by infusing them in boiling water, and peeling them. The success of the preparation depends upon beating the almonds to a smooth pulp, and triturating them with each portion of the watery fluid, so as to form an uniform mixture before another portion be added.

These liquors are principally used for diluting and correcting acrimonious humours; particularly in heat of urine and stranguries, arising either from a natural acrimony of the juices, or from the operation of cantharides, and other irritating medicines. In these cases, they are to be drunk frequently, to the quantity of half a pint or more at a time.

EMULSIO CAMPHORATA. *Ed.*
Camphorated Emulsion.

Take of
Camphor, one scruple;
Sweet almonds, blanched, two drachms;
Refined sugar, one drachm;
Water, six ounces.

THIS is made in the same manner as the common almond emulsion.

MISTURA CAMPHORÆ. *Lond.*
Camphor Mixture.

Take of
Camphor, half a drachm;
Rectified spirit, ten minims;
Water, one pint.
First triturate the camphor with the spirit, then with the water gradually poured upon it, and strain.

MISTURA CAMPHORATA. *Dub.*
Camphorated Mixture.

Take of
Camphor, one scruple;
Rectified spirit of wine, ten drops;
Refined sugar, half an ounce;
Water, one pint.
Rub the camphor first with the spirit of wine, then with the sugar; lastly, add the water, by degrees, during the trituration, and strain the mixture through linen.

NEITHER of these mixtures are very permanent, as the camphor separates, and swims upon the surface in the course of a few days. As extemporaneous prescriptions, they are, however, very convenient modes of exhibiting that active drug, and may be given to the extent of a table spoonful every three or four hours in typhoid fevers.

LAC AMMONIACI. *Dub.*
Emulsion of Gum Ammoniac.

Take of
Gum ammoniac, one drachm;
Pennyroyal water, eight ounces, by measure.
Rub the gum resin with the pennyroyal water, gradually poured on, until the mixture acquire a milky appearance. It is then to be poured through linen.

Mistura ammoniaci. *Lond.*
Mixture of Ammoniac.

Take of
Ammoniac, two drachms;
Water, half a pint.
Triturate the ammoniac with the water gradually added to it, until they are thoroughly mixed.

Lac asæfœtidæ. *Dub.*
Emulsion of Assafœtida.

Take of
Assafœtida, one drachm;
Pennyroyal water, eight ounces, by measure.
Triturate the assafœtida with the water, gradually added to it, until it form an emulsion.

Mistura assafœtidæ. *Lond.*
Mixture of Assafœtida.

Take of
Assafœtida, two drachms;
Water, half a pint.
Triturate the assafœtida with the water, gradually added to it, until they become thoroughly mixed.

The lac ammoniaci is employed for attenuating tough phlegm, and promoting expectoration in humoral asthmas, coughs, and obstructions of the viscera. It may be given to the quantity of two spoonfuls twice a day.

The assafœtida emulsion answers the same purposes as assafœtida in substance, and on some occasions is a more convenient, though very disagreeable mode of exhibiting it.

Mistura ferri composita. *Lond.*
Compound Mixture of Iron.

Take of
Myrrh in powder, one drachm;
Subcarbonate of potass, twenty-five grains;
Rose water, seven fluidounces and a half;
Sulphate of iron in powder, one scruple;
Spirit of nutmeg, half a fluidounce;
Refined sugar, a drachm.
Triturate the myrrh with the subcarbonate of potass and the sugar; and during the trituration, add first the rose water and spirit of nutmeg, and lastly the sulphate of iron. Immediately put the mixture into a proper glass bottle, and keep it well corked.

This is Griffith's celebrated tonic myrrh mixture. The myrrh is rendered more soluble, by forming a kind of soap with the alkali; a saponaceous emulsion is next formed, by the addition of the water, which is decomposed on the addition of the sulphate of iron. The alkali combines with the sulphuric acid, while the myrrh and black oxide of iron remain suspended in the mixture. It must be carefully preserved from the action of the air, which would gradually convert the black oxide of iron into the red. It is not easy to powder the myrrh alone. It must be well dried, and powdered, in very cold weather.

Mistura guaiaci. *Lond.*
Guaiac Mixture.

Take of
Guaiac, one drachm and a half;
Refined sugar, two drachms;
Mucilage of gum arabic, two fluidrachms;
Cinnamon water, eight fluidounces.
Triturate the guaiac with the sugar, then with the mucilage, and during the trituration with these, gradually add the cinnamon water.

This is one of the best forms of exhibiting guaiac, although it is not dissolved, but only mechanically suspended in the mixture, by means of the sugar and mucilage.

Mistura moschi. *Lond.*
Musk Mixture.

Take of
Musk,
Gum arabic, powdered,
Refined sugar, of each one drachm;
Rose water, six fluidounces.
Rub the musk first with the sugar, then with the gum, and add the rose water by degrees.

Unless the musk be very thoroughly triturated with the sugar and gum before the addition of the water, it soon separates. An ounce, or an ounce and a half, may be taken for a dose.

Potio carbonatis calcis; olim Potio cretacea. *Ed.*
Chalk Potion.

Take of
Prepared carbonate of lime, one ounce;

Refined sugar, half an ounce;
Mucilage of gum arabic, two ounces.
Triturate together, and then gradually add of
Water, two pounds and a half;
Spirit of cinnamon, two ounces.
Mix them.

MISTURA CRETÆ. *Lond. Dub.*
Mixture of Chalk.

Take of
Prepared chalk, half an ounce:
Refined sugar, three drachms;
Gum arabic, powdered, one ounce (half an ounce, *Lond.*);
Water, one pint.
Mix them by trituration.

THIS is a very elegant form of exhibiting chalk, and is an useful remedy in diseases arising from, or accompanied with, acidity in the primæ viæ. It is frequently employed in diarrhœa proceeding from that cause. The mucilage not only serves to keep the chalk uniformly diffused, but also improves its virtues. Of this medicine a pound or two may be taken in the course of a day.

MISTURA CORNU USTI. *Lond.* DECOCTUM CORNU CERVINI. *Dub.*
Mixture of Burnt Horn; Decoction of Hartshorn.

Take of
Burnt and prepared hartshorn, two ounces;
Gum arabic, in powder, one ounce (three drachms, *Dub.*);
Water, three pints.
Boil, constantly stirring, down to two pints; and strain.

PREPARED hartshorn is phosphate of lime in a minute state of mechanical division. By boiling in a mucilaginous liquid, it is diffused and imperfectly suspended, but not a particle of it is dissolved. This is therefore an extremely injudicious preparation; for phosphate of lime would be much more easily and effectually suspended by triturating it with a larger proportion of gum arabic, and adding the water gradually. But we believe that this preparation has no other action than that of a weak mucilage.

ENEMA CATHARTICUM. *Dub.*
Purging Clyster.

Take of
Manna, one ounce.

Dissolve in ten ounces, by measure, of
Compound decoction of chamomile; then add of
Olive oil, one ounce;
Sulphate of magnesia, half an ounce.
Mix them.

ENEMA FŒTIDUM. *Dub.*
Fetid Clyster,
Is made by adding to the former two drachms of the tincture of assafœtida.

THESE are very useful extemporaneous preparations.

ACETICA.

CHAP. XXX.—MEDICATED VINEGARS.

INFUSIONS of vegetable substances in acetic acid are commonly called Medicated Vinegars. The action of the acid in this case may be considered as twofold.

1. It acts simply as water, in consequence of the great quantity of water which enters into its composition, and generally extracts every thing which water is capable of extracting.

2. It exerts its own peculiar action as an acid. In consequence of this it sometimes increases the solvent power of its watery portion, or dissolves substances which water alone is incapable of dissolving, and in a few instances it impedes the solution of substances which water alone would dissolve.

As acetic acid, in itself sufficiently perishable, has its tendency to decomposition commonly increased, by the solution of any vegetable matter in it, it should never be used as a menstruum, unless where it promotes the solution of the solvend, as in extracting the acrid principle of squills, colchicum, &c. and in dissolving the volatile, and especially the empyreumatic oils, or where it coincides with the virtues of the solvend.

Acetum aromaticum. *Ed.*
Aromatic Vinegar.

Take of
Rosemary tops, dried,
Sage leaves, dried, each four ounces;
Lavender flowers, dried, two ounces;
Cloves, two drachms;
Distilled acetous acid, eight pounds.

Macerate for seven days, express the liquor, and filter it through paper.

This is given as an improved preparation of the *Vinaigre des quatre voleurs*, which was supposed to be a certain prophylactic against the contagion of plague and similar diseases. It is in fact a pleasant solution of essential oils in vinegar, which will have more effect in correcting bad smells, than in preventing fever.

Acetum scillæ maritimæ. *Ed.*
Vinegar of Squills.

Take of
Dried squills, two ounces;
Distilled acetous acid, two pounds and a half;
Alcohol, three ounces.

Macerate the squills in the acetous acid for seven days; then press out the liquor, to which add the alcohol; and when the fæces have subsided, pour off the clear liquor.

Acetum scillæ. *Lond.*
Vinegar of Squills.

Take of
Squills, recently dried, one pound;
Acetic acid, six pints;
Proof-spirit, half a pint.

Macerate the squills with the vinegar in a covered glass vessel, with a gentle heat, for twenty-four hours; then express the liquor, and set it aside until the fæces subside. Lastly, to the decanted liquor add the spirit.

Dub.

Take of
Squills, recently dried, half a pound;
Vinegar, three pints;
Proof-spirit, four ounces.

Macerate the squills in the vinegar for four days, in a glass vessel, frequently agitating it; then express the acid; to

which, poured from the fæces after they have subsided, add the spirit.

Vinegar of squills is a medicine of great antiquity. It is a very powerful stimulant; and hence it is frequently used, with great success, as a diuretic and expectorant. The dose of this medicine is from a drachm to half an ounce; where crudities abound in the first passages, it may be given at first in a larger dose to evacuate them by vomiting. It is most conveniently exhibited along with cinnamon, or other agreeable aromatic waters, which prevent the nausea it would otherwise, even in small doses, be apt to occasion.

Acetum colchici. *Lond.*
Vinegar of Meadow Saffron.

Take of
Fresh root of meadow saffron, sliced, one ounce;
Acetic acid, one pint;
Proof-spirit, one fluidounce.
Macerate the root with the vinegar, in a corked glass bottle, for twenty-four hours; then express the liquor, and set it at rest to settle; lastly, add the spirit to the defæcated liquor.

This is substituted for the oxymel of the former edition of the London Pharmacopœia, and appears to be a more convenient form. It is said to be powerfully diuretic.

Acidum aceticum camphoratum. *Dub.*
Camphorated Acetic Acid.

Take of
Acetic acid, six ounces by measure;
Camphor, half an ounce;
Rectified spirit, a sufficient quantity.
Reduce the camphor to powder, by means of the spirit; then add the acid and dissolve.

Acidum acetosum camphoratum. *Ed.*
Camphorated Acetous Acid.

Take of
Stronger acetous acid, six ounces;
Camphor, half an ounce;
Triturate the camphor with a little alcohol; add it to the acid and dissolve.

The alcohol in this preparation is used merely to facilitate the reduction of the camphor to powder; for the strong acetous, or, as we would rather call it, the acetic acid, is capable

of dissolving even a larger proportion of camphor than is directed in the above formula.

This solution is a powerful analeptic remedy. Its vapour, snuffed up the nostrils, which is the only method of using it, is one of the most pungent stimuli we possess. It is so extremely volatile and corrosive, that it is difficult to preserve, except in glass phials, with ground glass stoppers, or in small gold boxes, such as are used for Henry's aromatic spirit of vinegar, for which it is in fact an officinal substitute.

Chap. XXXI.—TINCTURES.

The term Tincture has often been employed in a very vague sense. It is now commonly applied to solutions, made by infusion or digestion, in alcohol, or diluted alcohol. But it is also, though perhaps incorrectly, extended to solutions in ether, etherial spirits, and spirit of ammonia.

Alcohol is capable of dissolving resins, gum resins, extractive, tannin, sugar, volatile oils, soaps, camphor, adipocere, colouring matters, acids, alkalies, and some compound salts. Many of these, as the gum resins, soaps, extractive, tannin, sugar, and saline substances, are also soluble in water, while water is capable of dissolving substances, such as gum, gelatin and most of the compound salts, which are insoluble in alcohol. But the insolubility of these substances in the different menstrua is not absolute, but merely relative; for a certain proportion of alcohol may be added to a solution of gum in water without decomposing it; and a solution of resin in alcohol will bear a certain admixture of water without becoming turbid. Therefore, diluted alcohol, which is a mixture of these two menstrua, sometimes extracts the virtues of heterogeneous compounds more completely than either of them separately.

Alcohol is used as a menstruum,

1. When the solvend is not soluble, or is only sparingly soluble in water.
2. When a watery solution of the solvend is extremely perishable.
3. When the use of alcohol is indicated as well as that of the solvend.

In making alcoholic tinctures, we must observe that the virtues of recent vegetable matters are very imperfectly extracted

by spiritous menstrua. They must therefore be previously carefully dried, and as we cannot assist the solution by means of heat, we must facilitate it by the mechanical division of the solvend. A coarse powder often answers best, as, when too minute, it is apt to settle and agglutinate. To prevent loss, the solution is commonly made in a close vessel, and the heat applied must be very gentle, lest it be broken by the expansion of vapour.

The action of tinctures on the living system is always compounded of the action of the menstruum, and of the matters dissolved in it. Now, these actions may either coincide with, or oppose each other; and as alcohol is at all times a powerful agent, it is evident that no substance should be exhibited in the form of a tincture, whose action is different from that of alcohol, unless it be capable of operating in so small a dose, that the quantity of alcohol taken along with it is inconsiderable.

Tinctures are not liable to spoil, as it is called, but they must nevertheless be kept in well-closed phials, especially when they contain active ingredients, to prevent the evaporation of the menstruum.

They generally operate in doses so small, that they are rarely exhibited by themselves, but commonly combined with some vehicle, which ought not to decompose the tincture, or at least not separate any thing from it in a palpable form.

The colleges direct all tinctures to be prepared in closed phials, and to be frequently shaken during the process.

Tinctura aloes socotorinæ. *Ed.*
Tincture of Socotorine Aloes.

Take of
Socotorine aloes, in powder, half an ounce;
Extract of liquorice, an ounce and a half;
Alcohol, four ounces;
Water, one pound.
Digest for seven days in a close vessel, with a gentle heat, and frequent agitation, (precautions which are to be observed in preparing all tinctures,) and pour off the depurated tincture.

Tinctura aloes. *Dub.*
Tincture of Aloes.

Take of
Socotorine aloes, powdered, half an ounce;

Extract of liquorice, dissolved in eight ounces of boiling water, an ounce and a half;
Proof-spirit, eight ounces, by measure.
Digest for seven days, then strain.

Lond.

Take of
Extract of spiked aloes, in powder, half an ounce;
Extract of liquorice, one ounce and a half;
Water, a pint;
Rectified spirit, four fluidounces.
Macerate in a sand bath until the extracts be dissolved, then strain.

This is one of the simplest of the aloetic tinctures, and is one of the best formulæ for the exhibition of that useful drug in a fluid form. The liquorice is added to cover the taste of the aloes, and to assist in suspending it in the fluid. About an ounce may be taken for a dose.

Tinctura aloes et myrrhæ. *Ed.*
Tincture of Aloes and Myrrh.

Take of
Myrrh, in powder, two ounces;
Alcohol, one pound and a half;
Water, half a pound.
Mix the alcohol with the water, then add the myrrh; digest for four days; and, lastly, add
Socotorine aloes, in powder, one ounce and a half;
Saffron, cut in pieces, one ounce.
Digest again for three days, and pour off the tincture from the sediment.

Tinctura aloes composita. *Lond. Dub.*
Compound Tincture of Aloes.

Take of
Socotorine aloes,
Saffron, of each three ounces;
Tincture of myrrh, two pints.
Digest for seven days (macerate for a fortnight, *Lond.*), and strain.

This is supposed to be an improvement on the elixir proprietatis of Paracelsus. These tinctures differ considerably in strength; the latter contains one part of aloes to eight of the menstruum; the former one to sixteen, while the simple

tincture already mentioned contains but one to thirty-two. In prescription these proportions must be attended to. The myrrh and saffron may add to its stimulating properties.

TINCTURA AMOMI REPENTIS. *Ed.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, bruised, four ounces;
Diluted alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

TINCTURA CARDAMOMI. *Lond. Dub.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, husked and bruised, three ounces;
Proof-spirit, two pints.
Digest for seven days (macerate for fourteen days, *Lond.*), and strain.

TINCTURE of Cardamoms has been in use for a considerable time. It is a pleasant warm cordial; and may be taken, along with any proper vehicle, in doses of from a drachm to a spoonful or two.

TINCTURA CARDAMOMI COMPOSITA. *Dub.*
Compound Tincture of Cardamom.

Take of
Lesser cardamom seeds, husked and bruised,
Cochineal, in powder,
Caraway seeds, each, powdered, two drachms;
Cinnamon, bruised, half an ounce;
Proof-spirit, two pints.
Digest for fourteen days, and strain.

Lond.

Take of
Cardamom seeds,
Caraway seeds,
Cochineal, of each, powdered, two drachms;
Cinnamon-bark, bruised, half an ounce;
Raisins, stoned, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture is somewhat less stimulant than the compound tincture of cinnamon, which, besides a larger propor-

tion of aromatics, contains also long pepper. The large proportion of raisins used by the London college forms only a very uneconomical and inelegant method of sweetening an aromatic tincture.

Tinctura angusturæ. *Dub.*
Tincture of Angustura.

Take of
Angustura bark, in coarse powder, two ounces;
Proof-spirit of wine, two pints;
Digest for seven days, and filter.

Angustura bark readily gives out its active principles to alcohol; hence the tincture is a convenient and useful preparation.

Tinctura aristolochiæ serpentariæ. *Ed.*
Tincture of Snake-Root.

Take of
Virginian snake-root, bruised, two ounces;
Cochineal, in powder, one drachm;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

Tinctura serpentariæ. *Lond. Dub.*
Tincture of Snake-Root.

Take of
Virginian snake-root, sliced and bruised, three ounces;
Proof-spirit, two pints;
Digest for seven days (macerate for fourteen, *Lond.*), and strain.

This tincture, which contains the whole virtues of the root, may be taken to the quantity of a spoonful or more every five or six hours; and to this extent it often operates as an useful diaphoretic.

Tinctura aurantii. *Lond. Dub.*
Tincture of Orange-peel.

Take of
Fresh orange-peel, three ounces;
Proof-spirit, two pints;
Digest for three days (macerate for fourteen days, *Lond.*), and strain.

This tincture is an agreeable bitter, flavoured at the same time with the essential oil of the orange-peel.

TINCTURA BENZOINI COMPOSITA. *Ed.*
Compound Tincture of Benzoin.

Take of
Benzoin, in powder, three ounces;
Balsam of Tolu, one ounce;
Socotorine aloes, in powder, half an ounce;
Alcohol, two pounds.
Digest with a gentle heat for seven days, and strain.

TINCTURA BENZOES COMPOSITA. *Dub.* TINCTURA BENZOINI COMPOSITA. *Lond.*
Compound Tincture of Benzoin.

Take of
Benzoin, three ounces;
Purified storax, two ounces;
Balsam of Tolu, one ounce;
Socotorine aloes, half an ounce;
Rectified spirit of wine, two pints.
Digest for seven days (macerate for fourteen days, *Lond.*), and filter.

THESE preparations may be considered as simplifications of some very complicated compositions, which were celebrated under different names; such as Baume de Commandeur, Wade's balsam, Friars balsam, Jesuits drops, &c. These, in general, consisted of a confused farrago of discordant substances.

TINCTURA CAMPHORÆ. *Ed.*
Tincture of Camphor.

Take of
Camphor, one ounce;
Alcohol, one pound.
Mix them together, that the camphor may be dissolved.
It may also be made with a double, triple, &c. proportion of camphor.

SPIRITUS CAMPHORÆ. *Lond.*
Spirit of Camphor.

Take of
Camphor, four ounces,
Rectified spirit, two pints.
Mix so as to dissolve the camphor.

SPIRITUS CAMPHORATUS. *Dub.*
Camphorated Spirit.

Take of
Camphor, one ounce;
Rectified spirit of wine, eight ounces, by measure.
Mix so as to dissolve the camphor.

THESE solutions of camphor are only employed for external uses, against rheumatic pains, paralytic numbnesses, inflammations, for discussing tumours, preventing gangrenes, or restraining their progress. They are too pungent to be exhibited internally, and cannot be diluted with water, without being totally decomposed.

TINCTURA CASCARILLÆ. *Lond. Dub.*
Tincture of Cascarilla.

Take of
The bark of cascarilla, powdered, four ounces;
Proof-spirit, two pints.
Digest for seven days, *Dub.* (macerate for fourteen days, *Lond.*), and strain.

THE proportion of alcohol is here so large, as indeed it is in most of the tinctures of this kind, that it is merely to be considered as a concealed dram.

TINCTURA CASTOREI. *Lond. Dub.*
Tincture of Castor.

Take of
Russian castor, powdered, two ounces;
Proof-spirit, two pints.
Digest (macerate, *Lond.*) for seven days, and strain.

Ed.

Take of
Russian castor, an ounce and a half;
Alcohol, one pound.
Digest for seven days, and strain through paper.

IT has been disputed, whether a weak or rectified spirit, and whether cold or warm digestion, are preferable for making this tincture; but, from experiment, it appears that castor, macerated without heat, gives out its finer and most grateful parts to either spirit, but most perfectly to the rectified: that heat enables both to extract the greatest part of its

grosser and more nauseous matter; and that proof-spirit extracts this last more readily than rectified.

The tincture of castor is recommended in most kinds of nervous complaints and hysteric disorders: in the latter, it sometimes does service, though many have complained of its proving ineffectual. The Dublin college has two tinctures of castor, which differ only in the one being made with Russian, and the other with Canadian castor. The dose is from twenty drops to forty, fifty, or more.

Tinctura capsici. *Lond. Dub.*
Tincture of Capsicum.

Take of
Capsicum pods, an ounce;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

This is a very powerful acrid stimulant. It has been recommended in gangrenous sore throats.

Tinctura cinchonæ officinalis. *Ed.* Tinctura cinchonæ. *Dub.*
Tincture of Cinchona.

Take of
Cinchona bark, in coarse powder, four ounces;
Diluted alcohol, two pounds and a half (two pints, *Dub*).
Digest for seven days, and strain through paper.

Tinctura cinchonæ. *Lond.*
Tincture of Cinchona.

Take of
Lance-leaved cinchona bark, in powder, seven ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

This tincture is certainly impregnated with the virtues of cinchona, but not to such a degree that it can be given in sufficient doses to act as cinchona, without exhibiting more alcohol than what is proper to be given as a medicine. Indeed, we are afraid that this and other bitter and tonic tinctures, as they are called, are with some only an apology for dram-drinking, and that the most certain effects they produce are slight degrees of intoxication. That of the London college is the best, as containing most bark.

TINCTURA CINCHONÆ COMPOSITA. *Lond. Dub.*
Compound Tincture of Cinchona.

Take of
Peruvian bark, powdered, two ounces;
Rind of Seville oranges, dried, one ounce and a half (half an ounce, *Dub.*);
Virginian snake-root, bruised, three drachms;
Saffron, one drachm;
Cochineal, powdered, two scruples;
Proof-spirit, twenty fluidounces.
Digest (macerate, *Lond.*) for fourteen days, and strain.

THIS is said to be the same with the celebrated *Huxham's Tincture of Bark.*

As a corroborant and stomachic, it is given in doses of two or three drachms: but when employed for the cure of intermittents, it must be taken to a greater extent.

TINCTURA CINNAMOMI COMPOSITA; olim TINCTURA AROMATICA. *Ed.*
Compound Tincture of Cinnamon, formerly *Aromatic Tincture.*
Take of
Cinnamon, bruised,
Lesser cardamom seeds, bruised, each one ounce;
Long pepper, in powder, two drachms;
Diluted alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

Lond. Dub.

Take of
Cinnamon, bruised, six drachms;
Lesser cardamom seeds, husked and bruised, three drachms;
Long pepper in powder,
Ginger, sliced, of each two drachms;
Proof-spirit, two pints.
Mix and digest for seven days (macerate for fourteen, *Lond.*)
Then strain.

IN their formula, the Dublin and London colleges diminish the quantity of cardamom seeds, and substitute for it a proportion of ginger. This makes no alteration in the virtues of the preparation, which is a very warm aromatic, too hot to be given without dilution. A tea-spoonful or two may be taken in wine, or any other convenient vehicle, in languors, weakness of the stomach, flatulencies, and other similar complaints; and in these cases it is often employed with advantage.

TINCTURA COLOMBÆ. *Ed.* TINCTURA COLUMBO. *Dub.*
Tincture of Colomba.

Take of
Colomba root, powdered, two ounces;
Proof-spirit of wine, two pints.
Digest for seven days, and filter through paper.

TINCTURA CALUMBÆ. *Lond.*
Tincture of Colomba.

Take of
Colomba root, sliced, two ounces and a half;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS is a very good stomachic tincture, which may be used when the stomach will not bear the colomba in powder.

TINCTURA CONVOLVULI JALAPÆ. *Ed.*
Tincture of Jalap.

Take of
Jalap, in powder, three ounces;
Diluted alcohol, fifteen ounces.
Digest for seven days, and strain the tincture through paper.

TINCTURA JALAPÆ. *Lond.*
Tincture of Jalap.

Take of
Jalap, in powder, eight ounces;
Proof-spirit, two pints.
Macerate for fourteen days, with a gentle heat, and filter.

Dub.

Take of
Jalap in coarse powder, five ounces;
Proof-spirit, two pints.
Digest for seven days, and filter.

ALCOHOL was formerly ordered for the preparation of this tincture; but diluted alcohol is a preferable menstruum, as it dissolves the active constituents of the jalap, as well as pure alcohol, and is less stimulating. The Edinburgh is the weakest, the London the strongest.

TINCTURA CROCI ANGLICI. *Ed.* TINCTURA CROCI. *Dub.*
Tincture of Saffron.

Take of
English saffron, cut in shreds, one ounce;
Diluted alcohol, fifteen ounces (one pint, *Dub*).
Digest for seven days, and strain through paper.

The proof-spirit is a very proper menstruum for extracting the medical virtues of the saffron, and affords a convenient mode of exhibiting that drug.

Tinctura digitalis purpureæ. *Ed.*
Tincture of Foxglove.

Take of
The dried leaves of foxglove, one ounce;
Diluted alcohol, eight ounces.
Digest for seven days, and strain through paper.

Tinctura digitalis. *Dub.*
Tincture of Foxglove.

Take of
The leaves of foxglove, (rejecting the larger ones), dried, and in coarse powder, two ounces;
Proof-spirit, one pint.
Digest for seven days, and filter.

Lond.

Take of
Leaves of foxglove, dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

This tincture is a very powerful medicine, and contains the virtues of the foxglove in a very manageable form. It has been chiefly used to diminish the force of the circulation of the blood in hæmoptysis, and often with remarkable success. It has been also said to cure incipient phthisis pulmonalis; but subsequent experience has not confirmed the first trials. Like every other form in which foxglove is given, it should be given in very small doses at first, such as from ten to twenty drops, and cautiously increased.

Tinctura ferulæ assæ fœtidæ. *Ed.*
Tincture of Assafœtida.

Take of
Assafœtida, four ounces;
Alcohol, two pounds and a half;
Digest for seven days, and strain through paper.

Tinctura assafœtidæ. *Lond.*
Tincture of Assafœtida.

Take of
Assafœtida, four ounces;
Rectified spirit, two pints.
Macerate for a fortnight, and filter.

Dub.

Take of
Assafœtida, four ounces;
Rectified spirit of wine, two pints;
Water, eight ounces by measure.
Add the spirit to the assafœtida, triturated with the water, and digest for seven days; then strain.

This tincture possesses the virtues of the assafœtida, and may be given in doses of from ten drops to fifty or sixty.

Tinctura galbani. *Dub.*
Tincture of Galbanum.

Take of
Galbanum, cut into small pieces, two ounces;
Proof-spirit of wine, two pints.
Digest with a gentle heat for seven days, and strain.

This tincture, though not so powerful, is less nauseous than that of assafœtida, and therefore in some cases may be preferable.

Tinctura gallarum. *Dub.*
Tincture of Galls.

Take of
Galls, in powder, four ounces;
Proof-spirit, two pints.
Mix; digest for seven days, and filter.

This tincture, now for the first time introduced into practice by the Dublin college, is, I have no doubt, the most powerful of all the astringent tinctures.

Tinctura gentianæ composita. *Ed.*
Compound Tincture of Gentian, commonly called *Stomachic Elixir.*

Take of
Gentian root, sliced and bruised, two ounces;
Seville orange-peel, dried and bruised, one ounce;
Canella alba, bruised, half an ounce;
Cochineal, in powder, half a drachm;
Diluted alcohol, two pounds and a half.
Macerate for seven days, and strain through paper.

Dub.

Take of
Gentian root, sliced and bruised, two ounces;
Dried rind of Seville oranges, one ounce;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit of wine, two pints.
Digest for seven days and strain.

Lond.

Take of
Gentian root sliced, two ounces;
Orange-peel dried, one ounce;
Cardamom seeds bruised, half an ounce;
Proof spirit, two pints.
Macerate for fourteen days, with a gentle heat, and strain.

THESE are very elegant spiritous bitters. As the preparations are designed, for keeping, lemon-peel, an excellent ingredient in the watery bitter infusions, has, on account of the perishableness of its flavour, no place in these.

TINCTURA GUAIACI OFFICINALIS. *Ed.*
Tincture of Guaiac.

Take of
Guaiac, in powder, one pound;
Alcohol, two pounds and a half.
Digest for ten days, and strain through paper.

TINCTURA GUAIACI. *Dub.*
Tincture of Guaiac.

Take of
Guaiac, four ounces;
Rectified spirit of wine, two pints.
Digest for seven days, and filter.

Lond.

Take of
Guaiac in powder, half a pound;
Rectified spirit, two pints.
Macerate for fourteen days, and filter.

WHAT is called gum guaiac is in fact a resin, and perfectly soluble in alcohol. This solution is a powerful stimulating sudorific, and may be given in doses of about half an ounce, in rheumatic and arthritic cases. It was once supposed to be a specific against the gout.

TINCTURA HELLEBORI NIGRI. *Dub.*
Tincture of Black Hellebore.

Take of
Black hellebore root, in coarse powder, four ounces;
Cochineal, powdered, two scruples;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

Ed.

Take of
Black hellebore root, bruised, four ounces;
Cochineal, in powder, half a drachm;
Diluted alcohol, two pints and a half.
Digest for seven days, and filter through paper.

Lond.

Take of
Black hellebore root, sliced, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS is perhaps the best preparation of hellebore, when designed for an alterative, the menstruum here employed extracting the whole of its virtues. It has been found particularly serviceable in uterine obstructions. In sanguine constitutions, where chalybeates are hurtful, it has been said that it seldom fails of exciting the menstrual evacuations, and removing the bad effects of their suppression. A tea-spoonful of the tincture may be taken twice a-day in warm water, or any other convenient vehicle.

TINCTURA HUMULI. *Lond.*
Tincture of Hops.

Take of
Hops, five ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

OPIUM in every form disagrees so completely with some people, as to render its exhibition to them improper. In these cases, we must have recourse to other narcotics, and of them the hop is one of the safest and most agreeable. Its comparative strength is not yet well ascertained, nor even the best form of exhibiting it. It is difficultly pulverizable, and in its natural form it is so extremely light and bulky, as to absorb and retain a great deal of the spirit employed to ex-

tract a tincture from it, even when subjected to much compression.

TINCTURA HYOSCIAMI NIGRI. *Ed.*
Tincture of Henbane.

Take of
The leaves of henbane, dried, one ounce;
Diluted alcohol, eight ounces.
Digest for seven days, and strain through paper.

TINCTURA HYOSCIAMI. *Dub.*
Tincture of Henbane.

Take of
Henbane leaves, dried, and in coarse powder, two ounces and a quarter;
Proof-spirit, one pint.
Macerate for fourteen days, and strain.

Lond.

Take of
Henbane leaves, dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS tincture, although not yet come into general use, is a valuable anodyne, and in many cases may be substituted with advantage for the tincture of opium, especially where the latter produces obstinate constipation, or, instead of its usual soporific and sedative effects, causes uneasiness, restlessness, and universal irritation.

An anonymous correspondent observes, that it is useful in recent coughs, in doses for an adult of not less than thirty drops, with ten drops of laudanum, which is equal to thirty drops of the latter. Tincture of henbane alone sometimes purges; when this is an inconvenience, it is corrected by the addition of a few drops of laudanum.

TINCTURA KINO. *Ed.*
Tincture of Kino.

Take of
Kino, in powder, two ounces;
Diluted alcohol, a pound and a half.
Digest for seven days, and strain through paper.

Dub.

Take of
Kino, in powder, three ounces;
Proof-spirit, a pint and a half.
Digest for seven days, and filter.

Lond.

Take of
Kino, in powder, three ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

I HAVE already stated my reasons for believing kino to be a species of tannin. This is certainly a very astringent tincture, and will be found an excellent medicine in obstinate diarrhœas, and in lienteria.

TINCTURA LAURI CINNAMOMI. *Ed.*
Tincture of Cinnamon.

Take of
Cinnamon, bruised, three ounces;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA CINNAMOMI. *Lond. Dub.*
Tincture of Cinnamon.

Take of
Cinnamon, bruised, three ounces (three ounces and a half, *Dub.*);
Proof-spirit of wine, two pints.
Digest for seven days, (macerate for fourteen days, *Lond.*), and strain.

THE tincture of cinnamon possesses the astringent virtues of the cinnamon, as well as its aromatic cordial ones; and in this respect it differs from the spirit prepared by distillation.

SPIRITUS LAVANDULÆ COMPOSITUS. *Ed.*
Compound Spirit of Lavender.

Take of
Spirit of lavender, three pounds;
Spirit of rosemary, one pound;
Cinnamon, bruised, one ounce;
Cloves, bruised, two drachms;
Nutmeg, bruised, half an ounce;
Red saunders wood, in shavings, three drachms.
Macerate for seven days, and filter.

SPIRITUS LAVANDULÆ COMPOSITUS. *Lond. Dub.*
Compound Spirit of Lavender.

Take of
Spirit of lavender, three pints;
Spirit of rosemary, one pint,
Cinnamon, bruised,
Nutmegs, bruised, of each half an ounce.
(Cloves, two drachms, *Dub.*)
Red saunders wood, sliced, one ounce.
Digest for ten days, (macerate for fourteen days, *Lond.*), and strain.

THESE preparations do not differ materially. They are grateful cordials, of which from ten to a hundred drops may be conveniently taken, dropt upon sugar. It does not appear very clearly whether they should be considered as spirits or tinctures; for although the spirit of lavender be the predominant ingredient, yet the mode of preparation is that of a tincture, and the spirit as a menstruum dissolves astringent, colouring, and other substances, which would not rise with it in distillation.

TINCTURA MELOES VESICATORII. *Ed.*
Tincture of Cantharides.

Take of
Cantharides, bruised, one drachm;
Diluted alcohol, one pound.
Digest for seven days, and strain through paper.

TINCTURA CANTHARIDIS. *Dub.*
Tincture of Spanish Flies.

Take of
Bruised cantharides, two drachms;
Cochineal, powdered, half a drachm;
Proof-spirit, one pint and a half.
Digest for seven days, and strain.

TINCTURA LYTTÆ. *Lond.*
Tincture of Cantharides.

Take of
Cantharides, bruised, three drachms;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture contains the active principle of the cantharides, whatever it may be. It is applied externally as a stimulant and rubefacient, and is sometimes given internally, in

doses of from ten to twenty drops, as a diuretic, or as a stimulant in gleets and gonorrhœa.

TINCTURA MIMOSÆ CATECHU. *Ed.*
Tincture of Catechu. Japonic Tincture.

Take of
Extract of catechu, three ounces;
Cinnamon, bruised, two ounces;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA CATECHU. *Lond. Dub.*
Tincture of Catechu.

Take of
Extract of catechu, three ounces;
Cinnamon, bruised, two ounces;
Proof-spirit, two pints.
Digest for seven days (macerate for fourteen, *Lond.*) and filter.

THE cinnamon is a very useful addition to the catechu, not only as warming the stomach, but likewise as covering its taste.

This tincture is of service in all kinds of defluxions, catarrhs, looseness, uterine fluxes, and other disorders, where astringent medicines are indicated. Two or three tea-spoonfuls may be taken every now and then in red wine, or any other proper vehicle.

TINCTURA MOSCHI. *Dub.*
Tincture of Musk.

Take of
Musk, in powder, two drachms;
Rectified spirit of wine, one pint.
Digest for seven days, and strain.

RECTIFIED spirit is the most complete menstruum for musk; but in this form it is often impossible to give a sufficient quantity of the musk.

TINCTURA MYRRHÆ. *Ed.*
Tincture of Myrrh.

Take of
Myrrh, in powder, three ounces;
Alcohol, twenty ounces;
Water, ten ounces.
Digest for seven days, and strain through paper.

Lond.

Take of
Myrrh, bruised, four ounces;
Rectified spirit, two pints;
Water, one pint.
Macerate for fourteen days, and strain.

Dub.

Take of
Myrrh, bruised, three ounces;
Proof-spirit of wine, a pint and a half;
Rectified spirit of wine, half a pint.
Digest for seven days, and filter.

TINCTURE of myrrh is recommended internally as a cardiac, for removing obstructions, particularly those of the uterine vessels, and resisting putrefaction. The dose is from fifteen drops to forty or more. The medicine may perhaps be given in these cases to advantage; though, with us, it is more commonly used externally, for cleansing foul ulcers, and promoting the exfoliation of carious bones.

TINCTURA OPII, sive THEBAICA; vulgo LAUDANUM LIQUIDUM. *Ed.*

Tincture of Opium, or *Thebaic Tincture*, commonly called *Liquid Laudanum*.

Take of
Opium, two ounces;
Diluted alcohol, two pounds.
Digest for seven days, and filter through paper.

Dub.

Take of
Hard purified opium, powdered, ten drachms;
Proof-spirit of wine, one pint.
Digest for seven days and strain.

Lond.

Take of
Hard opium, powdered, two ounces and a half;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

As these tinctures, on evaporation, furnish the same quantity of extract, they are believed to be of nearly equal strength; but it is to be regretted that they are not so well adapted for keeping as could be wished; after some time, a part of the

opium is gradually deposited from both, and consequently the tinctures become weaker: the part which thus separates, amounts sometimes, it is said, to near one-fourth of the quantity of opium at first dissolved. Mr Phillips found, that when alcohol of sp. gr. 0.930 was employed with select crude opium, the tincture acquired sp. gr. 0.952, and contained 26 grains of opium *per* fluidounce; but when purified opium was used, the sp. gr. of the tincture was 0.958, and the quantity of opium in the fluidounce 36 grains; of the crude opium one grain in 3.5 remained undissolved, and of the purified only one in twenty-five; while in the tincture made with the former, one grain of opium was contained in 18.3 minims, and in that with the latter in 13.3, so that from calculation the strength of the tincture made with purified opium to that made with crude opium is as three to two nearly. But I must here observe, that calculation cannot be altogether relied upon in this case, because, although purified opium contains more soluble matter than crude opium, its narcotic powers are diminished by the preparation it has undergone.

TINCTURA OPII CAMPHORATA, sive ELIXIR PAREGORICUM. *Dub.*

Camphorated Tincture of Opium. Paregoric Elixir.

Take of
Camphor, two scruples;
Hard purified opium, in powder,
Benzoic acid, of each one drachm;
Essential oil of aniseed, one drachm;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

TINCTURA CAMPHORÆ COMPOSITA. *Lond.*

Compound Tincture of Camphor.

Take of
Camphor, two scruples;
Hard opium in powder,
Benzoic acid, of each one drachm;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

IN this formula, the virtues of the opium and camphor are combined. It gets an agreeable flavour from the acid of benzoin and essential oil. The latter also renders it more stimulating; but whether it derives any salutary virtues from the former, we do not know. It was originally prescribed under the title of Elixir Asthmaticum, which it does not ill

deserve. It contributes to allay the tickling which provokes frequent coughing; and at the same time it is supposed to open the breast, and give greater liberty of breathing. It is given to children against the chincough, &c. in doses of from five drops to twenty; to adults, from twenty to an hundred. Half an ounce, by measure, contains about a grain of opium.

Tinctura quassiæ. *Dub.*
Tincture of Quassia.

Take of
Shavings of quassia, one ounce;
Proof-spirit, two pints.
Digest for seven days, and filter.

As the Dublin college have introduced into their Pharmacopœia the most powerful of all astringent tinctures, in the present instance they have also first directed a tincture to be prepared from the purest and most intense of all bitters.

Tintura rhei palmati. *Ed.*
Tincture of Rhubarb.

Take of
Rhubarb, sliced, three ounces;
Lesser cardamom seeds, bruised, half an ounce;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

Tinctura rhabarbari. *Dub.*
Tincture of Rhubarb.

Take of
Rhubarb, cut into pieces, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Liquorice root, bruised, half an ounce;
Saffron, two drachms;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

Tinctura rhei. *Lond.*
Tincture of Rhubarb.

Take of
Rhubarb, sliced, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Saffron, two drachms;
Proof-spirit, two pints.
Macerate for fourteen days with a gentle heat, and filter.

TINCTURA RHEI COMPOSITA. *Lond.*
Compound Tincture of Rhubarb.

Take of
Rhubarb, sliced, two ounces;
Liquorice root, bruised, half an ounce;
Ginger sliced,
Saffron, each two drachms;
Proof-spirit, one pint;
Water, twelve fluidounces.
Macerate for fourteen days with a gentle heat, and strain.

TINCTURA RHEI ET ALOES; olim ELIXIR SACRUM. *Ed.*
Tincture of Rhubarb and Aloes, commonly called *Sacred Elixir.*

Take of
Rhubarb, sliced, ten drachms;
Socotorine aloes, in powder, six drachms;
Lesser cardamom seeds, bruised, half an ounce;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA RHEI ET GENTIANÆ; olim TINCTURA RHEI AMARA. *Ed.*
Tincture of Rhubarb with Gentian, formerly *Bitter Tincture of Rhubarb.*

Take of
Rhubarb, sliced, two ounces;
Gentian root, sliced, half an ounce;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

ALL the foregoing tinctures of rhubarb are designed as stomachics and corroborants, as well as purgatives: spiritous liquors excellently extract those parts of the rhubarb in which the two first qualities reside, and the additional ingredients considerably promote their efficacy. In weakness of the stomach, indigestion, laxity of the intestines, diarrhœas, colic, and other similar complaints, these medicines are frequently of great service.

TINCTURA SAPONIS, vulgo LINIMENTUM SAPONACEUM. *Ed.*
Tincture of Soap, formerly *Saponaceous Liniment.*

Take of
Soap, in shavings, four ounces;
Camphor, two ounces;
Volatile oil of rosemary, half an ounce;
Alcohol, two pounds.

Digest the soap in the alcohol for three days; then add to the filtered liquor the camphor and the oil, shaking them well together.

LINIMENTUM SAPONIS COMPOSITUM. *Lond.*
Compound Soap Liniment.

Take of
Hard soap, three ounces;
Camphor, one ounce;
Spirit of rosemary, one pint.
Dissolve the camphor in the spirit, then add the soap, and macerate in a sand-bath until it be dissolved.

LINIMENTUM SAPONIS. *Dub.*
Soap Liniment.

Take of
Soap, three ounces;
Camphor, one ounce;
Spirit of rosemary, one pint.
Digest the soap in the spirit of rosemary until it be dissolved, then add the camphor.

TINCTURA SAPONIS ET OPII; olim LINIMENTUM ANODYNUM. *Ed.*
Tincture of Soap with Opium, formerly *Anodyne Liniment.*

THIS is prepared in the same way, and from the same substances, as the simple *Tincture of Soap*, but with the addition, from the beginning, of
Opium, one ounce.

THESE tinctures are only used externally, and possess great efficacy in removing local pains, when rubbed on the affected part. The London and Dublin colleges have omitted the anodyne liniment, probably as it may be easily prepared extemporaneously, by mixing an equivalent proportion of laudanum with soap liniment.

TINCTURA SCILLÆ. *Dub.*
Tincture of Squills.

Take of
Squills, fresh dried, four ounces;
Proof-spirit of wine, two pints.
Digest for seven days; then set it aside, and when the fæces have subsided, pour off the pure liquor.

Lond.

Take of
Squills, fresh dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days and strain.

THE active principle of squills is soluble in alcohol, and there are cases in which a tincture may be useful.

TINCTURA SENNÆ COMPOSITA: olim ELIXIR SALUTIS. *Ed.*
Compound Tincture of Senna, formerly *Elixir of Health.*
Take of
Senna leaves, two ounces;
Jalap root, bruised, one ounce;
Coriander seeds, bruised, half an ounce;
Diluted alcohol, three pounds and a half.
Digest for seven days, and to the tincture, filtered through paper, add,
Double refined sugar, four ounces.

TINCTURA SENNÆ. *Dub.*
Tincture of Senna.
Take of
Senna leaves, one pound;
Caraway seeds, bruised, one ounce and a half;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit, one gallon.
Digest for fourteen days, and strain.

Lond.

Take of
Senna leaves, three ounces;
Caraway seeds, bruised, three drachms;
Cardamom seeds, bruised, one drachm;
Raisins, stoned, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, with a gentle heat, and filter.

THESE tinctures are useful carminatives and cathartics, especially to those who have accustomed themselves to the use of spirituous liquors; they often relieve flatulent complaints and colics, where the common cordials have little effect; the dose is from one to two ounces.

Tinctura toluiferi balsami. *Ed.*
Tincture of the Balsam of Tolu.

Take of
Balsam of Tolu, an ounce and a half;
Alcohol, one pound.
Digest until the balsam be dissolved; and then strain the tincture through paper.

Tinctura balsami tolutani. *Dub.*
Tincture of Balsam of Tolu.

Take of
Balsam of Tolu, one ounce;
Rectified spirit, one pint.
Digest until the balsam be dissolved, and filter.

This solution of balsam of Tolu possesses all the virtues of the balsam itself. It may be taken internally, with the several intensions for which that balsam is proper, to the quantity of a tea-spoonful or two, in any convenient vehicle. Mixed with simple syrup, it forms an elegant balsamic syrup.

Tinctura valerianæ. *Lond. Dub.*
Tincture of Valerian.

Take of
The root of wild valerian, in coarse powder, four ounces;
Proof-spirit, two pints.
Digest for seven days, (macerate for fourteen, *Lond.*) and strain.

This tincture has a deep colour, and is strongly impregnated with the valerian; though it has not been found to answer so well in the cure of epileptic disorders as the root in substance, exhibited in the form of powder or bolus. The dose of the tincture is from half a spoonful to a spoonful or more, two or three times a-day.

Tinctura veratri albi. *Ed.*
Tincture of White Hellebore.

Take of
White hellebore root, bruised, eight ounces;
Diluted alcohol, two pounds and a half.
Digest them together for seven days, and filter the tincture through paper.

This tincture is sometimes used for assisting cathartics, &c. and as an emetic in apoplectic and maniacal disorders. It may likewise be so managed, as to prove a powerful alterative

and deobstruent, in cases where milder remedies have little effect. But a great deal of caution is requisite in its use; the dose, at first, ought to be only a few drops; if considerable, it proves violently emetic or cathartic.

TINCTURA ZINGIBERIS. *Lond. Dub.*
Tincture of Ginger.

Take of
Ginger sliced, (in coarse powder, *Dub.*), two ounces;
Proof-spirit, two pints.
Digest in a gentle heat for seven days, (macerate fourteen, *Lond.*) and strain.

THIS tincture is cordial and stimulant, and is only employed as a corrigent to purgative draughts.

CHAP. XXXII.

TINCTURES MADE WITH ETHEREAL SPIRITS.

WE have classed these tinctures by themselves, because they are more strongly characterised by the nature of the menstruum than of the substances dissolved in it. Indeed, the ethereal spirits are used in these instances, not to dissolve substances which would resist the action of alcohol and water, but for the sake of their own direct action on the system.

TINCTURA ALOES ÆTHEREA. *Ed.*
Ethereal Tincture of Aloes.

Take of
Socotorine aloes,
Myrrh, of each, in powder, one ounce and a half;
English saffron, sliced, one ounce;
Sulphuric ether, with alcohol, one pound.
Digest the myrrh with the sulphuric ether with alcohol for four days, in a close vessel; then add the saffron and aloes.
Digest again for four days, and, when the fæces have subsided, pour off the tincture.

THIS tincture agrees generally in its effects with the other tinctures of aloes, the only difference arising from the more penetrating and stimulating nature of the menstruum itself.

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. *Ed.*
Aromatic Sulphuric Ether with Alcohol.

This is made of the same aromatics, and in the same manner, as the *Compound Tincture of Cinnamon*; except that, in place of diluted alcohol, sulphuric ether with alcohol is employed.

THIS is designed for persons whose stomachs are too weak to bear the following acid tincture: to the taste it is gratefully aromatic, without any perceptible acidity.

ACIDUM SULPHURICUM AROMATICUM. *Ed.*
Aromatic Sulphuric Acid.

Take of
Alcohol, two pounds;
Sulphuric acid, six ounces.
Drop the acid gradually into the alcohol. Digest the mixture with a very gentle heat, in a close vessel, for three days, and then add of
Cinnamon, bruised, one ounce and a half;
Ginger, bruised, one ounce.
Digest again, in a close vessel, for six days, and then filter the tincture through paper placed in a glass funnel.

ALTHOUGH the name given to this preparation by the college does not sanction its arrangement with the ethereal tinctures, yet I have ventured to place it here, from the belief that the alcohol is completely or partially changed, by the digestion with the acid, into an ethereal spirit; and that the principal difference between this and the preceding tincture consists in the presence of the acid, which, however, is not to be considered as the menstruum by which the tincture is formed, but as an acid mixed with the ethereal tincture.

Medical use.—This is a valuable medicine in weakness and relaxation of the stomach, and decay of constitution, particularly in those which proceed from irregularities, which are accompanied with slow febrile symptoms, or which follow the suppression of intermittents. It frequently succeeds, after bitters and aromatics by themselves have availed nothing; and indeed great part of its virtues depend on the sulphuric acid; which, barely diluted with water, has, in those cases where the stomach could bear the acidity, produced happy effects.

It is very usefully conjoined with cinchona, and other tonic barks, both as covering their disagreeable taste, and as coinciding with them in virtue. It may be given in doses of from ten to thirty drops, or more, several times a-day.

Chap. XXXIII.

AMMONIATED or VOLATILE TINCTURES.

Ammonia, like ether, is so powerful an agent on the living system, that we think it gives a peculiar character to the compositions into which it enters. They are all highly stimulating and pungent, and apt to excite diaphoresis. As ammonia exerts considerable and peculiar powers as a solvent, these tinctures must never be combined in prescription with any thing acid, which would not only neutralize the ammonia, and destroy its peculiar action on the living system, but would precipitate whatever was dissolved by its agency. In prescribing these ammoniated tinctures, the practitioner must attend to the very great increase of strength in the ammoniated alcohol of the London College, being not less, according to Mr Phillips, than as five to one.

Linimentum camphoræ compositum. *Lond.*
Compound Camphor Liniment.

Take of
Camphor, two ounces;
Water of ammonia, six fluidounces;
Spirit of lavender, a pint.
Mix the water of ammonia with the spirit; and distil from a glass retort, with a slow fire, one pint. Then dissolve the camphor in the distilled liquor.

This is more pungent and penetrating than the solution of camphor in alcohol. Is the distillation necessary to get an ammoniated alcohol without water? Probably. Mr Phillips, dreading the extreme causticity of the *Aqua ammoniæ* of the present Pharmacopœia, proposes the substitution of anequivalent quantity of subcarbonate of ammonia.

Tinctura castorei composita. *Ed.*
Compound Tincture of Castor.

Take of
Russian castor, in powder, one ounce;
Assafœtida, half an ounce;
Ammoniated alcohol, one pound.
Digest for seven days, and filter through paper.

This composition is a medicine of real efficacy, particularly in hysterical disorders, and the several symptoms which accompany them. The spirit here used is an excellent menstruum, both for the castor and the assafœtida, and greatly adds to their virtues.

Tinctura cinchonæ ammoniata. *Lond.*
Ammoniated Tincture of Cinchona.

Take of
Lance-leaved cinchona bark in powder, four ounces;
Aromatic spirit of ammonia, two pints.
Macerate for ten days and strain.

This is now first introduced by the London college. It does not appear to be a very judicious preparation, or at least it can only act as a modification of ammoniated alcohol, for the cinchona cannot be supposed to contribute at all to its effects.

Tinctura guaiaci ammoniata. *Ed. Dub.*
Ammoniated Tincture of Guaiac.

Take of
Resin of guaiac, in powder, four ounces;
Ammoniated alcohol, one pound and a half (one pint and a half, *Dub.*).
Digest for seven days, and filter through paper.

Lond.

Take of
Guaiac, in powder, four ounces;
Aromatic spirit of ammonia, one pint and a half.
Macerate for fourteen days, and filter.

These are very elegant and efficacious tinctures; the ammoniated spirit readily dissolving the resin, and, at the same time, promoting its medicinal virtue. In rheumatic cases, a tea, or even table, spoonful, taken every morning and evening, in any convenient vehicle, particularly in milk, has proved of singular service.

Tinctura opii ammoniata; olim Elixir paregoricum. *Ed.*
Ammoniated Tincture of Opium, formerly *Paregoric Elixir.*

Take of
Benzoic acid,
English saffron, sliced, of each three drachms;
Opium, two drachms;

Volatile oil of aniseed, half a drachm;
Ammoniated alcohol, sixteen ounces.
Digest for seven days, in a close vessel, and filter through paper.

This is a preparation of considerable efficacy in many spasmodic diseases, as chincough, &c. the ammonia removing the spasm immediately, while the opium tends to prevent its return. Each drachm contains about a grain of opium.

Tinctura valerianæ ammoniata. *Lond.*
Ammoniated Tincture of Valerian.

Take of
Valerian root, four ounces;
Aromatic spirit of ammonia, two pints.
Macerate for fourteen days, and strain.

Dub.

Take of
Valerian root, in powder, two ounces.
Spirit of ammonia, one pint.
Digest for seven days, and filter.

The spirit of ammonia, both simple and compound, is here an excellent menstruum, and, at the same time, considerably promotes the virtues of the valerian, which, in some cases, wants assistance of this kind. The dose may be a tea-spoonful or two.

Chap. XXXIV.—MEDICATED WINES.

Parmentier has occupied thirty-two pages of the Annales de Chimie, to prove that wine is an extremely bad menstruum for extracting the virtues of medical substances. His only argument is, that, by the infusion of vegetable substances in wine, its natural tendency to decomposition is so much accelerated, that at the end of the process, instead of wine, we have only a liquor containing the elements of bad vinegar. As a solvent, diluted alcohol perfectly supersedes the use of wine; and if we wish to use wine to cover the taste, or to assist the operation of any medicine, M. Parmentier proposes,

that a tincture of the substance should be extemporaneously mixed with wine as a vehicle.

Notwithstanding this argument appears to us to have great weight, we shall give to the medicated wines, retained in the pharmacopœias, the characters they still generally possess.

VINUM ALOES SOCOTORINÆ; vulgo TINCTURA SACRA. *Ed.*
Wine of Socotorine Aloes, commonly called *Sacred Tincture.*
Take of
Socotorine aloes, in powder, one ounce;
Lesser cardamom seeds, bruised,
Ginger, bruised, each one drachm;
Spanish white wine, two pounds.
Digest for seven days, stirring now and then, and afterwards strain.

VINUM ALOES. *Dub.*
Wine of Aloes.

Take of
Socotorine aloes, four ounces;
Canella alba, one ounce;
Spanish white wine, three pints;
Proof-spirit, one pint.
Powder the aloes and canella alba separately; then mix and pour on the wine, mixed with the spirit; afterwards digest for fourteen days, frequently shaking the vessel; and, lastly, filter the liquor.

Lond.

Take of
Socotorine aloes, eight ounces;
Canella alba, two ounces;
Wine, six pints;
Proof-spirit, two pints.
Triturate the aloes with white sand washed clean, to powder; also powder the canella, and pour the wine and spirit upon these powders mixed together. Macerate for fourteen days, now and then shaking them, and strain.

THE sand is added to facilitate the pulverization of the aloes, and to prevent it, when moistened by the fluids, from running together into masses. It is evident, that it does not affect the tincture.

This medicine has long been in great esteem, not only as a cathartic, but likewise as a stimulus.

It appears from long experience to be a very useful medicine. The dose, as a purgative, is from one to two ounces. It may be introduced into the habit, so as to be productive of excellent affects, as an alterant, by giving it in small doses, at proper intervals. Thus managed, it does not for a considerable time operate remarkably by stool; but at length proves purgative, and occasions a lax habit, of much longer continuance than that produced by the other common cathartics.

VINUM GENTIANÆ COMPOSITUM; vulgo VINUM AMARUM. *Ed.*
Compound Wine of Gentian, commonly called *Bitter Wine.*

Take of
Gentian root, half an ounce;
Cinchona bark, one ounce;
Seville orange-peel, dried, two drachms;
Canella alba, one drachm;
Diluted alcohol, four ounces;
Spanish white wine, two pounds and a half.

First pour the diluted alcohol on the root and barks, sliced and bruised, and, after twenty-four hours, add the wine; then macerate for seven days, and strain.

THIS wine, which is a pleasant bitter, is intended as a substitute for the old *Tinctura ad Stomachicos.* Wines of this kind are sometimes introduced at the tables of epicures in Italy, to assist the stomach in digestion.

VINUM IPECACUANHÆ. *Lond. Dub.*
Wine of Ipecacuanha.

Take of
The root of ipecacuan, bruised, two ounces;
Spanish white wine, two pints.

Digest seven days, (macerate for fourteen days, *Lond.*), and strain.

Ed.

Take of
Ipecacuan, bruised, one ounce;
Spanish white wine, fifteen ounces.

Macerate for seven days, and filter through paper.

BOTH these wines are very mild and safe emetics, and equally serviceable, in dysenteries, with the ipecacuanha in substance, this root yielding nearly all its virtues to the Spanish white wine. The common dose is an ounce, more or less, according to the age and strength of the patient.

Vinum nicotianæ tabaci. *Ed.*
Tobacco Wine.

Take of
The dried leaves of tobacco, one ounce;
Spanish white wine, one pound.
Macerate for seven days, and strain the liquor through paper.

Wine seems to extract more fully the active principles of the tobacco than either water or spirit taken separately.

Vinum opii. *Lond.*
Wine of Opium.

Take of
Extract of opium, one ounce;
Cinnamon, bruised,
Cloves, bruised, of each one drachm;
Wine, one pint.
Macerate for eight days, and filter.

This is the Tinctura Thebaica of the Dispensatory 1745; the Laudanum Liquidum of Hoffman, which has continued to be popular, notwithstanding its exclusion from the late Pharmacopœias. Mr Ware, in particular, considers it as superior to every other solution of opium as an application in chronic inflammation of the eyes: and, with the same intention, it is sometimes used when inspissated by spontaneous evaporation.

Vinum rhei palmati. *Ed.*
Rhubarb Wine.

Take of
Rhubarb, sliced, two ounces;
Canella alba, bruised, one drachm;
Diluted alcohol, two ounces;
Spanish white wine, fifteen ounces.
Macerate for seven days, and strain through paper.

This is a warm, cordial, laxative medicine. It is used chiefly in weakness of the stomach and bowels, and some kinds of loosenesses, for evacuating the offending matter, and strengthening the tone of the viscera. It may be given in doses of from half a spoonful to three or four spoonfuls or more, according to the circumstances of the disorder, and the strength of the patient.

VINUM VERATRI. *Lond.*
Wine of White Hellebore.

Take of
White hellebore root sliced, eight ounces;
Wine, two pints and a half.
Macerate for fourteen days, and filter.

THIS preparation is now introduced, we are told by Dr Powell, "because it is a medicine usefully and extensively em-"ployed in practice." This must be understood as applying only to London, for it is not yet known in Edinburgh, although there can be no doubt of its activity.

CHAP. XXXV.—EXTRACTS AND RESINS.

EXTRACT, in pharmacy, has long been used, in the common and true acceptation of the term, to express a thing extracted, and therefore it was applied to substances of all kinds which were extracted from heterogeneous bodies, by the action of any menstruum, and again reduced to a consistent form, by the evaporation of that menstruum. Lately, however, Extract has been used in a different and much more limited sense, as the name for a peculiar principle, which is often indeed contained in extracts, and which before had no proper appellation. It is in the former sense that we employ it here, and in which we wish it to be only used, while a new word should be invented as the name of the new substance. Till a better be proposed, we shall call it *Extractive*.

The London college have also added to the confusion in their last edition, by applying the term extract to what are commonly called inspissated juices, where no menstruum is employed.

Extracts are of various kinds, according to the nature of the substances from which they are obtained, and the menstruum employed: but they commonly consist of gum, sugar, extractive, tannin, cinchonin, gallic acid, or resin, or several of them mixed in various proportions. The menstrua most commonly employed are water and alcohol. The former is capable of extracting all the substances enumerated, except the resin, and the latter all except the gum. Wine is also sometimes employed, but very improperly; for as a solvent it can only act as a mixture of alcohol and water, and the principles which it leaves behind, on evaporation, are rather injurious than of advantage to the extract.

Water is the menstruum most economically employed in making extracts, as it is capable of dissolving all the active principles except resin, and can have its solvent powers assisted by a considerable degree of heat.

Watery extracts are prepared by boiling the subject in water, and evaporating the strained decoction to a thick consistence.

It is indifferent, with regard to the medicine, whether the subject be used fresh or dry; since nothing that can be preserved in this process will be lost by drying. With regard to the facility of extraction, however, there is a very considerable difference; vegetables in general giving out their virtues more readily when dried than when fresh.

In many cases, it is necessary to assist the action of the menstruum by mechanical division, but it should not be carried so far as to reduce the substance to a very fine powder; as Fabbroni found that cinchona, at least, yielded a larger proportion of extract, when only coarsely powdered.

The quantity of water ought to be no greater than is necessary for extracting the virtues of the subject This point, however, is not very easily ascertained; for, although some of the common principles of extracts be soluble in a very small proportion of water, there are others, such as the tannin, of which water can dissolve only a certain proportion, and cannot be made to take up more by any length of boiling; besides, we have no very good method of knowing when we have used a sufficient quantity of water; for vegetable substances will continue to colour deeply successive portions of water boiled with them, long after they are yielding nothing to it but colouring matter. One of the best methods is to boil the subject in successive quantities of water, as long as the decoctions form a considerable precipitate with the test which is proper for detecting the substance we are extracting, such as a solution of gelatin for tannin, of alum for extractive, &c.

The decoctions are to be evaporated after they have been filtered boiling hot, without any farther depuration; because some of the most active principles of vegetable substances, such as tannin, are much more soluble in boiling than in cold water, and because almost all of them are very quickly affected by exposure to the atmosphere. Therefore, if a boiling decoction, saturated with tannin, be allowed to cool, the greatest part of the very principle on which the activity of the substance depends, will separate to the bottom, and, according to the usual directions, will be thrown away as sediment.

The same objection applies more strongly to allowing the decoction to cool, and deposite a fresh sediment, after it has been partially evaporated. Besides, by allowing the decoctions to stand several days before we proceed to their evaporation, we are, in fact, allowing the active principles contained in the decoction to be altered by the action of the air, and to be converted into substances, perhaps inactive, which also are thrown away as sediment.

The evaporation is most conveniently performed in broad shallow vessels; the larger the surface of the liquor, the sooner will the aqueous parts exhale. This effect may likewise be promoted by agitation.

When the matter begins to grow thick, great care is necessary to prevent its burning. This accident, almost unavoidable if the quantity be large, and the fire applied, as usual, under the evaporating basin, may be effectually prevented, by pouring the extract, when it has acquired the consistence of a syrup, into shallow tin or earthen pans, and placing these in an oven with its door open, moderately heated; which, acting uniformly on every part of the liquid, will soon reduce it to any degree of consistence required. This may likewise be done, and more securely, by setting the evaporating vessel in boiling water; but the evaporation is in this way very tedious. Dr Powell has figured a modification of the common tin sauce-pan for this purpose. It is nothing but putting a tin evaporating dish over a sauce-pan filled with water, which is made to boil.

Alcohol is much too expensive to be employed as a menstruum for obtaining extracts, except in those cases where water is totally inadequate to the purpose. These cases are,

1*st*, When the nature of the extract is very perishable when dissolved in water, so that it is liable to be decomposed before the evaporation can be completed, especially if we cannot proceed immediately to the evaporation.

2*dly*, When water is totally incapable of dissolving the substance to be extracted; and,

3*dly*, When the substance extracted can bear the heat of boiling alcohol without being evaporated, but would be dissipated by that of boiling water; that is, when it requires a heat greater than 176°, and less than 212°, for its evaporization.

In the last case, the alcohol must be perfectly free from water, because the heat necessary to evaporate it at the end of the process would frustrate the whole operation. Hence, also, the subject itself ought always to be dry: those substances,

which lose their virtue by drying, lose it equally on being submitted to this treatment with the purest alcohol.

In this way the alcoholic extract of some aromatic substances, as cinnamon, lavender, rosemary, retain a considerable degree of their fine flavour.

In the second case, the alcohol need not be so very strong, because it is capable of dissolving resinous substances, although diluted with a considerable proportion of water.

In the first case, the alcohol may be still much weaker; or rather, the addition of a small proportion of alcohol to water will be sufficient to retard or prevent the decomposition of the decoction.

The alcohol employed in all these cases should be perfectly free from any unpleasant flavour, lest it be communicated to the extract.

The inspissation should be performed from the beginning, in the gentle heat of a water-bath. We need not suffer the alcohol to evaporate in the air: the greatest part of it may be recovered by collecting the vapour in common distilling vessels. If the distilled spirit be found to have brought over any flavour from the subject, it may be advantageously reserved for the same purposes again.

When diluted alcohol is employed, the distillation should only be continued as long as alcohol comes over; and the evaporation should be finished in wide open vessels.

In this chapter we have also included the processes intended for purifying inspissated juices and resinous substances.

Pure resins are prepared, by adding, to spiritous tinctures of resinous vegetables, a large quantity of water. The resin, incapable of remaining dissolved in the watery liquor, separates and falls to the bottom; leaving in the menstruum such other principles of the plant as the spirit might have extracted at first along with it. But this is only practised for the purpose of analysis.

EXTRACTS MADE WITH WATER.

Extractum gentianæ luteæ. *Ed.*
Extract of Gentian.

Take of
Gentian root, any quantity.
Having cut and bruised it, pour upon it eight times its weight

of distilled water. Boil to the consumption of one-half of the liquor, and strain it by strong expression. Evaporate the decoction immediately, to the consistence of thick honey, in a bath of water saturated with muriate of soda.

Extracta. *Lond.*
Extracts.

In preparing all extracts, evaporate the fluid in a pan, in a water-bath, as quickly as possible, until it become of a proper thickness for forming into pills, stirring it constantly towards the end with a spatula.

Sprinkle a little Rectified spirit on all softer extracts.

Extracta simpliciora. *Dub.*
Simple Extracts.

All simple extracts, unless otherwise ordered, are to be prepared according to the following rule:

The vegetable matter is to be boiled in eight times its weight of water, to one-half; the liquor is then to be expressed, and, after the fæces have subsided, to be filtered; it is then to be evaporated, with a heat between 200° and 212°, until it becomes thickish; and, lastly, it is to be evaporated with a heat less than 200°, and frequently stirred, until it acquire a consistence proper for forming pills.

All extracts, when they begin to get thick, ought to be frequently stirred with a clean iron spatula. They may be reduced to a proper thickness by means of a stove, heated on purpose.

They ought to be preserved as much as possible from the contact of the air, and the softer ones are to be sprinkled with rectified spirit.

In this manner are prepared the following officinal Extracts.

Extractum *Cacuminum* Absinthii. *Dub.*	Extract of Wormwood.
Radicis Glycyrrhizæ glabræ. *Ed.*	Liquorice.
—— Glycyrrhizæ. *Dub.*	
—— Hellebori nigri. *Ed. Dub.*	Black Hellebore.
—— Gentianæ luteæ. *Ed.*	Gentian.
—— Gentianæ. *Dub.*	
—— Jalapæ. *Dub.*	Jalap.
Foliorum Rutæ graveolentis. *Ed.*	Rue.
—— Rutæ. *Dub.*	
—— Cassiæ sennæ. *Ed.*	Senna.
—— Sabinæ. *Dub.*	Savin.
Florum Anthemidis nobilis. *Ed.*	Chamomile.
—— Chamæmeli. *Dub.*	

Capitum PAPAVERIS SOMNIFERI. *Ed.*	Poppy-heads.
Cacuminum GENISTÆ. *Dub.*	Broom-tops.
Ligni HÆMATOXYLI CAMPECHIANI. *Ed.*	Logwood.
Scobis HÆMATOXYLI. *Dub.*	Logwood.
Corticis QUERCUS. *Dub.*	Oak bark.
Herbæ et Radicis TARAXACI. *Dub.*	Dandelion.

EXTRACTUM ALOES PURIFICATUM. *Lond.*
Purified Extract of Aloes.

Take of
Socotorine aloes, in powder, half a pound;
Boiling water, four pints.
Macerate in a gentle heat for three days, then strain, and set it at rest till the fæces subside. Pour off the clear liquor, and evaporate to a proper thickness.

THIS is supposed to be less irritating than the aloes itself, but it appears to be an unnecessary refinement.

EXTRACTUM ANTHEMIDIS. *Lond.*
Extract of Chamomile.

Take of
Chamomile flowers, dried, one pound;
Water, one gallon.
Boil down to four pints, and filter the liquor while hot. Then evaporate to a proper thickness.

EXTRACTUM CINCHONÆ. *Lond.*
Extract of Cinchona.

Take of
Lance-leaved cinchona bark, bruised, one pound;
Water, one gallon.
Boil to six pints, and filter the liquor while hot. With the same quantity of water, and in the same manner, repeat the boiling and filtration four times. Then reduce all these liquors, mixed together, to a proper thickness, by evaporation.
This extract must be kept in two forms; one *soft*, and fit for making pills; the other *hard* and pulverizable.

EXTRACTUM CINCHONÆ. *Dub.*
Extract of Cinchona.

Take of
Cinchona, in coarse powder, one pound;
Water, six pints.
Boil, for a quarter of an hour, in a vessel almost covered; filter the decoction while hot through linen, and set it

aside. Boil the residuum again, in the same quantity of water, and filter it in the same manner. This may be repeated a third time, and all the decoctions are to be mixed and reduced to a proper degree of thickness by evaporation.

This extract ought to be kept in two states; one soft, adapted for making pills; and the other hard, capable of being pulverised.

EXTRACTUM COLOCYNTHIDIS. *Lond.*
Extract of Colocynth.

Take of
Pulp of colocynth, one pound;
Water, one gallon.

Boil to four pints, and filter the liquor while hot. Lastly, evaporate to a proper thickness.

Mr Phillips says, that it is scarcely possible to boil the colocynth in the assigned quantity of water, and that the extract obtained is remarkably spongy, and very soon becomes hard and mouldy.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Dub.*
Compound Extract of Colocynth.

Take of
Pith of colocynth, cut small, six drachms;
Hepatic aloes, one ounce and a half;
Scammony, half an ounce;
Lesser cardamom seeds, husked, one drachm;
Castile soap, softened with warm water, so as to have a gelatinous consistence, three drachms;
Warm water, one pint.

Digest the colocynth in the water, in a covered vessel with a moderate heat, for four days. To the liquor, expressed and filtered, add the aloes and scammony, separately reduced to powder: then evaporate the mixture to a proper thickness for making pills, having added, towards the end of the evaporation, the soap-jelly and powdered seeds; and mix all the ingredients thoroughly together.

EXTRACTUM GENTIANÆ. *Lond.*
Extract of Gentian.

Take of
Gentian root, one pound;
Boiling water, one gallon.

Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evaporate it to a proper thickness.

Extractum glycyrrhizæ. *Lond.*
Extract of Liquorice.

Take of
Liquorice root, sliced, one pound;
Boiling water, one gallon.
Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evaporate it to a proper thickness.

Extractum hæmatoxyli. *Lond.*
Extract of Logwood.

Take of
Logwood, bruised, one pound;
Boiling water, one gallon.
Macerate for twenty-four hours, then boil to four pints.—Strain the liquor while hot, and evaporate to a proper consistence.

Extractum humuli. *Lond.*
Extract of Hops.

Take of
Hops, four ounces;
Water boiling, a gallon.
Boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence.

In the former edition 1809, the quantity of hops was half a pound, in regard to which Mr Phillips says that the proportion of water ordered was considerably too small. It has accordingly been corrected.

Extractum opii aquosum. *Dub.*
Watery Extract of Opium.

Take of
Opium, two ounces;
Boiling water, one pint.
Triturate the opium in the water, for ten minutes; then, after waiting a little, pour off the liquor, and triturate the remaining opium with the same quantity of boiling water, pouring off the infusion in the same manner. This may be repeated a third time. Mix the decanted liquors, and expose the mixture to the air, in an open vessel, for two

days. Lastly, filter through linen, and, by slow evaporation, form an extract.

Extractum opii. *Lond.*
Extract of Opium.

Take of
Opium, sliced, half a pound;
Water, three pints.

Add a small quantity of the water to the opium, and macerate for twelve hours, that it may soften; then, having gradually added the rest of the water, triturate them, until they become thoroughly mixed, and set the mixture at rest until the fæces subside. Then filter the liquor, and evaporate to a proper thickness.

Extractum papaveris. *Lond.*
Extract of Poppy.

Take of
Poppy heads, bruised without the seeds, one pound;
Boiling water, a gallon.

Macerate for twenty-four hours; then boil to four pints: strain the liquor while hot, and evaporate to a proper thickness.

Extractum sarsaparillæ. *Lond.*
Extract of Sarsaparilla.

Take of
Sarsaparilla root, sliced, one pound;
Boiling water, one gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

Extractum taraxaci. *Lond.*
Extract of Dandelion.

Take of
Fresh dandelion root, bruised, one pound;
Boiling water, one gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

EXTRACTUM VALERIANÆ. *Dub.*
Extract of Valerian.

Take of
Valerian root, in coarse powder, six ounces;
Boiling water, three pints.
Mix and digest, with a moderate heat, twenty-four hours, in a covered vessel; and then express the liquor, and evaporate it to a proper thickness.

EXTRACTS MADE WITH ALCOHOL.

EXTRACTUM CINCHONÆ OFFICINALIS. *Ed.*
Extract of Cinchona.

Take of
Cinchona bark, in powder, one pound;
Alcohol, four pounds.
Digest for four days, and pour off the tincture.
Boil the residuum in five pounds of distilled water, for fifteen minutes, and filter the decoction, boiling hot, through linen. Repeat this decoction and filtration, with the same quantity of distilled water, and reduce the liquor, by evaporation, to the consistence of thin honey.
Draw off the alcohol from the tincture, by distillation, until it also become thick; then mix the liquors, thus inspissated, and evaporate them in a bath of boiling water, saturated with muriate of soda, to a proper consistency.

EXTRACTUM CONVOLVULI JALAPÆ. *Ed.*
Extract of Jalap,
Is prepared in the same way, from the root.

EXTRACTUM CINCHONÆ RESINOSUM. *Lond.*
Resinous Extract of Cinchona.

Take of
Lance-leaved cinchona, bruised, one pound;
Rectified spirit of wine, four pints.
Macerate for four days, and strain; distil the tincture, in a water-bath, to a proper thickness.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Lond.*
Compound Extract of Colocynth.

Take of
Pulp of colocynth, sliced, six drachms;

Socotorine aloes, in powder, one ounce and a half;
Scammony, in powder, half an ounce;
Cardamom seeds, powdered, one drachm;
Proof-spirit, one pound.

Macerate the pulp of colocynth in the spirit, with a gentle heat, for four days. Strain the liquor, and add to it the aloes and scammony. Then evaporate to a proper thickness, adding, towards the end of the operation, the cardamom seeds.

Extractum rhei. *Lond.*
Extract of Rhubarb.

Take of
Rhubarb root, in powder, one pound;
Proof-spirit, one pint;
Water, seven pints.

Macerate, with a gentle heat, for four days; then filter, and set it aside, until the fæces subside. Pour off the liquor clear, and evaporate to a proper thickness.

Extractum jalapæ. *Lond.*
Extract of Jalap.

Take of
Jalap, in powder, one pound;
Rectified spirit, four pints;
Water, two pints.

Macerate the jalap in the spirit, for four days, and pour off the tincture. Boil the residuum in the water to two pints. Then filter the tincture and decoctions separately, and evaporate the latter, and distil the former until both thicken; lastly, mix the extract with the resin, and evaporate to a proper thickness.

This extract is to be kept in two states, one *soft*, proper for making pills, and one *hard* and pulverizable.

Extractum cascarillæ resinosum. *Dub.*
Resinous Extract of Cascarilla.

Take of
Cascarilla, in coarse powder, one pound;
Rectified spirit of wine, four pints.

Digest for four days; then pour off the tincture, and strain; boil the residuum, in ten pints of water, to two: evaporate the filtered decoction, and distil the tincture, in a retort, till both begin to grow thick; then mix them, and evaporate them to a state fit for making pills. Lastly, they are to be intimately mixed.

In this way are prepared

EXTRACTUM CINCHONÆ RUBRÆ RESINOSUM. *Dub.*
Resinous Extract of Red Cinchona Bark.

EXTRACTUM JALAPÆ RESINOSUM. *Dub.*
Resinous Extract of Jalap.

OPIUM PURIFICATUM. *Dub.*
Purified Opium.

Take of
Opium, cut into small pieces, one pound;
Proof-spirit of wine, twelve pints.

Digest with a gentle heat, stirring now and then till the opium be dissolved; filter the liquor through paper, and distil in a retort until the spirit be separated: Pour out the liquor which remains, and evaporate, until the extract acquires a proper thickness.

Purified opium must be kept in two forms; one *soft*, proper for forming into pills; the other *hard*, capable of being reduced into powder.

Lond.

Very carefully separate opium from all heterogeneous matters, especially those adhering to it on the outside. Opium is to be kept in two states; one *soft*, fit for making pills; and another *hard*, dried in a water-bath, until it become pulverizable.

ALL these extracts are supposed to contain the virtues of the substances from which they are prepared, in a very pure and concentrated form; but this supposition is, probably in several instances, erroneous; and the directions for preparing them are frequently injudicious and uneconomical.

As the changes which opium and aloes undergo by solution, and subsequent evaporation, have never been ascertained by careful and satisfactory experiments, well-selected pieces of these substances are to be preferred to the preparations in which they are supposed to be purified. As a farther proof of the superiority of good opium over all its preparations, I may also remark, that the latter, however well prepared, soon become mouldy, the former never does.

Mr Phillips, however, prefers the preparing of an extract of opium, by first submitting it to the action of boiling water, as long as any portion of it continues to be dissolved, and then digesting the residuum in rectified spirit, and mixing the watery and alcoholic extracts thus obtained. He found, that 72 parts of opium, dried by steam till it became pulverizable,

yielded to cold water 30 parts, then to boiling water 9, and, lastly, to alcohol 7. The first solution or cold infusion was of a deep brownish-red colour, remained transparent, and smelt strongly of opium; the second or decoction was of a pale brown colour, deposited on cooling the greater part of what had been dissolved, and had no smell of opium; and the third or tincture very much resembled common tincture of opium, and furnished, on the addition of water, an abundant yellowish-white precipitate. Dr Powell also says, that proof-spirit by heat dissolves 9-12ths of opium; and water, although heated, only 5-12ths.

Cinchona bark is a medicine of very great importance; but, unfortunately, the proportion of woody fibres, or inert matter, which enters into its composition, is so great, that weak stomachs cannot bear it, when given in quantity sufficient to produce any very powerful effects. On this account the preparation of an extract, which may contain its active principles in a concentrated form, is a desirable object. On this subject there is still much room for experiment. The London college, in its former Pharmacopœia, certainly erred in two important particulars; in the first place, in desiring the decoction to be continued until the greatest part of the menstruum was evaporated; and, in the second place, in separating, by filtration, the powder which separated from the decoction after it had cooled. The first error probably originated in the idea, that, by continuing the boiling for a great length of time, more of the bark would be dissolved; but it is now known, that water is incapable of dissolving more than a certain quantity of the active principles of cinchona; and that after the water has become saturated, by continuing the decoction we diminish the quantity of the menstruum, and therefore also diminish the quantity of bark dissolved. It is not easy to account for the second error; for, according to the old idea, that the powder which separated, on cooling, from a saturated decoction of cinchona, was a resinous substance, it surely ought not to have been rejected from what were supposed to be resinous extracts. This precipitate is now known to be caused by the much greater solubility of its active principles in boiling than in cold water; so that the precipitate is not different from what remains in solution. Accordingly, I ascertained, by experiment, that cinchona gave at least one half more extract when the decoction was conducted according to the directions of the Edinburgh college; and the London college, in their present Pharmacopœia, have improved their processes on the same principles.

The real advantage of so expensive an agent as alcohol, in preparing any of these extracts, has not been demonstrated; and, if I be not misinformed, it is seldom employed by the apothecaries in preparing even what are called the Resinous Extracts.

Resina flava. *Dub.*
Yellow Resin.

This remains in the retort after the distillation of oil of turpentine.

Turpentines are combinations of volatile oil and resins, which are easily separated by distillation. The process, however, cannot be carried so far as to separate the whole of the oil, without charring and burning part of the resin. In this state it has a brown colour, and a certain degree of transparency, and is well known under the name of Fiddlers Rosin. But if water be added to the residuum of the distillation, and be thoroughly mixed with it by agitation, it becomes opaque, and is called Yellow Rosin.

Yellow rosin is a useful ingredient in the composition of plasters and hard ointments.

Gummi resinæ. *Lond.*
Gum Resins.

Those gum-resins are to be reckoned the best which are selected so pure, that they do not stand in need of purification. But if they seem impure, boil them in water until they grow soft; then squeeze them through a canvas bag, by means of a press. Let them remain at rest till the resinous part subside; then evaporate, in a water-bath, the part of the water decanted off; and towards the end of the evaporation, mix the resinous part with the gummy into a homogeneous mass.

Gum-resins which melt easily may be purified by putting them into an ox bladder, and holding it in boiling water till they become so soft, that they can be separated from impurities by pressing them through a hempen cloth.

As one, and perhaps the most active, constituent of gummy resins, as they are called, is of a volatile nature, it is evident that it must be, in a great measure, dissipated in the process just described, and that we cannot expect the same virtues in these substances after they are purified, which they possess in their crude state. This process is, therefore, contrary to the principles of good pharmacy; and such specimens of these

gummy resins as stand in need of it to give them an apparent degree of purity, should not be admitted into the shop of the apothecary. Besides, many of the impurities which they usually contain are easily separated, in compounding the preparations or extemporaneous prescriptions into which they enter.

STYRAX PURIFICATA. *Lond.*
Purified Storax.

Dissolve storax in rectified spirit of wine, and filter; afterwards reduce the balsam to a proper thickness, by distilling off the spirit with a gentle heat.

Dub.

Digest the storax in water, with a low heat, until it get soft; then express it between iron plates, heated with boiling water; and, lastly, separate it from the water.

STORAX is a balsam, or combination of resin and benzoic acid, both of which are soluble in alcohol, and neither of them volatile in the heat necessary for evaporating alcohol. The London process for purifying it is therefore not liable to any chemical objections. The method now directed by the Dublin college is certainly more economical, but must be attended with loss of benzoic acid.

CHAP. XXXVI.—POWDERS.

THIS form is proper for such materials only as are capable of being sufficiently dried to become pulverizable, without the loss of their virtue. There are several substances, however, of this kind, which cannot be conveniently taken in powder; bitter, acrid, fetid drugs are too disagreeable; emollient and mucilaginous herbs and roots are too bulky; pure gums cohere, and become tenacious in the mouth; fixed alkaline salts deliquesce when exposed to the air; and volatile alkalies exhale. Many of the aromatics, too, suffer a great loss of their odorous principles when kept in powder, as in that form they expose a much larger surface to the air.

The dose of powders, in extemporaneous prescription, is generally about half a drachm; it rarely exceeds a whole drachm; and is not often less than a scruple. Substances

which produce powerful effects in small doses are not exhibited in this form, unless their bulk be increased by additions of less efficacy; those which require to be given in larger ones are better fitted for other forms.

The most useful vehicle for taking the lighter powders, is any agreeable thin liquid. The ponderous powders, particularly those prepared from metallic substances, require a more consistent vehicle, as syrups; for from thin ones they soon subside. Resinous substances, likewise, are most commodiously taken in thick liquors; for in thin ones they are apt to run into lumps, which are not easily diffused.

In pulverem triti. *Dub.*
Powders.

Substances to be powdered, previously dried, are to be pulverized in an iron-mortar. The powder is then to be separated, by shaking it through an hair-sieve, and is to be kept in close vessels.

Pulvis aloes cum canella. *Dub.*
Powder of Aloes with Canella.

Take of
Hepatic aloes, one pound;
White canella, three ounces.
Powder them separately, and then mix them.

This was formerly well known by the title of Hiera Picra. The spicy canella acts as a corrigent to the aloes, but the compound is more adapted to the form of pills, than of powder.

Pulvis aloes cum guaiaco. *Dub.*
Powder of Aloes with Guaiac.

Take of
Hepatic aloes, one ounce and a half;
Gum guaiacum, one ounce;
Aromatic powder, half an ounce.
Rub the aloes and gum guaiacum separately to powder; then mix them with the aromatic powder.

Pulvis aloes compositus. *Lond.*
Compound Powder of Aloes.

Take of
Socotorine aloes, one ounce and a half;
Gum-resin guaiac, one ounce;
Compound powder of cinnamon, half an ounce.

Powder the aloes and guaiac separately; then mix the compound powder of cinnamon with them.

THIS powder is supposed to combine the sudorific effects of the guaiac with the purgative of the aloes.

PULVIS AROMATICUS. *Dub.*
Aromatic Powder.

Take of
Cinnamon, two ounces;
Smaller cardamom seeds, husked,
Ginger,
Long pepper, of each one ounce.
Rub them together to a powder.

Ed.

Take of
Cinnamon,
Smaller cardamom seeds,
Ginger, each equal parts.
Reduce them to a very fine powder, which is to be kept in a glass vessel, well closed.

PULVIS CINNAMOMI COMPOSITUS. *Lond.*
Compound Powder of Cinnamon.

Take of
Cinnamon bark, two ounces;
Cardamom seeds, an ounce and a half;
Ginger, one ounce;
Long pepper, half an ounce;
Reduce them together to a very fine powder.

THESE compositions are agreeable, hot, and spicy, and may be usefully taken in cold phlegmatic habits, and decayed constitutions, for warming the stomach, promoting digestion, and strengthening the tone of the viscera. The dose is from ten grains to a scruple and upwards. The first and third are considerably the warmest, from the long pepper which they contain.

PULVIS ASARI COMPOSITUS. *Ed.*
Compound Powder of Asarabacca.

Take of
The leaves of asarabacca, three parts;
——————— marjoram,
Flowers of lavender, of each one part.
Rub them together to powder.

Dub.

Take of
Dried leaves of asarabacca, one ounce;
Lavender flowers, two drachms.
Powder them together.

THESE are agreeable and efficacious errhines, and superior to most of those usually sold under the name of *herb snuff*. They are often employed with great advantage in cases of obstinate headach, and of ophthalmia resisting other modes of cure. Taken under the form of snuff, to the extent of five or six grains, at bed-time, they will operate the succeeding day as a powerful errhine, inducing frequent sneezing, and likewise a copious discharge from the nose. It is, however, necessary, during their operation, to avoid exposure to cold.

PULVIS CARBONATIS CALCIS COMPOSITUS; olim PULVIS CRETACEUS. *Ed.*
Compound Powder of Carbonate of Lime, formerly *Chalk Powder*.

Take of
Prepared carbonate of lime, four ounces;
Nutmeg, half a drachm;
Cinnamon, one drachm and a half.
Reduce them together to powder.

PULVIS CRETÆ COMPOSITUS, *Lond.*
Compound Powder of Chalk.

Take of
Prepared chalk, half a pound;
Cinnamon bark, four ounces;
Tormentil root,
Gum arabic, of each three ounces;
Long pepper, half an ounce.
Reduce them separately to a very fine powder, and mix them.

THE addition of the aromatic coincides with the general intention of the remedy, which is indicated in weakness and acidity of the stomach, and in looseness from acidity.

PULVIS CRETÆ COMPOSITUS CUM OPIO. *Lond.*
Compound Powder of Chalk with Opium.

Take of
Compound powder of chalk, six ounces and a half;
Hard opium, in powder, four scruples.
Mix them.

The addition of the opium renders this a more powerful remedy than the carbonate of lime alone, especially where the diarrhœa proceeds from irritation of the intestinal canal.

Pulvis contrayervæ compositus. *Lond.*
Compound Powder of Contrayerva.

Take of
Contrayerva root, in powder, five ounces;
Prepared oyster-shells, one pound and a half.
Mix them.

This medicine has a very good claim to the title of an alexipharmic and sudorific. The contrayerva, by itself proves very serviceable in low fevers, where the vis vitæ is weak, and a diaphoresis to be promoted. It is probable that the carbonate of lime is of no farther service than to divide this active ingredient, and make it sit more easily on the stomach.

Pulvis ipecacuanhæ et opii. *Ed.*
Powder of Ipecacuan and Opium.

Take of
Ipecacuan, in powder,
Opium, of each one part;
Sulphate of potass, eight parts.
Triturate them together into a fine powder.

Pulvis ipecacuanhæ compositus. *Lond.*
Compound Powder of Ipecacuan.

Take of
Ipecacuan root, in powder,
Hard opium, in powder, each one drachm;
Sulphate of potass, in powder, one ounce.
Mix them.

The sulphate of potass, from the grittiness of its crystals, is perhaps better fitted for tearing and dividing the tenacious opium than any other salt; this seems to be its only use in the preparation. The operator ought to be careful that the opium and ipecacuanha be equally diffused through the whole mass of powder, otherwise different portions of powder must differ in degree of strength.

This powder is one of the most certain sudorifics, and as such was recommended by Dr Dover, as an effectual remedy in rheumatism. Modern practice confirms its reputation, not only in rheumatism, but also in dropsy, and several other

diseases, where it is often difficult, by other means, to produce a copious sweat. The dose is from five to twenty grains, according as the patient's stomach and strength can bear it. It is proper to avoid much drinking immediately after taking it, otherwise it is very apt to be rejected by vomiting before any other effects are produced.

Pulvis jalapæ compositus. *Ed.*
Compound Powder of Jalap.

Take of
Jalap root, in powder, one part;
Supertartrate of potass, two parts.
Grind them together to a very fine powder.

The use of the tartrate in this preparation is to break down and divide the jalap; and therefore they are directed to be triturated together, and not separately.

Pulvis kino compositus. *Lond.*
Compound Powder of Kino.

Take of
Kino, fifteen drachms;
Cinnamon, half an ounce;
Hard opium, one drachm.
Reduce them separately to a very fine powder, then mix them.

This, though well known in extemporaneous prescription, is a new officinal preparation, and one which promises to be convenient. It is anodyne and astringent, containing one part of opium in twenty.

Pulvis opiatus. *Ed.*
Opiate Powder.

Take of
Opium, one part;
Prepared carbonate of lime, nine parts.
Rub them together to a fine powder.

Pulvis cornu cervi cum opio. *Lond.*
Powder of Hartshorn with Opium.

Take of
Hard opium, in powder, one drachm;
Hartshorn, burnt and prepared, one ounce;
Cochineal, in powder, one drachm.

In these powders, the opium is the active ingredient; and

it is immaterial whether the phosphate or carbonate of lime be used to facilitate its mechanical division.

PULVIS SCAMMONEÆ COMPOSITUS. *Lond.*
Compound Powder of Scammony.

Take of
Scammony,
Hard extract of jalap, of each two ounces;
Ginger, half an ounce.
Reduce them separately, to a very fine powder, and mix them.

PULVIS SCAMMONII. *Ed.*
Powder of Scammony.

Take of
Scammony,
Supertartrate of potass, equal parts.
Rub them together to a very fine powder.

IN the first of these compositions, the scammony is combined with another purgative little less active than itself, and in the other with one much less so; which difference must be attended to in prescription. The ginger is an useful addition, and will render it less apt to gripe.

PULVIS SENNÆ COMPOSITUS. *Lond.*
Compound Powder of Senna.

Take of
Senna leaves,
Supertartrate of potass, of each two ounces;
Scammony, half an ounce;
Ginger, two drachms.
Triturate the scammony by itself, reduce the rest together into a very fine powder, and then mix.

THIS powder is given as a cathartic, in the dose of two scruples, or a drachm. The scammony is used as a stimulus to the senna; the quantity of the latter necessary for a dose, when not assisted by some more powerful substance, being too bulky to be conveniently taken in this form. The ginger is added to make it sit easier on the stomach, and gripe less.

PULVIS SULPHATIS ALUMINÆ COMPOSITUS; olim PULVIS STYPTICUS. *Ed.*

Compound Powder of Sulphate of Alumine, formerly *Styptic Powder.*

Take of
Sulphate of alumine, four parts;
Kino, one part.
Rub them together to a fine powder.

THIS powder is composed of two very powerful astringents, but which we believe are not combined with propriety; at least it is certain that a solution of alum is decomposed by a solution of kino.

PULVIS TRAGACANTHÆ COMPOSITUS. *Lond.*

Compound Powder of Tragacanth.

Take of
Tragacanth, powdered,
Gum arabic, powdered,
Starch, of each one ounce and a half;
Refined sugar, three ounces.
Powder the starch and sugar together; then add the tragacanth and gum arabic, and mix.

THIS composition is a mild emollient; and hence becomes serviceable in hectic cases, tickling coughs, strangury, some kinds of alvine fluxes, and other disorders proceeding from a thin acrimonious state of the excreted fluids, or an abrasion of the mucus of the intestines; it is supposed to soften, and give a greater degree of consistency to the former, and defend the latter from being irritated or excoriated by them. All the ingredients coincide in these general intentions. The dose is from half a drachm to two or three drachms, which may be frequently repeated.

CHAP. XXXVII.—CONSERVES, ELECTUARIES, AND CONFECTIONS.

CONSERVES are compositions of recent vegetable matters, and sugar, beaten together into an uniform mass.

This process is introduced for preserving certain simples, undried, in an agreeable form, with as little alteration as possible in their native virtues; and in some cases it is very advantageous. Vegetables, whose virtues are lost or destroyed in drying, may in this form be kept uninjured for a considerable time; for by carefully securing the mouth of the containing vessel, the alteration, as well as dissipation, of their active principles, is generally prevented; and the sugar preserves them from the corruption which juicy vegetables would otherwise undergo.

The sugar should be pounded by itself, and passed through a sieve, before it be mixed with the vegetable mass; for without this it cannot be properly incorporated. Rose buds, and some other vegetables, are prepared for mixing with the sugar, by grinding them in a small wooden mill, contrived for that purpose.

There are, however, vegetables whose virtues are impaired by this treatment. Mucilaginous substances, by lying long with sugar, become less glutinous; and astringents sensibly become softer upon the palate. Many of the fragrant flowers are of so tender and delicate a texture, as almost entirely to lose their peculiar qualities on being beaten or bruised.

In general, it is obvious, that in this form, on account of the large proportion of sugar, only substances of considerable activity can be taken with advantage as medicines. And, indeed, conserves are at present considered chiefly as auxiliaries to medicines of greater efficacy, or as intermediums for joining them together. They are very convenient for reducing into bolusses or pills the more ponderous powders, as submuriate of mercury, the oxides of iron, and other mineral preparations; which, with liquid or less consistent matters, as syrups, will not cohere.

The shops were formerly encumbered with many conserves, altogether insignificant; the few now retained have in general either an agreeable flavour to recommend them, or are capable of answering some useful purposes, as medicines. Their common dose is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is, in general, no great danger of exceeding in the dose.

Electuaries are composed chiefly of powders mixed up with syrups, &c. into such a consistence, that the mass shall neither be too stiff to swallow, nor so thin as to allow the powders to separate, and that a dose may be easily taken up on the point of a knife.

Electuaries are chiefly composed of the milder alterative medicines, and such as are not ungrateful to the palate. The more powerful drugs, as cathartics, emetics, opiates, and the like, (except in officinal electuaries to be dispensed by weight), are seldom exhibited in this form, on account of the uncertainty of the dose; unpleasant ones, acrids, bitters, fetids, cannot be conveniently taken in it; nor is the form of an electuary well fitted for the more ponderous substances, as mercurials, these being apt to subside on keeping, unless the composition be made very stiff.

The lighter powders require thrice their weight of honey, or of syrup boiled to the thickness of honey, to make them into the consistence of an electuary; of syrups of the common consistence, twice the weight of the powder is sufficient.

Where common syrups are employed, the compound is apt to candy and dry too soon: electuaries of Peruvian bark, for instance, made up with syrup alone, will often in a day or two grow too dry for use. This is owing to the crystallization of the sugar. Deyeux, therefore, advises electuaries, confections, and conserves, to be made up with syrups, from which all the crystallizable parts have been separated. For this purpose, the syrups, after being sufficiently evaporated, are to be exposed to the heat of a stove as long as they form any crystals. What remains, probably from the presence of some vegetable acid, has no tendency to crystallize, and is to be decanted and evaporated to a proper consistence. In hospital practice, the same object may be obtained much more easily by using molasses instead of syrups, and in private practice, by the substitution of a little conserve.

The quantity of an electuary directed at a time in extemporaneous prescription varies much, according to its constituent parts; but is rarely less than the size of a nutmeg, or more than two or three ounces.

Confectio amygdalarum. *Lond.*
Confection of Almonds.

Take of

Sweet almonds, one ounce;
Gum arabic, in powder, one drachm;
Refined sugar, half an ounce.

Having first blanched the almonds, by macerating them in water, and peeling them, beat the whole ingredients into a homogeneous mass.

By triturating this confection with water, we immediately form an almond emulsion, which on many occasions is desira-

ble, as it takes a considerable time to make from the unmixed materials, and soon spoils after it is made.

Confectio aurantiorum. *Lond.*
Confection of Orange-peel.

Take of
Fresh orange-peel, grated off, one pound;
Refined sugar, three pounds.
Bruise the peel in a stone mortar with a wooden pestle; then, adding the sugar, beat them into a homogeneous mass.

Conserva aurantii. *Dub.*
Conserve of Orange-peel.

To the fresh rind of Seville oranges, grated off, add three times its weight of refined sugar, while beating it.

Conserva citri aurantii. *Ed.*
Conserve of Orange-peel.

Grate off the rind of Seville oranges, beat it into pulp, and while beating it, add gradually three times its weight of double refined sugar.

Confectio rosæ caninæ. *Lond.*
Confection of Hips.

Take of
Pulp of hips, one pound;
Refined sugar, in powder, twenty ounces.
Expose the pulp to a gentle heat, in a water-bath, then gradually add the sugar, and beat them into a homogeneous mass.

Conserva rosæ caninæ. *Ed.*
Conserve of Hips.

Beat ripe hips, carefully cleaned from the seeds and down, to a pulp; and, while beating it, gradually add three times its weight of double refined sugar.

Confectio rosæ gallicæ. *Lond.*
Confection of Red Roses.

Take of
Red rose buds, with the heels cut off, one pound;
Refined sugar, three pounds.
Beat the petals in a stone mortar; then add the sugar, and reduce the whole to a homogeneous mass.

Conserva rosæ. *Dub.*
Conserve of Red Roses.

Pluck the petals of red rose buds from the calyces; and having cut off the heels, beat them, gradually adding three times their weight of refined sugar.

Conserva rosæ gallicæ. *Ed.*
Conserve of Red Roses.

Beat the petals of red rose buds to pulp; and add, during the beating, three times their weight of double refined sugar.

La Grange says, that by infusing the red rose leaves in four times their weight of water, and squeezing them out of the infusion, they lose their bitterness, and are more easily reduced to a pulp, which he then mixes with a thick syrup, prepared by dissolving the sugar in the expressed liquor, and boiling it down to the consistence of an electuary.

It is scarcely necessary to make any particular remarks on these conserves. Their taste and virtues are compounded of those of sugar, and the substance combined with it. The hips are acidulous and refrigerant, the orange rind bitter and stomachic, and the red rose buds astringent.

Electuarium aromaticum. *Ed.*
Aromatic Electuary.

Take of
Aromatic powder, one part;
Syrup of orange-peel, two parts;
Mix and beat them well together, so as to form an electuary.

Dub.

Take of
Cinnamon,
Nutmeg, of each half an ounce;
Refined sugar,
Saffron, of each one ounce;
Lesser cardamom seeds, husked,
Cloves, each two drachms;
Precipitated chalk, two ounces;
Syrup of orange-peel, a sufficient quantity.
Powder the aromatics separately, then mix them with the syrup.

CONFECTIO AROMATICA. *Lond.*
Aromatic Confection.

Take of
Cinnamon bark,
Nutmeg, of each two ounces;
Cloves, one ounce;
Cardamom seeds, half an ounce;
Saffron, dried, two ounces;
Prepared oyster shells, sixteen ounces;
Refined sugar, powdered, two pounds;
Water, one pint.

Reduce the dry substances together to a very fine powder, then gradually add the water, and mix them until they be incorporated.

THESE compositions are sufficiently grateful, and moderately warm. They are given in the form of a bolus, in doses of from five grains to a scruple, or upwards, as a cordial, or as a vehicle for more active substances. The simple composition of the Edinburgh college serves all these purposes as well as the complicated formula of the other colleges. Mr Phillips also very properly remarks, that in this composition, and indeed in every instance, prepared chalk might be advantageously substituted for oyster shells, as it is hardly possible to reduce the latter to so fine a powder as the former.

ELECTUARIUM CASSIÆ FISTULÆ. *Ed.*
Electuary of Cassia.

Take of
Pulp of cassia fistularis, four parts;
Pulp of tamarinds,
Manna, each, one part;
Syrup of pale roses, four parts.

Having beat the manna in a mortar, dissolve with a gentle heat in the syrup; then add the pulps, and evaporate with a regularly continued heat to a proper consistence.

ELECTUARIUM CASSIÆ. *Dub.*
Electuary of Cassia.

Take of
The fresh extracted pulp of cassia, half a pound;
Manna, two ounces;
Pulp of tamarinds, one ounce;
Syrup of orange-peel, half a pound.

Dissolve the manna, bruised, with a moderate heat in the

syrup; then add the pulps; and evaporate slowly the mixture to a proper thickness.

CONFECTIO CASSIÆ. *Lond.*
Confection of Cassia.

Take of
Fresh cassia pulp, half a pound;
Manna, two ounces;
Tamarind pulp, one ounce;
Syrup of roses, half a pint.
Bruise the manna; then dissolve it in the syrup, by the heat of a water-bath; lastly, mix in the pulps, and evaporate to a proper thickness.

THESE compositions are very convenient officinals, to serve as a basis for purgative electuaries, and other similar purposes. The tamarinds give them a pleasant acidity, and do not, as might be expected, dispose them to ferment. After standing for four months, the composition has been found no sourer than when first made. This electuary is usually taken by itself, to the quantity of two or three drachms occasionally, for gently loosening the belly in costive habits.

ELECTUARIUM CASSIÆ SENNÆ; olim ELECTUARIUM LENITIVUM. *Ed.*
Electuary of Senna, commonly called *Lenitive Electuary.*
Take of
Senna, eight ounces;
Coriander seeds, four ounces;
Liquorice root, bruised, three ounces;
Figs,
Pulp of prunes, each one pound;
——— tamarinds, half a pound;
Refined sugar, two pounds and a half.

CONFECTIO SENNÆ. *Lond.*
Confection of Senna.

Take of
Senna leaves, eight ounces;
Figs, one pound;
Pulp of tamarinds,
—— of cassia,
—— of prunes, each half a pound;
Coriander seeds, four ounces;
Liquorice root, three ounces;
Refined sugar, two pounds and a half.

(Powder the senna with the coriander seeds, and sift out ten ounces of the mixed powder; boil the remainder with the figs and liquorice in four pints of water to one half; express and strain the liquor, which is then to be evaporated to about a pint and a half; dissolve the sugar in it; add this syrup by degrees to the pulps; and, lastly, mix in the sifted powder. *Ed. Lond.*)

ELECTUARIUM SENNÆ. *Dub.*
Electuary of Senna.

Take of
Senna leaves, in very fine powder, four ounces;
Pulp of French prunes, one pound;
——— tamarinds, two ounces;
Molasses, a pint and a half;
Essential oil of caraway, two drachms.
Boil the pulps in the syrup, to the thickness of honey: then add the powder, and, when the mixture cools, the oil; lastly, mix the whole intimately.

THIS electuary is a very convenient laxative, and has long been in common use among practitioners. Taken to the size of a nutmeg, or more, as occasion may require, it is an excellent laxative for loosening the belly in costive habits. The formula of the Dublin college is much more simple and elegant than the others. Mr Phillips also remarks, that the stalks of the senna, and the husks of the coriander seed, can add but little to the virtues of this compound; but since the decoction must be employed for the figs and liquorice root, it is no additional trouble to boil the stalks and husks along with them.

ELECTUARIUM MIMOSÆ CATECHU; olim CONFECTIO JAPONICA, *Ed.*
Electuary of Catechu, commonly called *Japonic Confection.*
Take of
Extract of mimosa catechu, four ounces;
Kino, three ounces;
Cinnamon,
Nutmeg, each one ounce;
Opium, diffused in a sufficient quantity of Spanish white wine, one drachm and a half.
Syrup of red roses, boiled to the consistence of honey, two pounds and a quarter.
Reduce the solids to powder; and having mixed them with the opium and syrup, make them into an electuary.

Electuarium catechu compositum. *Dub.*
Compound Electuary of Catechu.

Take of
Catechu, four ounces;
Cinnamon, two ounces;
Kino, three ounces; powder these, then add,
Hard purified opium, diffused in Spanish white wine, a drachm and a half;
Syrup of ginger, evaporated to the consistence of honey, two pounds and a quarter.
Mix them.

These electuaries, which do not differ in any material particular, are extremely useful astringent medicines, and are often given in doses of a tea spoonful, frequently repeated, in cases of diarrhœa, &c. Ten scruples contain one grain of opium.

Confectio scammoneæ. *Lond.*
Confection of Scammony.

Take of
Scammony, in powder, one ounce and a half;
Cloves, bruised,
Ginger, in powder, of each six drachms;
Essential oil of caraway, half a fluidrachm;
Syrup of roses, as much as is sufficient.
Reduce the dry substances together to a very fine powder; add the syrup, and triturate them together; lastly, add the oil of caraway, and mix the whole.

Electuarium scammonii. *Dub.*
Electuary of Scammony.

Take of
Scammony,
Ginger, of each, in powder, one ounce;
Oil of cloves, one scruple;
Syrup of orange-peel, what is sufficient.
Mix the powdered ginger with the syrup: then add the scammony, and lastly the oil.

This electuary is a warm brisk purgative. A drachm contains ten grains of scammony.

ELECTUARIUM OPIATUM; olim ELECTUARIUM THEBAICUM. *Ed.*

Opiate Electuary, commonly called *Thebaic Electuary.*

Take of
- Aromatic powder, six ounces;
- Virginian snake-root, in fine powder, three ounces;
- Opium, diffused in a sufficient quantity of Spanish white wine, half an ounce;
- Syrup of ginger, one pound.

Mix them, and form an electuary.

CONFECTIO OPII. *Lond.*

Confection of Opium.

Take of
- Hard opium, powdered, six drachms;
- Long pepper, one ounce;
- Ginger, two ounces;
- Caraway seeds, three ounces;
- Syrup, one pint.

Mix the opium with the syrup heated; then add the other ingredients, powdered, and mix.

THE action which these electuaries will produce on the living system, is abundantly apparent from the nature of their ingredients. They are combinations of aromatics with opium; one grain of opium being contained in thirty-six of the London confection, and in forty-three of the Edinburgh electuary.

CONFECTIO RUTÆ. *Lond.*

Confection of Rue.

Take of
- Rue leaves, dried,
- Caraway seeds,
- Laurel berries, of each an ounce and a half;
- Sagapenum, half an ounce;
- Black pepper, two drachms;
- Clarified honey, sixteen ounces.

Triturate the dry substances to a very fine powder; then adding the honey, mix the whole.

THIS was long supposed to be a powerful antihysteric. Its use is now confined to glysters.

Chap. XXXVIII.—TROCHES.

Troches and lozenges are composed of powders made up with glutinous substances into little cakes, and afterwards dried. This form is principally made use of for the more commodious exhibition of certain medicines, by fitting them to dissolve slowly in the mouth, so as to pass by degrees into the stomach, or to act upon the pharynx and top of the trachea; and hence these preparations have generally a considerable proportion of sugar, or other materials grateful to the palate. Some powders have likewise been reduced into troches, with a view to their preservation; though possibly for no very good reason; for the moistening, and afterwards drying them in the air, must rather tend to injure than to preserve them. The lozenges of the confectioner are so superior in elegance to those of the apothecary, that they are almost universally preferred; and hence it probably is that the Dublin and London colleges have entirely omitted them.

Trochisci carbonatis calcis. *Ed.*
Troches of Carbonate of Lime.

Take of
Carbonate of lime, prepared, four ounces;
Gum arabic, one ounce;
Nutmeg, one drachm;
Refined sugar, six ounces.
Powder them together, and form them with water into a mass for making troches.

These are used against acidity of the stomach, especially when accompanied with diarrhœa.

Trochisci glycyrrhizæ glabræ. *Ed.*
Troches of Liquorice.

Take of
Extract of liquorice,
Gum arabic, each one part;
White sugar, two parts.
Dissolve them in warm water, and strain; then evaporate the solution over a gentle fire, till it be of a proper consistence for being formed into troches.

THESE are both agreeable pectorals, and may be used at pleasure in tickling coughs. The solution, and subsequent evaporation, of the extract of liquorice, directed by the Edinburgh college, is exceedingly troublesome, and apt to give the troches an empyreumatic flavour. They are more easily made, by reducing the liquorice also to powder, and mixing up the whole with rose-water. Refined extract of liquorice should be used; and it is easily powdered in the cold, after it has been laid for some days in a dry and rather warm place.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. *Ed.*
Liquorice Troches with Opium.

Take of
Opium, two drachms;
Tincture of Tolu, half an ounce;
Common syrup, eight ounces;
Extract of liquorice, softened in warm water,
Gum arabic, in powder, of each five ounces.
Triturate the opium well with the tincture, then add by degress the syrup and extract; afterwards gradually mix in the powdered gum arabic. Lastly, dry them so as to form a mass, to be divided into troches, each weighing ten grains.

THESE directions for preparing the above troches are so full and particular, that no further explanation is necessary; seven and a half contain about one grain of opium. These troches are medicines of approved efficacy in tickling coughs depending on irritation of the fauces. Besides the mechanical effect of the viscid matters in involving acrid humours, or lining and defending the tender membranes, the opium no doubt must have a considerable effect, by more immediately diminishing the irritability of the parts themselves.

TROCHISCI GUMMOSI. *Ed.*
Gum Troches.

Take of
Gum arabic, four parts;
Starch, one part;
Refined sugar, twelve parts.
Powder them, and make them into a proper mass with rose-water, so as to form troches.

THIS is a very agreeable pectoral, and may be used at pleasure. It is calculated for allaying the tickling in the throat which provokes coughing.

TROCHISCI NITRATIS POTASSÆ. *Ed.*
Troches of Nitrate of Potass.

Take of
Nitrate of potass, one part;
Double refined sugar, three parts.
Rub together to powder, and form them, with mucilage of gum tragacanth, into a mass, to be divided into troches.

THIS is a very agreeable form for the exhibition of nitre; though, when the salt is thus taken without any liquid, (if the quantity be considerable), it is apt to occasion uneasiness about the stomach, which can only be prevented by large dilution with aqueous liquors.

CHAP. XXXIX.—PILLS.

THIS form is peculiarly adapted to those drugs which operate in a small dose, and whose nauseous and offensive taste or smell require them to be concealed from the palate.

Pills should have the consistence of a firm paste, a round form, and a weight not exceeding five grains. Essential oils may enter them in small quantity: deliquescent salts are improper. Efflorescent salts, such as carbonate of soda, should be previously exposed to the air until they fall to powder: deliquescent extracts should have some powder combined with them. The mass should be beaten until it become perfectly uniform and plastic. Powders may be made into pills with extracts, balsams, soap, mucilages, bread crumb, &c.

Gum-resins, and inspissated juices, are sometimes soft enough to be made into pills, without addition: where any moisture is requisite, spirit of wine is more proper than syrups or conserves, as it unites more readily with them, and does not sensibly increase their bulk. Light dry powders require syrups or mucilages: and the more ponderous, as the mercurial and other metallic preparations, thick honey, conserve, or extracts.

Light powders require about half their weight of syrup, or about three-fourths their weight of honey, to reduce them into a due consistence for forming pills. Half a drachm of the mass will make five or six pills of a moderate size.

Gums and inspissated juices are to be first softened with the liquid prescribed; the powders are then to be added, and the whole beat thoroughly together, till they be perfectly mixed.

The masses for pills are best kept in bladders, which should be moistened now and then with some of the same kind of liquid that the mass was made up with, or with some proper aromatic oil.

When the mass is to be divided into pills, a given weight of it is rolled out into a cylinder of a given length, and of an equal thickness throughout, and is then divided into a given number of equal pieces, by means of a simple machine. These pieces are then rounded between the fingers or by a machine; and to prevent them from adhering, they are covered either with starch, or powder of liquorice, or orris root. In Germany the powder of lycopodium is much used.

PILULÆ ALOETICÆ. *Ed.*
Aloetic Pills.

Take of
Aloes, *in powder*,
Soap, equal parts.
Beat them with simple syrup into a mass fit for making pills.

PILULÆ ALOES CUM ZINGIBERE. *Dub.*
Pills of Aloes and Ginger.

Take of
Hepatic aloes, one ounce;
Ginger root, in powder, one drachm;
Soap, half an ounce;
Essence of peppermint, half a drachm.
Powder the aloes with the ginger, then add the soap and the essence, so as to form an intimate mixture.

PILULÆ ALOES COMPOSITÆ. *Lond.*
Compound Pills of Aloes.

Take of
Socotorine aloes, powdered, one ounce;
Extract of gentian, half an ounce;
Oil of caraway, forty minims;
Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

ALTHOUGH soap can scarcely be thought to facilitate the solution of the aloes in the stomach, as was supposed by Boerhaave and others, it is, probably, the most convenient sub-

stance that can be added, to give it the proper consistence for making pills. When extract of gentian is triturated with aloes, they re-act upon each other, and become too soft to form pills, so that the addition of any syrup to the mass, as directed by the London college, is perfectly unnecessary; unless, at the same time, some powder be added to give it consistency.

Aloetic pills are much used as warm and stomachic laxatives; they are very well suited for the costiveness so often attendant on people of sedentary lives, and, upon the whole, are one of the most useful articles in the materia medica.

PILULÆ ALOES ET ASSÆ FŒTIDÆ. *Ed.*
Pills of Aloes and Assafœtida.

Take of
Socotorine aloes, in powder,
Assafœtida,
Soap, equal parts.
Form them into a mass, with mucilage of gum arabic.

THESE pills, in doses of about ten grains, twice a-day, produce the most salutary effects in cases of dyspepsia, attended with flatulence and costiveness.

PILULÆ ALOES CUM COLOCYNTHIDE. *Ed.*
Pills of Aloes with Colocynth.

Take of
Socotorine aloes,
Scammony, of each eight parts;
Colocynth, four parts;
Oil of cloves,
Sulphate of potass with sulphur, of each one part.
Reduce the aloes and scammony into a powder, with the salt; then let the colocynth, beat into a very fine powder, and the oil be added: lastly, make it into a proper mass with mucilage of gum arabic.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. *Dub.*
Compound Pills of Colocynth.

Take of
Pith of colocynth, half an ounce;
Hepatic aloes,
Scammony, each one ounce;
Castile soap, two drachms;
Oil of cloves, one drachm.

Powder the aloes, scammony, and colocynth, separately; then triturate them with the soap and the oil, and form them into a mass with simple syrup.

THIS is more powerful in its operation than the simpler aloetic pills.

PILULÆ ALOES ET MYRRHÆ. *Ed.*
Pills of Aloes and Myrrh.

Take of
Socotorine aloes, four parts;
Myrrh, two parts;
Saffron, one part.
Beat them into a mass with simple syrup.

Dub.

Take of
Hepatic aloes, one ounce;
Myrrh, half an ounce;
Saffron, in powder, two drachms;
Essential oil of caraway, half a drachm;
Syrup, a sufficient quantity.
Powder the aloes and myrrh separately, then mix the whole intimately together.

PILULÆ ALOES CUM MYRRHA. *Lond.*
Pills of Aloes with Myrrh.

Take of
Socotorine aloes, two ounces;
Myrrh,
Saffron, of each one ounce;
Simple syrup, as much as is sufficient.
Powder the aloes and myrrh separately; and afterwards beat all the ingredients together into a homogeneous mass.

THESE pills have long continued in practice, without any other alteration than in the syrup with which the mass is made up, and in the proportion of saffron. The virtues of this medicine may be easily understood from its ingredients. Given to the quantity of half a drachm, or two scruples, they prove considerably cathartic, but they answer much better purposes in smaller doses as laxatives or alteratives.

Pilulæ assæ fœtidæ compositæ. *Ed.*
Compound Pills of Assafœtida.

Pilulæ myrrhæ compositæ. *Dub.*
Compound Pills of Myrrh.

Take of
Assafœtida,
Galbanum,
Myrrh, each eight parts (one ounce, *Dub.*);
Rectified oil of amber, one part, (half a drachm, *Dub.*)
Beat them into a mass with simple syrup.

Pilulæ galbani compositæ. *Lond.*
Compound Pills of Galbanum.

Take of
Galbanum, one ounce;
Myrrh,
Sagapenum, of each one ounce and a half;
Assafœtida, half an ounce;
Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

These pills are designed for antihysterics and emmenagogues, and are very well calculated for answering those intentions; half a scruple, a scruple, or more, may be taken every night, or oftener. It is singular, that each of the colleges should have given them different names. The assafœtida is certainly the most powerful article.

Pilulæ cambogiæ compositæ. *Lond.*
Compound Pills of Gamboge.

Take of
Gamboge, in powder,
Socotorine aloes in powder,
Compound powder of cinnamon, of each one drachm;
Soap, two drachms.
Mix the powders, then add the soap, and beat the whole into a homogeneous mass.

This is a very useful purgative pill, being considerably more active than aloes alone.

Pilulæ ammoniareti cupri. *Ed.*
Pills of Ammoniaret of Copper.

Take of
Ammoniaret of copper, in fine powder, sixteen grains;
Bread crumb, four scruples;

Water of carbonate of ammonia, as much as may be sufficient.

Beat them into a mass, to be divided into thirty-two equal pills.

EACH of these pills weighs about three grains, and contains somewhat more than half a grain of the ammoniaret of copper. They seem to be the best form of exhibiting this medicine.

PILULÆ FERRI COMPOSITÆ. *Lond.*
Compound Pills of Iron.

Take of
Myrrh *in powder*, two drachms;
Subcarbonate of soda,
Sulphate of iron,
Sugar, of each one drachm.

Powder the myrrh with the subcarbonate of soda; then having added the sulphate of iron, rub them again; then beat the whole, mixed together, into a homogeneous mass.

THIS is Griffith's mixture in a solid form, and may often be convenient.

PILULÆ HYDRARGYRI. *Ed.*
Mercurial Pills.

Take of
Purified quicksilver,
Conserve of red roses, of each one ounce;
Starch, two ounces.

Triturate the quicksilver with the conserve, in a glass mortar, till the globules completely disappear, adding, occasionally, a little mucilage of gum arabic; then add the starch, and beat the whole with a little water into a mass, which is to be immediately divided into four hundred and eighty equal pills.

Lond. Dub.

Take of
Purified quicksilver, two drachms;
Confection of red roses, three drachms;
Liquorice root, powdered, one drachm;

Rub the quicksilver with the confection until the globules disappear; then, adding the liquorice powder, mix them together into a homogeneous mass.

THE common mercurial pill is one of the best preparations

of mercury, and may, in general, supersede most other forms of this medicine. In this preparation the mercury is minutely divided, and, probably, converted into the black oxide. To effect its mechanical division, it must be triturated with some viscid substance. Soap, resin of guaiac, honey, extract of liquorice, manna, and conserve of roses, have all been, at different times, recommended. The soap and guaiac have been rejected on account of their being decomposed by the juices of the stomach: and the honey, because it was apt to gripe some people. With regard to the others, the grounds of selection are not well understood; perhaps the acid contained in the conserve of roses may contribute to the extinction of the mercury. The mercury is most easily known to be completely extinguished, if no globules appear, on rubbing a very little of the mass with the point of the finger on a piece of paper. As soon as this is the case, it is necessary to mix with the mass a proportion of some dry powder, to give it a proper degree of consistency. For this purpose, powder of liquorice root has been commonly used; but it is extremely apt to become mouldy, and to cause the pills to spoil. The Edinburgh college have, therefore, with great propriety, substituted for it starch, which is a very unalterable substance, and easily procured, at all times, in a state of purity. It is necessary to form the mass into pills immediately, as it soon becomes hard. One grain of mercury is contained in four grains of the Edinburgh mass, and in three of the London and Dublin. The dose of these pills must be regulated by circumstances; from two to six five-grain pills may be given daily.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. *Lond.*
Compound Pills of Submuriate of Mercury.

Take of
Submuriate of quicksilver,
Precipitated sulphuret of antimony, of each one drachm;
Guaiac, in powder, two drachms.
Triturate the submuriate with the precipitated sulphuret of antimony, and then with the guaiac; and add as much mucilage of gum arabic, as will give the mass a proper consistence.

THESE pills were recommended to the attention of the public, about forty years ago, by Dr Plummer, whose name they long bore. He represented them, in a paper which he published in the Edinburgh Medical Essays, as a very useful al-

terative; and on his authority they were at one time much employed; but they are now less extensively used than formerly.

PILULÆ SAPONIS CUM OPIO. *Lond.*
Pills of Soap with Opium.

Take of
Hard opium, in powder, half an ounce;
Hard soap, two ounces.
Beat them into a homogeneous mass.

PILULÆ E STYRACE. *Dub.*
Storax Pills.

Take of
Purified storax, three drachms;
Soft purified opium,
Saffron, of each one drachm.
Beat them into an uniform mass.

PILULÆ OPIATÆ; olim PILULÆ THEBAICÆ. *Ed.*
Opiate, or *Thebaic Pills.*

Take of
Opium, one part;
Extract of liquorice, seven parts;
Jamaica pepper, two parts.
Soften the opium and extract separately with diluted alcohol; and having beat them into a pulp, mix them: then add the pepper reduced to a powder: and, lastly, having beat them well together, form the whole into a mass.

IT is unfortunate that these compositions should differ so much in strength, the first containing one grain of opium in three, the second one in five, and the last only one grain of opium in ten of the mass. Under the idea that opium is to operate as a sedative, the addition of the pepper is somewhat injudicious. The title adopted by the Edinburgh college is ambiguous, as it may be mistaken for pills of opium, without any addition. That of the Dublin college is better, although it does not mention the only active ingredient, as it is often necessary to conceal from our patients that we are giving them opium, which both the name and smell of the storax enable us to do. But that of the London college is upon the whole perhaps the best.

Pilulæ rhei compositæ. *Ed.*
Compound Pills of Rhubarb.

Take of
Rhubarb, in powder, one ounce;
Socotorine aloes, six drachms;
Myrrh, half an ounce;
Volatile oil of peppermint, half a drachm.
Make them into a mass, with syrup of orange-peel.

This pill is intended for moderately warming and strengthening the stomach, and gently opening the belly. A scruple of the mass may be taken twice a-day.

Pilulæ scillæ compositæ. *Lond.*
Compound Pills of Squill.

Take of
Fresh dried squills, powdered, one drachm;
Ginger, powdered,
Hard soap, of each three drachms;
Gum ammoniac, in powder, two drachms.
Mix the powders together, then beat them with the soap, with the addition of as much syrup as will give them a proper consistence.

Pilulæ scillæ cum zingibere. *Dub.*
Squill Pills with Ginger.

Take of
Powder of squills, one drachm;
Ginger, in powder, two drachms;
Essential oil of aniseed, ten drops.
Triturate together, and form into a mass with jelly of soap.

Pilulæ scillitice. *Ed.*
Squill Pills.

Take of
Dried root of squills, in fine powder, one scruple;
Gum ammoniac,
Lesser cardamom seeds, in powder,
Extract of liquorice, each one drachm.
Form them into a mass with simple syrup.

These are elegant and commodious forms for the exhibition of squills, whether for promoting expectoration, or with the other intentions to which that medicine is applied. As the virtue of the compound is derived chiefly from the squills, the other ingredients are often varied in extemporaneous prescription.

Chap. XL.—CATAPLASMS.

Cataplasma fermenti. *Lond.*
Yeast Cataplasm.

Take of
Flour, one pound;
Bear yeast, half a pint.
Mix and expose to a gentle heat, till the mass begin to swell.

The yeast excites fermentation in the flour, and converts the whole into a thin dough. This cataplasm is considered as a very efficacious application to putrid or putrescent ulcers or tumours.

Cataplasma sinapeos. *Dub.*
Mustard Cataplasm.

Take of
Mustard seed, powdered,
Crumb of bread, of each half a pound;
Vinegar, as much as is sufficient.
Mix, and make a cataplasm.

Sinapisms may be made stronger, by adding of
Horse-radish root, scraped, two ounces.

Cataplasma sinapis. *Lond.*
Mustard Cataplasm.

Take of
Mustard seed,
Linseed, of each, in powder, half a pound;
Warm vinegar, as much as may be sufficient.
Mix to the thickness of a cataplasm.

Cataplasms of this kind are commonly known by the name of *Sinapisms*. They were formerly frequently prepared in a more complicated state, containing garlic, black soap, and other similar articles; but the above simple form will answer every purpose which they are capable of accomplishing. They are employed only as stimulants; they often inflame the part, and raise blisters, but not so perfectly as cantharides. They are frequently applied to the soles of the feet, in the low state of acute diseases, for raising the pulse, and relieving the head. The chief advantage they have depends on the suddenness of their action.

Chap. XLI.—LINIMENTS, OINTMENTS, CERATES, and PLASTERS.

These are all combinations of fixed oil, or animal fat, with other substances, and differ from each other only in consistence. Deyeux has, indeed, lately defined plasters to be combinations of oil with metallic oxides; but as this would comprehend many of our present ointments, and exclude many of our plasters, we shall adhere to the old meaning of the terms.

Liniments are the thinnest of these compositions, being only a little thicker than oil.

Ointments have generally a degree of consistence like that of butter.

Cerates are firmer, and contain a larger proportion of wax.

Plasters are the most solid, and derive their firmness, either from a large proportion of wax, rosin, &c. or from the presence of some metallic oxide, such as that of lead.

Plasters should have such a consistence as not to adhere to the fingers when cold, but become soft and plastic when gently heated. The heat of the body should render them tenacious enough to adhere to the skin, and to the substance on which they are spread. When prepared, they are usually formed into rolls, and inclosed in paper. Plasters of a small size are often spread on leather, sometimes on strong paper, or on tinfoil, by means of a spatula gently heated, or the thumb. The leather is cut of the shape wanted, but somewhat larger; and the margin all around, about $\frac{1}{2}$ inch in breadth is left uncovered, for its more easy removal when necessary. Linen is also used, especially for the less active plasters, which are used as dressings, and often renewed. It is generally cut into long slips, of various breadths, from one to six inches. These may either be dipt into the melted plaster, and passed through two pieces of straight smooth wood, held firmly together, so as to remove any excess of plaster; or, what is more elegant, they are spread on one side only, by stretching the linen, and applying the plaster, which has been melted and allowed to become almost cold, evenly by means of a spatula gently heated, or, more accurately, by passing the

linen on which the plaster has been laid, through a machine formed of a spatula fixed, by screws, at a proper distance from a plate of polished steel.

To prevent repetition, the Edinburgh college give the following canon for the preparation of these substances:

In making these compositions, the fatty and resinous substances are to be melted with a gentle heat, and then constantly stirred, adding, at the same time, the dry ingredients, if there be any, until the mixture on cooling becomes stiff.

The Dublin College prefixes the following direction:

Tutty and calamine employed in making ointments, are prepared in the same manner as chalk.

In making ointments and plasters, the wax, resins, and fats, are to be melted with a moderate heat, then removed from the fire, and constantly stirred, until they cool, adding, at the same time, the dry ingredients, if there be any, in very fine powder.

SEVUM PRÆPARATUM. *Lond.*
Prepared Suet.

Cut the suet into pieces, melt it over a slow fire, and express it through linen.

ADEPS PRÆPARATA. *Lond.*
Prepared Hogs Lard.

Cut the lard into pieces, melt it over a slow fire, and express it through linen.

ADEPS SUILLUS PRÆPARATUS. *Dub.*
Prepared Hogs Lard.

Melt fresh lard, cut in pieces, with a moderate heat, and strain with expression through flannel.

Lard, which is purified by those who sell it, and which is preserved with salt, is to be melted with twice its weight of boiling water, and the mixture well agitated. Set it then aside until it cool, and separate the fat.

BEFORE proceeding to melt these fats, it is better to separate as much of the membranes as possible, and to wash them in repeated quantities of water until they no longer give out any colour. Over the fire they will be perfectly transparent, and, if they do not crackle on throwing a few drops into the fire, it is a sign that all the water is evaporated, and that the

fats are ready for straining, which should be done through a linen cloth without expression. The residuum may be repeatedly melted with a little water, until it become discoloured with the fire. The fluid fat should be poured into the vessels, or bladders, in which it is to be preserved.

These articles had formerly a place also among the preparations of the Edinburgh college. But now they introduce them only into their list of the materia medica; as the apothecary will, in general, find it more for his interest to purchase them thus prepared, than to prepare them for himself; for the process requires to be very cautiously conducted, to prevent the fat from burning or turning black.

Cera flava purificata. *Dub.*
Purified Yellow Wax.

Take of
Yellow wax, any quantity.
Melt it with a moderate heat, remove the scum, and after allowing it to settle, pour it cautiously off from the fæces.

Yellow wax is so often adulterated, that this process is by no means unnecessary.

Linimentum simplex. *Ed.*
Simple Liniment.

Take of
Olive oil, four parts;
White wax, one part.

This consists of the same articles which form the Unguentum simplex of the Edinburgh Pharmacopœia, but merely in a different proportion, so as to render the composition thinner; and where a thin consistence is requisite, this may be considered as a very elegant and useful application.

Unguentum simplex. *Ed.*
Simple Ointment.

Take of
Olive oil, five parts;
White wax, two parts.

Both these ointments may be used for softening the skin and healing chaps.

Unguentum cetacei. *Lond.*
Ointment of Spermaceti.

Take of
Spermaceti, six drachms;

White wax, two drachms;
Olive oil, three fluidounces.
Melt them together over a slow fire, and stir them constantly until they be cold.

UNGUENTUM SPERMATIS CETI. *Dub.*
Ointment of Spermaceti.

Take of
White wax, half a pound;
Spermaceti, one pound;
Prepared hogs lard, three pounds;
Make into an ointment.

THIS had formerly the name of *Linimentum album*, and it is perhaps only in consistence that it can be considered as differing from the Unguentum simplex, already mentioned, or the Ceratum simplex, afterwards to be taken notice of.

CERATUM SIMPLEX. *Ed.*
Simple Cerate.

Take of
Olive oil, six parts;
White wax, three parts;
Spermaceti, one part.

CERATUM CETACEI. *Lond.*
Cerate of Spermaceti.

Take of
Spermaceti, half an ounce;
White wax, two ounces;
Olive oil, four fluidounces.
Add the oil to the wax and spermaceti, melted together, and stir until the cerate be cold.

THIS had formerly the name of *Ceratum album*, and it differs in nothing from the Unguentum cetacei, or Linimentum album as it was formerly called, excepting in consistence, both the wax and the spermaceti bearing a greater proportion to the oil.

CERATUM SIMPLEX. *Lond.*
Simple Cerate.

Take of
Olive oil, four fluidounces;
Yellow wax, four ounces.
Add the oil to the melted wax, and mix.

Unguentum ceræ flavæ. *Dub.*
Ointment of Yellow Wax.

Take of
Purified yellow wax, a pound;
Prepared hogs lard, four pounds.
Make into an ointment.

Unguentum ceræ albæ. *Dub.*
Ointment of White Wax,

Is prepared in the same manner, with white wax, instead of yellow.

Unguentum sambuci. *Lond.*
Elder Ointment.

Take of
Elder flowers,
Prepared lard, of each two pounds.
Boil the flowers in the lard till they become crisp; then express through linen.

Dub.

Take of
Fresh elder flowers, three pounds;
Prepared hogs lard, four pounds;
Mutton suet, two pounds.
Boil the flowers in the lard, until they become crisp; then strain with expression; lastly, add the suet, and melt them together.

Compositions of this kind were formerly very frequent; but vegetables, by boiling in fats and oils, impart to them nothing but a little mucilage, which changes the greasy oils to drying oils, and any resin or volatile oil they may contain; but that also is never in such quantity as to affect the nature of the fat or fixed oil. We therefore do not suppose that this ointment possesses any properties different from a simple ointment of the same consistence, except its fragrancy.

Linimentum terebinthinæ. *Lond.*
Turpentine Liniment.

Take of
Cerate of resin, one pound;
Oil of turpentine, half a pint.
Add the oil of turpentine to the cerate melted, and mix.

Much used for rubbing parts affected with rheumatic pains, and on sprained joints.

CERATUM RESINÆ. *Lond.*
Cerate of Resin.

Take of
Yellow resin,
Yellow wax, of each one pound;
Olive oil, one pint.
Melt the resin and wax together with a slow fire; then add the oil, and strain the cerate, while still hot, through linen.

UNGUENTUM RESINÆ ALBÆ. *Dub.*
Ointment of White Resin.

Take of
Hogs lard, four pounds;
White resin, two pounds;
Yellow wax, one pound;
Make into an ointment, which is to be strained while hot, through a sieve.

UNGUENTUM RESINOSUM. *Ed.*
Resinous Ointment.

Take of
Hogs lard, eight parts;
Pine resin, five parts;
Yellow wax, two parts.

THESE are commonly employed in dressings, for digesting, cleansing, and incarnating wounds and ulcers.

EMPLASTRUM CERÆ. *Lond.*
Wax Plaster.

Take of
Yellow wax,
Prepared suet, of each three pounds;
Yellow resin, one pound.
Melt them together, and strain.

EMPLASTRUM SIMPLEX, olim EMPLASTRUM CEREUM. *Ed.*
Simple or Wax Plaster.

Take of
Yellow wax, three parts;
Mutton suet,
Pine resin, each two parts.

THIS is chiefly used to support the discharge from a part which has been blistered, and was therefore formerly called *Emplastrum attrahens.* Sometimes, however, it irritates too much, on account of the resin; and hence, when designed

only for dressing blisters, the resin ought to be entirely omitted, unless where a continuance of the pain and irritation, excited by the vesicatory, is required. Indeed, plasters of any kind are not very proper for dressing blisters; their consistence makes them sit uneasy, and their adhesiveness renders the taking of them off painful. Cerates, which are softer and less adhesive, appear much more eligible: the Ceratum spermatis ceti will serve for general use; and for some particular purposes, the Ceratum resinae flavæ may be applied.

Unguentum elemi. *Dub.*
Ointment of Elemi.

Take of
Resin of elemi, one pound;
White wax, half a pound;
Prepared hogs lard, four pounds.
Make into an ointment, to be strained through a sieve while hot.

Unguentum elemi compositum. *Lond.*
Compound Ointment of Elemi.

Take of
Elemi, one pound;
Turpentine, ten ounces;
Suet, prepared, two pounds;
Olive oil, two fluidounces.
Melt the elemi with the suet; and having removed it from the fire, mix with it immediately the turpentine and oil; after which strain the mixture through linen.

This ointment, formerly known by the name of *Linimentum Arcæi*, has long been used for digesting, cleansing, and incarnating, and, for these purposes, is preferred by some surgeons to all the other compositions of this kind, probably because it is more expensive.

Unguentum picis liquidæ. *Lond.*
Tar Ointment.

Take of
Tar,
Prepared suet, of each one pound.
Melt them together, and express through linen.

Dub.

Take of
Tar,
Mutton suet prepared, of each half a pound.
Melt them together, and strain through a sieve.

UNGUENTUM PICIS. *Ed.*
Tar Ointment.

Take of
Tar, five parts;
Yellow wax, two parts.

THESE compositions cannot be considered as differing essentially from each other. As far as they have any peculiar activity, this entirely depends on the tar. From the empyreumatic oil and saline matters which it contains, it is undoubtedly of some activity. Accordingly, it has been successfully employed against some cutaneous affections, particularly *tinea capitis*.

UNGUENTUM RESINAE NIGRÆ. *Lond.*
Ointment of Pitch.

Take of
Pitch,
Yellow wax,
Yellow resin, of each nine ounces;
Olive oil, a pint.
Melt together, and express through linen.

EMPLASTRUM PICIS COMPOSITUM. *Lond.*
Compound Pitch Plaster.

Take of
Burgundy pitch, two pounds;
Frankincense, one pound;
Yellow resin,
Yellow wax, of each four ounces;
Expressed oil of mace, one ounce.
To the pitch, resin, and wax, melted together, add first the frankincense, and then the oil of mace, and mix.

EMPLASTRUM CUMINI. *Lond.*
Cumin Plaster.

Take of
Cumin seeds,
Caraway seeds,
Bay berries, of each three ounces;
Burgundy pitch, three pounds;
Yellow wax, three ounces.
Melt the pitch and wax together, and mix with them the rest of the ingredients, powdered.

This plaster has been recommended, as a moderately warm discutient; and is directed by some to be applied to the hypogastric region, for strengthening the viscera, and expelling flatulencies.

Emplastrum aromaticum. *Dub.*
Aromatic Plaster.

Take of
Frankincense, three ounces;
Yellow wax, half an ounce;
Cinnamon, in powder, six drachms;
Essential oil of pimento,
——— —— lemon, each two drachms.
Melt the frankincense and wax together, and strain; when getting stiff, from being allowed to cool, mix in the cinnamon and oils, and make a plaster.

This has been considered as a very elegant stomach plaster. As this kind of compositions, on account of their volatile ingredients, does not keep, it is only made occasionally, and it should be but moderately adhesive, that it may not offend the skin, and may without difficulty be frequently renewed; which such applications, in order to their producing any considerable effect, require to be.

Unguentum sulphuris. *Lond.*
Sulphur Ointment.

Take of
Sublimed sulphur, three ounces;
Prepared lard, half a pound.
Mix.

Ed.

Take of
Hogs lard, four parts;
Sublimed sulphur, one part.
To each pound of this ointment add of
Volatile oil of lemons, or lavender, half a drachm.

Dub.

Take of
Prepared lard, four pounds;
Sublimed sulphur, one pound.
Make an ointment.

UNGUENTUM SULPHURIS COMPOSITUM. *Lond.*
Compound Sulphur Ointment.

Take of
Sublimed sulphur, half a pound;
White hellebore root, in powder, two ounces;
Nitrate of potass, one drachm;
Soft soap, half a pound;
Prepared lard, a pound and a half.
Mix.

SULPHUR is a certain remedy for the itch, more safe than mercury. A pound of ointment serves for four unctions. The patient is to be rubbed every night, a fourth part of the body at each time. Though the disease may be thus cured by a single application, it is in general advisable to touch the parts most affected for a few nights longer, and to conjoin with the frictions the internal use of sulphur.

UNGUENTUM ACIDI NITROSI. *Ed.*
Ointment of Nitrous Acid.

Take of
Hogs lard, one pound;
Nitrous acid, six drachms.
Mix the acid gradually with the melted axunge, and diligently beat the mixture as it cools.

Dub.

Take of
Olive oil, one pound;
Prepared hogs lard, four ounces;
Nitrous acid, one ounce, by weight.
Having melted the oil and lard together in a glass vessel, add the acid; digest with a moderate heat, in a water-bath, for a quarter of an hour; then remove them from the bath, and stir them constantly with a glass rod, until they get stiff.

THE oil and axunge in this ointment are oxidized; for during the action of the acid upon them, there is a great deal of nitric oxide gas disengaged. It acquires a yellowish colour, and a firm consistency, and forms an efficacious and cheap substitute, in slight cutaneous affections, for the ointment of nitrate of mercury.

UNGUENTUM INFUSI MELOES VESICATORII; olim UNGUENTUM EPISPASTICUM MITIUS. *Ed.*

Ointment of Infusion of Cantharides, formerly called *Milder Epispastic Ointment.*

Take of
Cantharides,
Pine resin,
Yellow wax, each one part;
Hogs lard,
Venice turpentine, each two parts;
Boiling water, four parts.

Macerate the cantharides in the water for a night; then strongly press out and strain the liquor, and boil it with the lard till the water be consumed; then add the resin and wax; and, when these are melted, take the ointment off the fire, and add the turpentine.

UNGUENTUM LYTTÆ. *Lond.*

Ointment of Spanish Flies.

Take of
Spanish flies, in very fine powder, two ounces;
Distilled water, eight fluidounces;
Cerate of resin, eight ounces.

Boil the water with the flies to one half, and mix the cerate with the filtered liquor, and then evaporate to a proper consistence.

OINTMENTS, containing the soluble parts of the cantharides, uniformly blended with the other ingredients, are more commodious, and in general occasion less pain, though little less effectual in their action, than the compositions with the fly in substance. A very good stimulating liniment is composed by melting one part of this with half a part of camphor in powder, and three parts of turpentine.

UNGUENTUM PULVERIS MELOES VESICATORII; olim UNGUENTUM EPISPASTICUM FORTIUS. *Ed.*

Ointment of the Powder of Spanish Flies, formerly *Stronger Epispastic Ointment.*

Take of
Resinous ointment, seven parts;
Powdered cantharides, one part.

UNGUENTUM CANTHARIDIS. *Dub.*

Ointment of Spanish Flies.

Take of
Ointment of yellow wax, half a pound;

Spanish flies, in powder, an ounce.
Make into an ointment.

CERATUM LYTTÆ. *Lond.*
Cerate of Cantharides.

Take of
Cerate of spermaceti, six drachms;
Spanish flies, in very fine powder, one drachm.
Add the flies to the cerate, softened over the fire, and mix.

THIS ointment is employed in the dressing for blisters, intended to be made *perpetual*, as they are called, or to be kept running for a considerable time, which, in many chronic, and some acute cases, is of great service. Particular care should be taken, that the cantharides employed in these compositions be reduced into very subtile powder, and that the mixtures be made as equal and uniform as possible.

EMPLASTRUM LYTTÆ. *Lond.*
Plaster of Spanish Flies.

Take of
Spanish flies, in very fine powder, one pound;
Wax plaster, one pound and a half;
Prepared hogs lard, one pound.
Having melted the plaster and lard together, and removed them from the fire, sprinkle in the flies, a little before they become firm, and mix the whole together.

EMPLASTRUM CANTHARIDIS. *Dub.*
Plaster of Spanish Flies.

Take of
Purified yellow wax,
Mutton suet, each one pound;
Yellow resin, four ounces;
Cantharides, in fine powder, one pound.
To the wax, suet, and resin melted together, a little before they stiffen, on being allowed to cool, mix in the cantharides, and form an ointment.

EMPLASTRUM MELOES VESICATORII; olim EMPLASTRUM VESICATORIUM. *Ed.*

Plaster of Spanish Flies, formerly *Blistering Plaster.*

Take of
Mutton suet,
Yellow wax,
Pine resin,
Cantharides, each equal weights.

Mix the cantharides, reduced to a fine powder, with the other ingredients, previously melted, and removed from the fire.

IN making these plasters, from an incautious application of heat, the cantharides sometimes lose their vesicating powers; therefore it is customary, after the blister is spread, to cover its surface with powdered cantharides. The desired effect is also more speedy and certain, if the part to which it is to be applied be well bathed with hot vinegar; and the blister is more easily removed if a bit of thin gauze be interposed between it and the skin.

EMPLASTRUM CALEFACIENS. *Dub.*

Calefacient Plaster.

Take of
Plaster of cantharides, one part;
Burgundy pitch, seven parts.

Melt together, with a moderate heat, and make into a plaster.

THIS is a very convenient plaster, being more active as a stimulant and rubefacient than the simple Burgundy pitch plaster, while it will scarcely ever raise a blister.

EMPLASTRUM MELOES VESICATORII COMPOSITUM. *Ed.*

Compound Plaster of Spanish Flies.

Take of
Venice turpentine, eighteen parts;
Burgundy pitch,
Cantharides, each twelve parts;
Yellow wax, four parts;
Subacetite of copper, two parts;
Mustard seed,
Black pepper, each one part.

Having first melted the pitch and wax, add the turpentine, and to these, in fusion, and still hot, add the other ingredients, reduced to a fine powder, and mixed, and stir the whole carefully together, so as to form a plaster.

This is supposed to be a most infallible blistering plaster. It certainly contains a sufficient variety of stimulating ingredients.

Unguentum piperis nigri. *Dub.*
Ointment of Black Pepper.

Take of
Prepared lard, one pound;
Black pepper, in powder, four ounces.
Make into an ointment.

This is stimulating and irritating.

Unguentum veratri. *Lond.*
Ointment of White Hellebore.

Take of
White hellebore root, in powder, two ounces;
Prepared hogs lard, eight ounces;
Oil of lemon, twenty minims.
Mix.

Unguentum hellebori albi. *Dub.*
Ointment of White Hellebore.

Take of
Prepared hogs lard, one pound;
White hellebore root, in powder, three ounces.
Make into an ointment.

This is recommended in the itch, and other cutaneous affections.

Unguentum sabinæ. *Dub.*
Savine Ointment.

Take of
Fresh savine leaves, separated from the stalks and bruised, half a pound;
Prepared hogs lard, two pounds;
Yellow wax, half a pound.
Boil the leaves in the lard until they become crisp; then filter with expression; lastly, add the wax, and melt them together.

Ceratum sabinæ. *Lond.*
Cerate of Savine.

Take of
Fresh savine leaves, bruised, one pound;

Yellow wax, half a pound;
Prepared hogs lard, two pounds.

Boil the savine leaves with the lard and wax melted together, and express through linen.

This is an excellent issue ointment, being in many respects preferable to those of cantharides. If fresh leaves are not to be had, it may be made by mixing the dried leaves finely powdered, with any ointment of proper consistency.

Emplastrum oxidi plumbi semivitrei; olim Emplastrum commune. *Ed.*
Plaster of the Semi-vitrified Oxide of Lead, formerly Common Plaster.

Take of
Semi-vitrified oxide of lead, one part;
Olive oil, two parts.

Boil them, adding water, and constantly stirring the mixture till the oil and oxide be formed into a plaster.

Emplastrum lithargyri. *Dub.*
Litharge Plaster.

Take of
Litharge, in very fine powder, five pounds;
Olive oil, nine pounds;
Boiling water, two pints.

Mix them at a high temperature, (200° to 212°), constantly stirring until the oil and litharge unite, so as to form a plaster, occasionally supplying the waste of the water with fresh additions.

Emplastrum plumbi. *Lond.*
Lead Plaster.

Take of
Semi-vitrified oxide of lead in very fine powder, five pounds;
Olive oil, one gallon;
Water, two pints.

Boil together with a slow fire, constantly stirring them, until the oil and oxide of lead acquire by their union the thickness of a plaster. But it will be necessary to add a little more boiling water, if that employed at first be almost all consumed before the end of the operation.

Oxides of lead, boiled with oils, unite with them into a plaster of an excellent consistence, and forming a proper basis for several other plasters.

In the boiling of these compositions, a quantity of water must be added, to prevent the plaster from burning and growing black. Such water as it may be necessary to add during the boiling, must be previously made hot; for cold liquor would not only prolong the process, but likewise occasion the matter to explode, and be thrown about with violence, to the great danger of the operator: this accident will equally happen upon the addition of hot water, if the plaster be extremely hot. It is therefore better to remove it from the fire a little before each addition of water.

These plasters, which have been long known under the name of Diachylon, are common applications in excoriations of the skin, slight flesh wounds, and the like. They keep the part soft and somewhat warm, and defend it from the air, which is all that can be expected in these cases from any plaster.

Emplastrum resinosum; olim Emplastrum adhæsivum. *Ed.*

Resinous Plaster, formerly *Adhesive Plaster*.

Take of

Plaster of semi-vitrified oxide of lead, five parts;
Pine resin, one part.

Emplastrum lithargyri cum resina. *Dub.*

Litharge Plaster with Resin.

Take of

Litharge plaster, three pounds and a half;
Yellow resin, half a pound.

To the litharge plaster melted with a moderate heat, add the resin, reduced to a very fine powder, that it may melt quickly, and make a plaster.

Emplastrum resinæ. *Lond.*

Plaster of Resin.

Take of

Yellow resin, half a pound;
Lead plaster, three pounds.

Add the resin, in powder, to the lead plaster, melted with a slow fire, and mix.

These plasters are used as adhesives, for keeping on other dressings; for retaining the edges of recent wounds together when we are endeavouring to cure them by the first intention, and especially for giving mechanical support to new flesh; and contracting the size of ulcers, in the manner recommended by Mr Baynton, for the cure of ulcers of the legs, a mode of treatment so efficacious, that it has entirely changed the character of these sores.

Emplastrum assæ fœtidæ. *Ed.*
Plaster of Assafœtida.

Take of
Plaster of semi-vitrified oxide of lead;
Assafœtida, each two parts;
Galbanum,
Yellow wax, each one part.

This plaster is applied to the umbilical region, or over the whole abdomen, in hysteric cases; and sometimes with good effect.

Emplastrum gummosum. *Ed.*
Gum Plaster.

Take of
Plaster of semi-vitrified oxide of lead, eight parts;
Gum ammoniacum,
Galbanum,
Yellow wax, each one part.

Emplastrum ammoniaci. *Lond.*
Plaster of Ammoniac.

Take of
Strained gum ammoniac, five ounces;
Acetic acid, half a pint.
Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron pot, by the heat of a water-bath, stirring it constantly till it acquire a proper thickness.

Emplastrum galbani. *Dub.*
Plaster of Galbanum.

Take of
Plaster of litharge, two pounds;
Galbanum, half a pound;
Yellow wax, sliced, four ounces.
Add the plaster and wax to the galbanum, melted, and then melt the whole together with a moderate heat.

EMPLASTRUM GALBANI COMPOSITUM. *Lond.*
Compound Plaster of Galbanum.

Take of
Strained galbanum, eight ounces;
Plaster of lead, three pounds;
Turpentine, ten drachms;
Frankincense, in powder, three ounces.
With the galbanum and turpentine melted together, mix first the frankincense, and afterwards the litharge plaster, melted also with a very slow fire, and make a plaster.

ALL these plasters are used as digestives and suppuratives; particularly in abscesses, after a part of the matter has been maturated and discharged, for suppurating or discussing the induration which remains.

EMPLASTRUM OPII. *Lond.*
Plaster of Opium.

Take of
Hard opium, in powder, half an ounce;
Frankincense, in powder, three ounces;
Lead plaster, one pound.
Add the opium and frankincense to the melted plaster, and mix.

OPIUM plaster is applied in rheumatisms and other local pains, and is supposed to act by absorption.

CERATUM SAPONIS. *Lond.*
Soap Cerate.

Take of
Hard soap, eight ounces;
Yellow wax, ten ounces;
Semi-vitrified oxide of lead, powdered, one pound;
Olive oil, one pint;
Vinegar, one gallon.
Boil the vinegar with the oxide of lead, over a slow fire, constantly stirring, until they unite; then add the soap, and repeat the boiling in the same manner, until the moisture be entirely evaporated; and, lastly, mix with them the wax previously melted in the oil.

THIS acts in reality as a saturnine application, the soap having only the effect of giving a very convenient degree of adhesiveness.

EMPLASTRUM SAPONIS. *Lond. Dub.*
Soda Plaster.

Take of
Hard soap, sliced, half a pound;
Lead plaster, three pounds.
Mix the soap with the melted plaster, and boil them to the thickness of a plaster.

EMPLASTRUM SAPONACEUM. *Ed.*
Saponaceous Plaster.

Take of
Plaster of semi-vitrified oxide of lead, four parts;
Gum plaster, two parts;
Soap, sliced, one part.
To the plasters, melted together, add the soap; then boil for a little, so as to form a plaster.

THESE are supposed to be mild discutients.

UNGUENTUM OXIDI PLUMBI ALBI; vulgo UNGUENTUM ALBUM. *Ed.*
Ointment of White Oxide of Lead, formerly *White Ointment.*
Take of
Simple ointment, five parts;
White oxide of lead, one part.

UNGUENTUM CERUSSÆ sive SUBACETATIS PLUMBI. *Dub.*
Ointment of Ceruse, or of Subacetate of Lead.
Take of
Ointment of white wax, one pound;
Ceruse, in very fine powder, two ounces.
Make into an ointment.

THIS is a cooling desiccative ointment of great use when applied to excoriated surfaces.

UNGUENTUM ACETITIS PLUMBI; vulgo UNGUENTUM SATURNINUM. *Ed.*
Ointment of Acetate of Lead, formerly *Saturnine Ointment.*
Take of
Simple ointment, twenty parts;
Acetite of lead, one part.

UNGUENTUM ACETATIS PLUMBI. *Dub.*
Ointment of Acetate of Lead.

Take of
Ointment of white wax, one pound and a half;
Acetate of lead, one ounce.
Make into an ointment.

CERATUM PLUMBI SUPERACETATIS. *Lond.*
Cerate of Superacetate of Lead.

Take of
Superacetate of lead, in powder, two drachms;
White wax, two ounces;
Olive oil, half a pint.
Melt the wax in seven fluidounces of the oil, and gradually add to these the superacetate of lead, separately triturated with the rest of the oil, and stir the mixture with a wooden spatula until they unite.

THESE are also excellent cooling ointments, of the greatest use in many cases.

CERATUM PLUMBI COMPOSITUM. *Lond.*
Compound Cerate of Lead.

Take of
Solution of subacetate of lead, two fluidounces and a half;
Yellow wax, four ounces;
Olive oil, nine fluidounces;
Camphor, half a drachm.
Mix the melted wax with eight fluidounces of the oil, then remove from the fire; and as soon as the mixture begins to thicken, pour in, by degrees, the solution of subacetate of lead, and stir constantly, with a wooden spatula, until it be cold; then mix in the camphor, previously melted in the rest of the oil.

THIS composition was much recommended by M. Goulard. It differs from the other saturnine ointments only in consistence.

UNGUENTUM HYDRARGYRI; vulgo UNGUENTUM COERULEUM. *Ed.*
Ointment of Quicksilver, commonly called *Blue Ointment.*
Take of
Quicksilver,
Mutton suet, each one part;
Hogs lard, three parts.

Rub the mercury carefully in a mortar with a little of the hogs lard, until the globules entirely disappear; then add the rest of the fats.

This ointment may also be made with double or triple the quantity of quicksilver.

Dub.

Take of
Purified quicksilver,
Prepared hogs lard, equal weights.
Triturate them together in a marble or iron mortar, until the globules of quicksilver disappear.

Unguentum hydrargyri mitius. *Dub.*
Milder Qintment of Quicksilver,

Is made with twice the quantity of lard.

Unguentum hydrargyri fortius. *Lond.*
Stronger Mercurial Ointment.

Take of
Purified quicksilver, two pounds;
Prepared hogs lard, twenty-three ounces;
Prepared mutton suet, one ounce.
First triturate the quicksilver with the suet and a little of the hogs lard, until the globules be extinguished; then add the rest of the lard, and mix.

Unguentum hydrargyri mitius. *Lond.*
Milder Mercurial Ointment.

Take of
The stronger ointment of quicksilver, one pound;
Hogs lard, prepared, two pounds.
Mix them.

Linimentum hydrargyri. *Lond.*
Liniment of Mercury.

Take of
Stronger mercurial ointment,
Prepared lard, of each four ounces;
Camphor, one ounce;
Rectified spirit, fifteen minims;
Water of ammonia, four fluidounces.
First rub the camphor with the spirit, then with the lard and mercurial ointment, lastly, having gradually added the water of ammonia, mix all the ingredients together.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. *Ed.*
Ointment of Grey Oxide of Quicksilver.

Take of
Grey oxide of quicksilver, one part;
Hogs lard, three parts.

THESE ointments are principally employed, not with a view to their topical action, but with the intention of introducing mercury in an active state into the circulating system, which may be effected by gentle friction on the sound skin of any part, particularly on the inside of the thighs or legs. For this purpose, these simple ointments are much better suited than the more compounded ones, with turpentine and the like, formerly employed; for, by any acrid substance, topical inflammation is apt to be excited, preventing further friction, and giving much uneasiness. To avoid this, it is necessary, even with the mildest and weakest ointment, to change occasionally the place at which the friction is performed.

It is requisite that the ointments in which the mercury is extinguished by trituration should be prepared with very great care; for upon the degree of triture which has been employed, the activity of the mercury very much depends The addition of the mutton-suet, now adopted by London and Edinburgh, is an advantage to the ointment, as it prevents it from running into the state of oil, which the hogs lard alone, in warm weather, or in a warm chamber, is sometimes apt to do, and which is followed by a separation of its constituent parts. We are even inclined to think, that the proportion of suet, directed by the London college, is too small for this purpose, and, indeed, seems to be principally intended for the more effectual triture of the mercury; but it is much more to be regretted, that in a medicine of such activity, the colleges should not have directed the same proportion of mercury to the fatty matter.

EMPLASTRUM HYDRARGYRI. *Ed.*
Plaster of Quicksilver.

Take of
Olive oil,
Pine resin, each one part;
Quicksilver, three parts;
Plaster of semi-vitrified oxide of lead, six parts.
Melt the oil and resin together, and when this mixture is cold, let the quicksilver be rubbed with it till the globules disappear; then add, by degrees, the litharge plaster, melted, and let the whole be accurately mixed.

EMPLASTRUM HYDRARGYRI. *Lond.*
Plaster of Quicksilver.

Take of
Purified quicksilver, three ounces;
Sulphuretted oil, one fluidrachm;
Litharge plaster, one pound.
Triturate the quicksilver with the sulphuretted oil until the globules disappear; then gradually add the lead plaster melted, and mix the whole together.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. *Lond. Dub.*
Plaster of Gum Ammoniac with Quicksilver.

Take of
Gum ammoniac, strained, one pound;
Purified quicksilver, three ounces;
(Sulphuretted oil, a fluidrachm, *Lond.*)
(Turpentine, two drachms, *Dub.*)
Triturate the quicksilver with the sulphuretted oil, (turpentine, *Dub.*) until its globules disappear; then gradually add the gum ammoniac, melted, and mix them.

THESE mercurial plasters are considered as powerful resolvants and discutients, acting with much greater certainty for these intentions than any composition of vegetable substances alone; the mercury exerting itself in a considerable degree, and being sometimes introduced into the habit in such quantity as to affect the mouth. Syphilitic pains in the joints and limbs, nodes, tophi, and beginning indurations, are said to yield to them sometimes.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI. *Lond.*
Ointment of White Precipitated Quicksilver.

Take of
White precipitated quicksilver, one drachm;
Prepared lard, one ounce and a half.
Add the precipitated quicksilver to the lard, melted with a slow fire, and mix.

UNGUENTUM SUBMURIATIS HYDRARGYRI AMMONIATI. *Dub.*
Ointment of Ammoniated Submuriate of Quicksilver.

Take of
Ointment of white wax, one pound;
Ammoniated submuriate of quicksilver, an ounce and a half.
Make into an ointment.

THIS is a very elegant mercurial ointment, and frequently made use of in the cure of obstinate cutaneous affections.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. *Ed.*
Ointment of Red Oxide of Quicksilver.

Take of
Red oxide of quicksilver by nitrous acid, one part;
Hogs lard, eight parts.

UNGUENTUM SUBNITRATIS HYDRARGYRI. *Dub.*
Ointment of Subnitrate of Quicksilver.

Take of
Ointment of white wax, half a pound;
Subnitrate of quicksilver, half an ounce.
Make into an ointment.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. *Lond.*
Ointment of Nitric-oxide of Quicksilver.

Take of
Nitric-oxide of quicksilver, one ounce;
White wax, two ounces;
Prepared lard, six ounces.
Add the nitric-oxide, in very fine powder, to the wax and lard, previously melted together, and mix.

THE oxide should be reduced to very fine powder before it be added to the axunge. This is an excellent stimulating ointment, often of very great service in indolent ill-conditioned sores, when we wish to excite them to greater action. As an eye-ointment, its effects are most remarkable, in the cure of all inflammations of the tunica conjunctiva, and more particularly when there is a thickening and swelling of the inner membrane of the palpebrae. In such cases, it seems to act with much greater certainty, if applied immediately after the eyelids have been scarified. In inflammation, accompanied with specks, it has a most powerful effect in removing both. It is also useful in all those ophthalmias which so frequently appear after small pox, measles, and eruptive diseases of the hairy scalp. It is used in the same quantity, and in the same manner as the Unguentum nitratis hydrargyri; and if it prove too stimulating, it may be diluted with axunge. It is useful to know that if it be mixed with any ointment containing resin, the red oxide is very quickly converted into the black, and the ointment gradually loses its red colour, and passes through olive-green to black.

UNGUENTUM SUPERNITRATIS HYDRARGYRI. *Dub.*
Ointment of Supernitrate of Quicksilver.

Take of
Distilled quicksilver, one ounce;
Nitrous acid, by weight, two ounces;
Olive oil, one pint;
Prepared hogs lard, four ounces.

Dissolve the quicksilver in the acid; mix the solution with the oil and lard, melted together, and make into an ointment, in the same manner as the ointment of nitrous acid.

UNGUENTUM HYDRARGYRI NITRATIS. *Lond.*
Ointment of Nitrate of Quicksilver.

Take of
Purified quicksilver, one ounce;
Nitric acid, eleven fluidrachms;
Prepared hogs lard, six ounces;
Olive oil, four fluidounces.

First dissolve the quicksilver in the acid, and then mix the solution, while hot, with the lard and oil previously melted together.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS; vulgo UNGUENTUM CITRINUM. *Ed.*
Stronger Ointment of Nitrate of Quicksilver, commonly called *Citrine Ointment.*

Take of
Purified quicksilver, one part;
Nitrous acid, two parts;
Olive oil, nine parts;
Hogs lard, three parts.

Dissolve the quicksilver in the acid; then beat up the solution in a glass mortar, with the lard and oil when getting stiff, after having been melted together, until an ointment be formed.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. *Ed.*
Milder Ointment of Nitrate of Quicksilver.

This is prepared in the same way (as the Ointment of nitrate of quicksilver), with three times the quantity of oil and hogs lard.

THIS ointment, when prepared with lard alone, soon becomes so very hard, that it is necessary to mix it with fresh axunge before it can be used. The substitution of the oil for

part of the axunge obviates, in a great measure, this inconvenience. The hardening is entirely owing to the excess of the acid in the solution of mercury. Hence the London college have acted in 1809 very inconsiderately in increasing the quantity of nitrous acid, from two ounces by weight to two fluidounces, which caused, as Mr Phillips found, violent action, and the evolution of much noxious vapour, when the solution of mercury is mixed with the axunge, and renders the ointment extremely corrosive. They have in 1815 corrected this error: But the property which nitrate of mercury, prepared by ebullition, has, of being decomposed by waer, furnished me with an easy way of getting rid of all excess of acid, and of procuring the subnitrate of mercury in the state of the most minute division possible. An ointment, prepared with this subnitrate, had a most beautiful golden colour; after six months was perfectly soft; and had all the properties desired.

When the citrine ointment is too hard, it should be softened by triturating it with lard or oil; for, if melted with them, it very soon hardens again.

Medical use.—This ointment has the very best effects in herpes, tinea capitis, and similar obstinate cutaneous affections, and is almost specific in psorophthalmia, in those slight excoriations of the tarsi, attended with extreme itching, and in all the inflammations of the eyes, attended by eruptive disorders of the hairy scalp or face. It is most conveniently and effectually used, by rubbing a piece of the size of half a garden pea, with the point of a hair pencil, over the tarsi, among the roots of the ciliæ, and allowing a small quantity to get on the inner membrane of the palpebræ. In obstinate cases, a weak solution of muriate of mercury, used as a collyrium along with this ointment, proves a most powerful remedy.

Unguentum subacetitis cupri. *Ed.*
Ointment of Subacetite of Copper.

Take of
Resinous ointment, fifteen parts;
Subacetite of copper, one part.

Unguentum aeruginis. *Dub.*
Ointment of Verdigris.

Take of
Ointment of white resin, one pound;
Prepared verdegris, half an ounce.
Make into an ointment.

This ointment is used for cleansing sores, and keeping down fungous flesh. Where ulcers continue to run from a weakness in the vessels of the parts, the tonic powers of copper promise considerable advantage.

It is also frequently used with advantage in cases of ophthalmia, depending on scrofula, where the palpebræ are principally affected; but when it is to be thus applied, it is, in general, requisite that it should be somewhat weakened by the addition of a proportion of simple ointment or hogs lard.

Unguentum oxidi zinci impuri. *Ed.*
Ointment of Impure Oxide of Zinc.

Take of
Simple liniment, five parts;
Prepared impure oxide of zinc, one part.

Unguentum tutiæ. *Dub.*
Ointment of Tutty.

Take of
Ointment of white wax, ten ounces;
Prepared tutty, two ounces.
Make into an ointment.

Unguentum oxidi zinci. *Ed.*
Ointment of Oxide of Zinc.

Take of
Simple liniment, six parts;
Oxide of zinc, one part.

Dub.

Take of
Ointment of white wax, one pound;
Oxide of zinc, an ounce and a half.
Make into an ointment.

Unguentum zinci. *Lond.*
Ointment of Zinc.

Take of
Oxide of zinc, one ounce;
Prepared lard, six ounces;
Mix.

These ointments are chiefly used in affections of the eye, particularly in those cases where redness arises rather from relaxation than from active inflammation.

CERATUM CARBONATIS ZINCI IMPURI; olim CERATUM LAPIDIS CALAMINARIS. *Ed.*

Cerate of Impure Carbonate of Zinc, formerly *Cerate of Calamine.*

Take of
Simple cerate, five parts;
Prepared impure carbonate of zinc, one part.

CERATUM CALAMINÆ. *Lond.*

Cerate of Calamine.

Take of
Calamine, prepared,
Yellow wax, of each half a pound;
Olive oil, one pint.
Mix the oil with the melted wax, then remove from the fire; and, as soon as the mixture begins to thicken, add the calamine, and stir the cerate constantly until it be cold.

UNGUENTUM CALAMINARIS. *Dub.*

Calamine Ointment.

Take of
Ointment of yellow wax, five pounds;
Prepared calamine, one pound.
Make into an ointment.

THESE compositions resemble the cerate which Turner strongly recommends in cutaneous ulcerations and excoriations, and which has been usually distinguished by his name. They appear, from experience, to be excellent epulotics; and, as such, are frequently made use of in practice.

EMPLASTRUM OXIDI FERRI RUBRI; olim EMPLASTRUM ROBORANS. *Ed.*

Plaster of Red Oxide of Iron, commonly called *Strengthening Plaster.*

Take of
Plaster of semi-vitrified oxide of lead, twenty-four parts;
Pine resin, six parts;
Yellow wax,
Olive oil, each three parts;
Red oxide of iron, eight parts.
Grind the red oxide of iron with the oil, and then add it to the other ingredients, previously melted.

Emplastrum thuris. *Dub.*
Plaster of Frankincense.

Take of
Plaster of litharge, two pounds;
Frankincense, half a pound;
Red oxide of iron, three ounces.
Sprinkle the oxide into the plaster and frankincense, melted together, stirring the mixture at the same time, and make into a plaster.

This plaster is used in weakness of the large muscles, as of the loins; and its effects seem to proceed from the mechanical support given to the part, which may also be done by any other plaster that adheres with equal firmness.